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Process Precedes Product: a Developing Paradigm
Design in Developing Countries Strand
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Abstract
This paper makes the case that design, particularly in the context of non-western, developing, countries requires a different framework for both execution and evaluation from those frameworks that have become standard in western economies and cultures. The paper examines the central proposition that design in this context should be more appropriately regarded and understood as process, rather than as residing in the formal qualities and the cultural, social and economic symbolism of the resulting objects.

To do this it makes reference to two recent design-led projects and other material from within the research group of which the author is a member, in order to examine issues related to intention, measures of success and of sustainability, benefits, indigenous skills, timescales, education and training, markets and distribution, local and “global” influences and the people involved throughout.

The paper highlights the need for increased understanding of the context and greater acknowledgement, on the part of western designers, educators and historians of, amongst other factors, traditional/indigenous knowledge, experience and skills, which appear to be crucial to success in this, and possibly other, aspects of design.

Introduction
“Design aims to seduce. The sign of a great design is not that it performs the task for which it is intended particularly well, but that it demands to be possessed”\(^1\).
Thus the opening article in a recent edition of The Independent Magazine. But surely that is what you might expect of a Saturday life-style supplement; the discerning reader knows better. But don’t such representatives of the ‘quality’ press, besides helping to form opinion, also act as a barometer of prevailing current opinion? There is overwhelming evidence, in every Western, Northern, industrialised, capitalist country, that design is seen and valued by industry and government for its ability to weave a sales-boosting, profit-generating spell over all aspects of business. This is not to deny the contribution that design, wisely used of course, can bring to efficient and effective business and consumers. But, this paper suggests, we do need to stop, draw breath, look around and ask ourselves whether this is all that design can do – to bring greater excess of luxury to the 6% of the

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world population that owns 59% of its wealth. .... if you keep your food in a refrigerator and your clothes in a closet; if you have a roof over your head and have a bed to sleep in; you are richer than 75% of the entire world population” \(^2\) [to quote from “The Sustainable Village”].

In responding to the call for papers for this conference; to its clear invitation to engage with the “non western” and the “interface between the industrialised and developed worlds”, this paper proposes that design has a crucial role to play in this context and a real opportunity thereby to elevate its theory and practice to a level of service to humanity that would start to gain it the place to which it aspires, alongside that of other true professions.

Design has had, over the last fifty years, a small, but growing, interest in playing a part in the alleviation of poverty in the peripheral regions and countries on this planet. The history has been one of small numbers of designers, usually working alone and sometimes with the spasmodic support of design bodies or international organisations, making un-coordinated, disconnected excursions into this territory.

The moment seems to have arrived for a more coordinated move into that arena. The author might even suggest that such a move could benefit the wealthier nations as they are forced to confront the impact that diminishing resources, destabilised climates, and demands for greater equity in access to resources, will have on their own lifestyles and quality of life.

**Time for a more coordinated approach**

In July 2001 a seminar was held in Cardiff, UK, entitled “Design & Development.” The thirteen participants, from a variety of backgrounds and disciplines, were invited for their known interest in the proposition that design has a role to play in the context of a developing world.

The single most positive outcome from the seminar was a unanimous decision by the participants to form into a permanent research group with the remit to continue to work in this area. The group has now been operating for just over one year under the name *The Cardiff Group*. It is shortly to publish the proceedings of the seminar\(^3\) and its website\(^4\) is also about to go live. The latter will carry details of the group’s aims, objectives, members, activities, outcomes and forward plans.

The principal strength of the group is its interdisciplinarity - its ability to bring together a wider range of skills, experience and resources, in the pursuit of its gaols.

One of the clearest points of agreement at the seminar was that design, in this context, is principally about process and it is that aspect of design that is the focus

\(^2\) The Sustainable Village  http://www.thesustainablevillage.com/minature_earth/

\(^3\) Design and Development: Seminar Proceedings, UWIC Press, September 2002

\(^4\) http://www.thecardiffgroup.org.uk
of this paper. It is possible to argue that process in design is always of prime importance, because without it design is a random activity that cannot be counted as a discipline. Process is often regarded as informed by intuition; but to be conscious of what it is; to try to understand and develop it, adds to rather than takes away from the potency of the discipline.

In this paper, process is the over-arching, organising framework, embracing strategy and method, deployed by the project teams in response to the contexts within which the projects are situated. The constraints on this paper limit it to brief descriptions of the project contexts. The contexts are critical, as they shape the process. Process, in that sense, stands between context and product and must precede any worthwhile ‘product’.

Two case studies

The two case studies that have been compiled for this paper are of recently completed design-led projects, carried out in development contexts. I gratefully acknowledge the generosity of the following members of the two organisations responsible for the two projects, in providing me with the necessary information and insights. They are:

- Rob Aley
  The Intermediate Technology Development Group (ITDG)\(^5\)  
  ITDG is an international non-governmental organisation (NGO), which specialises in helping people to use technology for practical answers to poverty. Its work is informed by the four core principles:
  - Putting people first
  - Working in partnership
  - A concern for future generations
  - Respect for diversity

- David Constantine, Sarah Beattie and Chris Rushman
  Motivation Charitable Trust (Motivation)\(^6\)
  
  Motivation is a “UK registered charity working primarily in developing countries to improve the quality of life of wheelchair users”. Its vision is to “initiate self-sustainable projects that will improve the quality of life of as many wheelchair users worldwide as possible”. The key words are ‘quality of life’; ‘people focused’ and ‘needs-led’.

One project is concerned with the design, manufacture and distribution of a single product, a Peanut Butter Maker, set within a larger programme of commercial/industrial regeneration in Zimbabwe, starting at the level of

\(^5\) http://www.itdg.org
\(^6\) http://www.motivation.org.uk
individuals, families and cooperatives and starting to achieve informal export sales. This would be challenging enough, but the current economic and political climate in Zimbabwe raises the stakes.

The other project was generated as a response to an overwhelming demand to run individual projects throughout Africa, by devising a training course that will provide a supply of skilled technologists, with some design skills, to the whole of Africa. It aims to work with existing indigenous skills and knowledge and to develop new ones.

While the first project is typical of a range of projects carried out by ITDG, the second project is, however, not typical for Motivation. It is their first project to prioritise training as a key requirement for long-term, sustainability – not just for one specific location, but for the whole of Africa.

As a consequence, the resulting ‘product’, a training course, is also atypical. It has been a learning process for the team and for Motivation. Its development has been organic; ideas have changed as it has developed; local partnerships have become increasingly important and there has been increased use of local partner ideas. The team has aimed at making the course generic and therefore suitable as a basis for other courses elsewhere.

Both teams consist of a mixture of local staff and specialist, almost always design-trained, British, members.

The timescales of the two projects are similar. One spanned six months (January - June 1998) – within a larger five-year project. The other spanned ten months (June 1999 – March 2002) following a research period in 1997/98.

It is the practice of both organisations to set up project teams in the locality of the need. These teams are responsible for detailed needs assessments and research, feasibility studies, setting up local partnerships, funding, supplies, training local staff in production, testing, training users, marketing, distribution and product design and development. In the case of Motivation, its teams’ responsibilities include training local staff in assessment of individual user needs and training users in user-skills, product adjustment and maintenance, knowledge of their specific needs and abilities and active rehabilitation training to help people gain the most from their wheelchairs through mobility skills training and health education7.

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7 http://www.motivation.org
Case Study

ITDG Peanut Butter Maker

This project, carried out by ITDG in Zimbabwe, over six months in 1998, is concerned with the design and development of an item of capital equipment – a Peanut Butter Maker (PBM). The Peanut Butter Maker project was part of a five-year project to support small-scale artisanal metalworking workshops in Zimbabwe.

One of the project facilities is a Tool-hire Centre where artisans can hire time on serviced machines. Another facility is a Business Shop, which finds new markets for artisans; promotes and markets products (including the peanut butter maker); provides a retail outlet for a small number of products (around 10 – 12); and provides quality assurance for the range of products, product guarantees and after-sales support, including repair and maintenance.

There is some collaboration with a sister project in Kenya.

The Starting point: the need, problem or issue

The twin starting points for this project were the need to create viable, sustainable enterprises for the end users of the product; and to increase the product range for the product makers.

The Beneficiaries

In addition to the two groups central to the needs that the project seeks to address: the users of the machines and the makers of the machines, a third emerged during the project and that was the employees of the tool-hire centre – now, after 4-5 years, a viable, sustainable private company.

ITDG defines a sustainable enterprise (for the purposes of its own operations) as one that is independent, makes a profit and meets development objectives.

The project aims

One of ITDG’s aims was to focus on marginalized groups. Peanuts are grown locally and are harvested by poor women so, it was reasoned, there would be a market for a PBM and jobs in processing were likely to go to women.

The intended users, therefore, were small community groups consisting primarily of women. Purchase would be through the Business Shop.

Within the larger project there is a fund for product development. This can be used to buy artisans out of the making to sell cycle, to concentrate on product development and innovation. In addition to creating new or improved products, this also develops existing and new indigenous skills.
The context

Political and economic

Possibly the most powerful of these is the current politico/economic situation in Zimbabwe. Before the recent economic collapse of the country there was already high inflation (60% in 2000), but the Zimbabwean government was receptive to external funding and agencies. The current land reforms and subsequent sanctions have led to a further deterioration in the politico/economic situation, which is not conducive to development. The country also has the highest incidence of AIDS in the world (over 25% of the adult population in 1999).

Most of the artisans who were employed to work on the PBM are trained workers who have been made redundant by larger engineering concerns – they have skills and abilities, but no capital.

Those whose employment is precarious, or who have been made redundant, are looking for alternatives – small and medium size enterprises (SMEs) are one form of alternative.

Paradoxically, if the economy recovers then formal employment will increase and enterprise-driven SMEs will suffer.

Market intelligence and marketing have been strengthened significantly through being increasingly focused on the Business Shop. Distribution is based on ‘take away’ upon purchase, which eliminates this overhead from the costs. Distribution by this method is often over a very wide area and distance, including neighbouring countries, and this increases export revenue.

Funding

As part of the larger project this was one-third funded by the E.C., with the rest from the UK Government, Trusts and Foundations – a typical funding structure for ITDG.

Project team

The project manager for the PBM worked with a small number of local artisans with support from the ITDG regional office in Harare, which employs some 40-50 Zimbabweans.

Project Structure

The project structure was devised by the project manager and followed a typical model for ITDG. The opening stages followed a fairly familiar, systematic sequence:

- Product search, extending to other countries
- Competition search, including USA
• Setting minimum criteria for performance, cost and energy requirements.

**Resources, skills and knowledge**

The resources represented by the tool-hire centre and the business shop have already been referred to. (Repeat Business Context diagram, OHT).

The product development team members acquired specific product development and production skills, as well as generic and transferable skills, through the project, as well as others relevant to the project context.

The employees of the business shop gained collective and individual market-related skills and knowledge, including those relating to quality assurance.

No conscious training was provided in design, development, or production although there is good evidence that workshop owners tend to be innovators. ITDG has considered the possibility of identifying the most innovative and creative individuals and running design workshops for them, over a small number of days. It is believed that some participants might be able to afford the costs of attending.

It has been ITDG’s experience that wherever a project is located, there are always a number of individuals that has the capacity and/or inclination to innovate and this is a factor that ITDG tends to foster.

**Outcomes**

The Peanut Butter Maker has rapidly become a recognised product in Zimbabwe and was an immediate major success in terms of numbers of sales.

ITDG’s analysis, in terms of capacity, price and added value of the butter [five times the cost of the unprocessed peanuts], is that the design is right.

It is easy to use and out-performs the competition.

Each machine sold creates one full-time job for its user.

The user buys in the nuts and the butter is sold locally – minimising supply and distribution distance, time and costs.

As already noted, the machine distribution costs are similarly minimal due to take away on purchase.

A machine owner might, in turn, employ others as users.

A typical purchaser would be a wealthy, middle class individual, with a large family, who would buy two or three machines to provide employment for family members.

The cycle of making, distribution, ownership and use of the machines and subsequent sales of butter can revolutionise lives and incomes. Machines are covered by a one-year guarantee, underwritten by the Business Shop.
The project is judged to be a commercial success. This is confirmed by accounts and the added value is easily calculated. Most of the success is measured at the Business Shop, which is now judged to be a viable business.

**Evaluation**

ITDG does not and cannot spend much of its resources on monitoring of, or following up, their projects. But there have been some follow-ups with individual users. Evaluation techniques are therefore strictly pragmatic, as with the evidence for commercial success.

However the project is judged to have met all of the needs identified at the outset, with a significant measure of success. All three groups that the project aimed to benefit have been shown to benefit to a significant and sustainable level through the overall economic/commercial cycle, the sales of machines and individual income based on the added value of the product.

There is an apprenticeship culture (especially in Kenya, which is relevant to the sister project). But experience would support the view that while this characteristic might help manufacture, it is not particularly conducive to innovation and might even suppress it.

Team members have found it stimulating and liberating to see and contribute to the development of a new, viable, product in a context where little changes.

**Case Study**

**Motivation Wheelchair Technologists Training Course**

The second project, carried out by Motivation mainly in Tanzania, over ten months in 1999/2000, following research in 1997/98, is concerned with the design, development and piloting of a training course – a one-year, full-time Wheelchair Technologists Training Course (WTTC), part of the ‘Wheelchairs for Africa’ project.

**The Starting point: the need, problem or issue**

The starting point for the project is described by Motivation as the need to address the very large number of requests for help that it was receiving from many African countries (over 60 requests for help with wheelchair provision, from 25 different African countries). While the subject of this case study dealt with a specific issue, that of developing an indigenous skill-base and resource, it led directly to the overarching ‘Wheelchairs for Africa’ project, with a wider remit concerned with the need for long-term, sustainable, provision of wheelchairs, suitable for local needs and environments, throughout Africa.
The Beneficiaries

The ultimate beneficiaries of the WTTC are wheelchair users throughout Africa. The immediate beneficiaries are the course graduates.

The project aims

The overall aim of the WTTC was “to train people from all over Africa everything they need to know to establish and run a wheelchair workshop”.

Subsidiary aims were for local trainers to be able to teach students how to design and build wheelchairs suitable for their local environment and how to manage a successful production and distribution service.

The course covers basic marketing, but Motivation is also working in the countries of the first graduates to help develop wheelchair financing systems which include development of credit schemes and wheelchair funds.

It also aims, through working with the course graduates, to carry out “active rehabilitation training to help people gain the most from their wheelchair through mobility skills training and health education”.

The Context

Location

The WTTC is based at the Tanzanian Training Centre for Orthopaedic Technologists (TATCOT). Training Centres for Orthopaedic Technologists were set up in a number of developing countries by the German, Sepp Hein in the 1980s. The Tanzanian Government now recognises Wheelchair Technologist as a profession, as a result of this project; the course is the only WTTC and awards the first recognised Certificate in Wheelchair Technology in the world.

The WTTC students come from all over Africa – so there will be a wide variety of resulting designs, responding to a very wide range of situations and needs.

Political and economic

Motivation has been active in grouping together relevant NGOs to strengthen the position of disabled peoples’ organisations and to lobby for funding for wheelchairs.

Funding of the project, the trainers and students and the subsequent manufacture and distribution of the wheelchairs is problematic, as wheelchair users are poor. Many of the students so far have been sponsored by USAID.

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8 Motivation website  http://www.motivation.org
9 Correspondence with Motivation
10 Motivation website  http://www.motivation.org
Cultural

Although the graduates have carried out design exercises, studied aspects of design theory and completed simple design projects, they feel they “do not know about design”. It is therefore necessary to find out - and address within the course - what students understand by ‘design’.

The prevailing characteristics and expectations of learning – large classes, learning by rote, no speaking in class – are not conducive to creativity and personal initiative.

Markets, distribution

The market for a specific wheelchair design is relatively local, since the wheelchair is designed for the local need and environment.

Funding

The EC contributed 1/2 of the project costs, with the rest coming from a variety of other sponsors. Again, this is a typical funding structure for Motivation.

Project team

Motivation followed its normal practice in setting up a local project team, responsible for all aspects of the project, consisting of a core of British specialists: a designer/technical specialist, a designer/course coordinator, a project manager, an occupational therapist, together with a staff of 10 Tanzanians.

The WTTC itself employed the recommended minimum of 2 trained technicians as workshop staff – there are funding constraints on any increase above that number – and has appointed local partners in all countries participating in the project.

Project Structures

The project structure was devised by the core project team, working from first principles and the local context, in the complete absence of any precedent. Previous projects conducted by Motivation, elsewhere in the world, provided valuable experience and transferable, generic skills. The stages followed were:

- Design the course
- Design, develop and produce the course material: manuals, lesson plans, work sheets, design problems
- Set up the training workshop
- Train the course staff
- Pilot the course – including teaching and assessment of students.
- Evaluate the course

Motivation was directly involved in delivery of course during the first year, acquiring crucial knowledge and confirmation of needs in the process.
The five students - from Zimbabwe, Uganda and Tanzania all come from existing workshops, so had jobs to return to. The two trainers have carried out post-course follow-up visits to all five graduates.

In the second year of the course, Motivation was involved in developing and ‘concretising’ – not yet monitoring – the course. Again the course consisted of five students from the same three countries.

In the third year there were eight students from an extended range of countries, which included Nigeria, Zambia and Ethiopia. This was the intended full complement of the course and was achievable due to being housed in larger, permanent, facilities built during the second year.

**Resources, skills and knowledge**

The course employs a systematic approach to the technology of wheelchair design, manufacture and use. It has moved beyond the ‘traditional’ basis of local training for carrying out own repairs and repairs and making for others, to acquiring a greater all-round knowledge of the technology and the process of basic design and production.

A fundamental and crucially need is that of the training of course staff.

The project and course teams acknowledge that, through this project and its larger framework project, they have gained greater skills and knowledge in education and training in this context.

The indigenous course staff and graduates have developed skills and knowledge in the broad field of technology, which for the purposes of the course, is understood to include some design-related topics, e.g. problem solving, design evaluation, costing, design management11.

Graduates have also developed skills and knowledge in designing and building wheelchairs suitable for their local environment; managing a successful production and distribution service; teaching students to develop ways of ensuring that wheelchairs are available to the poorest members of their community. In due course, these skills will be applied by the graduates in training their own client/users.

The course also has a strong emphasis on management skills, including finance and costing.

Motivation brought to the project the principle that users should pay something, for their course and subsequently for a wheelchair, as they have evidence that this raises respect for the service or product.

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11 Motivation Wheelchair Technologists Training Course manual
Costs are means tested and some graduates might subsequently have access to funding, advice, or a support centre.

Outcomes

The initial outcomes were judged to have met the initial requirements: There is a tested, generic course design, with one cohort of graduates and another currently enrolled on the course gaining the range of skills and knowledge intended.

The course is the key to a cycle of provision, in a potentially growing number of African countries, with the real prospect of ‘Wheelchairs for Africa’, of sustained enhancement of the quality of life of wheelchair users in Africa, through increased availability of appropriate wheelchairs.

Evaluation

The WTTC has been evaluated by Motivation against the original project objectives through following-up the graduates in their own countries.

Motivation’s initial evaluation indicates that this is possibly one of its more sustainable projects to date.

The EC has also conducted its own initial evaluation and the external examiner for the Training Course debriefed individual students regarding the qualities of the course.

Sustainability objectives require testing over a range of criteria commensurate with the complexity of the project context, involving crucially, local partners and the spread of beneficiaries, over a longer time-scale.

A more comprehensive project evaluation is planned for March 2003 – 1 year after completion, and an external evaluation is planned for September 2003 – 18 months after completion.

A number of specific findings have been generated by Motivation’s own evaluation to date:

Motivation has identified the need to encourage the local partner to contribute more to planning rather than relying on their feedback since they have a tendency of ‘agreeing’ with the Northern NGO.

As it was the first time Motivation had attempted to establish a structured training course and also their first project in Africa, they did not fully understand or anticipate the complexities involved.

Neither did the team sufficiently recognise the amount of extra time that would be needed for training trainers, or the factors that influence and tend to extend the overall time scale.
The team’s experience has led to the belief that a longer involvement, perhaps with more part-time involvement rather than a continuous presence, could be a better approach in Africa.

The team has decided that they will now encourage two students from each workshop to attend the course together, to support each other after graduation.

Motivation believes there is high potential for replication of the course elsewhere and there is already interest expressed by other accredited prosthetics and orthotics centres.

**Conclusions**

The conclusions are reflective of the original intentions for the paper, as outlined in the abstract and introduction, and of the aims of the Conference as set out in the call for papers.

The frameworks adopted for the execution and evaluation of these projects are, of necessity, markedly different from those that have often become standard in western, northern design practice. The differences lie in the initial needs research and feasibility studies, in the multi-disciplinary role of the “designers”, in the extreme breadth and depth of knowledge required to achieve viable solutions in complex and marginal situations, and in the direct involvement of the project team in piloting, monitoring, follow-up and evaluation on the ground.

There is a rapidly developing and consolidating body of knowledge and skill in both organisations that revolves around process and its effectiveness in particular situations. This is design as process, driven by the need to fulfil the essentially practical requirements of each project and reflective of the visions and aims of both organisations – people first; alleviation of poverty; enhancement of the quality of life; concern for future generations and respect for diversity.

While, within the process, there is an appropriate and proper concern for the aesthetic qualities of the outcomes, the central concerns are those which enable the products to make a demonstrable, and in many cases, significant difference to individuals and to the economies within which those individuals live.

It is believed that these case studies demonstrate that a greater commitment to the process of design, as described, as distinct from an over-concern with the visual, fashionable, ephemeral qualities of the outcomes, is crucial to successful design in challenging and critical circumstances.

It is significant that both organisations identified the starting point for the projects in simple, high level terms, with implicit long-term goals:

- viable, sustainable enterprises for end users
• increase in the product range
• the need to address very large numbers of requests for help.
• long-term, sustainable, provision of wheelchairs, for local needs and environments, all over Africa.

That both projects are parts of larger projects serves to highlight what is probably the principal process issue: that design is not conducted in a social, cultural, political, commercial or industrial, vacuum. Design is crucially influenced by and responsive to a range of issues, concerns, constraints and needs that stretch out beyond the immediate product. A full understanding of the significance of that is vital to the success of any design-led project – wherever conducted and whoever its beneficiaries.

There is an emphasis throughout on the necessity of placing projects within their overall contexts and on the value of being able to take a more holistic view of the issues and problems being confronted. It is clear that the acute awareness of and responsiveness to the project contexts by the designer/leaders of these two projects had a profound influence on the processes and on the nature of the outcomes and was important for their success.

It can be argued that design, as practiced in these and similar projects, is skilled at inquiry into, understanding of and responding to context and that it has, as a consequence, developed a process, or processes for doing this. From the case studies it is evident that design-trained individuals are essentially multidisciplinary and have an array of transferable skills that are particularly valuable in the development and management of the process of design, beyond the more confined act of object-centred designing. Corlett12 (1997) emphasises that “There are skills that designers possess in analysis and synthesis, which could be used for other purposes than the creation of objects”. This view is also supported by Balaram (1998)13 writing about the Indian context “… there is another kind of design which is prevalent largely in the third world … such design is developmental in nature and is non-tangible or invisible to people who are used to looking for an end product”

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**ITDG: Peanut Butter Maker**

**Business/production context**

- **Individual Workshops**
  - (1-6 artisans)
  - some use Tool Hire Centre

- **Tool Hire Centre**
  - Product sales & making/repairs commissions via Business Shop

- **Business Shop**
  - Off-shelf machine + service package

- **Customers**
  - for range of making/repairs commissions

- **Sales & marketing**