DESIGN INGENUITY ADDRESSES DEVELOPING WORLD ISSUES

Dual economies, like South Africa, offer challenging environments for product developers. Language and cultural diversity often means that assumptions about product acceptance imported from developed economies fail to gain acceptance. Devices that are contextually sensitive and perhaps over-engineered seldom stand up to the rugged African environment in which they need to work.

The wind-up radio that caught the world's imagination a decade ago established ...XYZ Design's reputation as innovative solution providers to emerging market challenges.

Among the main products developed by the firm are bicycle assembly kits allowing owners to custom-build a robust cycle that suits different needs and an electronic device that delivers greater accuracy to sociological and market research questionnaires.

Research tool

The Qbee is an electronic hand-held device that sociological and market researchers can use to accurately gauge the attitudes and feelings of people – irrespective of language and cultural norms. The device can be used on illiterate people.

Byron Qually, XYZ design director, notes that "obtaining sensitive information from respondents using unfamiliar technology was a challenge. Apart from usual ergonomic constraints required of handheld devices, subconscious user interactions should ideally not influence the quality of data collated. The completed design aimed to tone down technical complexity and encourage user/device partnering whereby the device acted as a kind of confidante".

Prototypes of the Qbee – developed by the Qbee Survey Consortium – were used by the Foundation for Alcohol Related Research (FARR) and the University of Cape Town in a foetal alcohol syndrome survey conducted in De Aar last year.

While the research findings await publication the researchers' reaction to the efficacy of the Qbee in gathering quality data was extremely positive, says Chris Meintjies who is the consortium's project manager for the development and market acceptance of the tool.

"For the first time researchers conducting an attitudinal survey believed they were getting accurate responses


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to personally sensitive questions from both illiterate people and people with a low education."

The recorded questions – moulded into the appropriate local dialect of Afrikaans – were relayed through earphones so the respondents could use the Qbee in private without the presence of an interviewer. A brief recorded tutorial, which taught the respondents how the device worked, was followed by the survey questions. The respondents recorded their response to the research questions by pushing a tensioned toggle button to the appropriate point on the scale.

Meintjies says that from the researchers preliminary results, the responses captured by the device were more accurate than those gathered through other market research devices, primarily because the respondents were more honest in their responses. There was no personal contact with an interviewer whom they might fear would be judgmental or could not be trusted with sensitive information.

He adds that the Qbee supports attitudinal survey best practice requirements as its built-in motoric resistance enables its respondents to give graded answers to questions, including the measurement of attitudes and perceptions of people.

"Researching social issues has always been a challenge for researchers because it's not easy to accurately put feelings into words. The De Aar trial enabled researchers to gather more accurate responses than is currently possible using the commonly used Likert Scale of multiple answers. With the latter the quality of the responses was always questionable in the case of illiterate respondents."

What excites Meintjies about QBee's potential is the impact it will have on research among the world's one billion illiterate adults, as well as among children.

"South Africans grappling with African challenges have pooled their ideas, experiences and skills to innovate

The Qbee is an electronic hand-held device that sociological and market researchers can use to accurately gauge the attitudes and feelings of people.

an electronic device that has universal application across nations, cultures, languages and educational levels. For the first time there is a tool that breaks down the barriers that challenge academics' accurate understanding of attitudes, feelings and behaviour. It is a custom-designed and built research tool.

"Other electronic devices – such as Personal Data Assistants (PDAs) and mobile phones – that have been adapted for research purposes do not go far enough because many of the respondents are not comfortable with the technology that is commonplace in literate, technologically advanced societies."

The Qbee was born of the frustrations lifelong researcher Dr De Wet Schutte of UniSearch Research Consultants experienced while doing research HIV/AIDS and other socially stigmatised diseases among illiterate and low educated people in various African countries.

He developed the Schutte Scale,now commonly used in South Africa, of which the tensioned slider manually registers responses in a face-to-face interview with a researcher. But he believed that it was possible to develop a 'friendly electronic version' that could make a 'faceless face-to-face' interview possible and in doing so, enhance the access to sensitive data from respondents.

The consortium – comprising Dr Schutte, market researcher Chris Meintjies of Five Senses, learning materials developer James Thomas of Just Think, and Grant Broomhall and Michael Walton of Far South Networks – pooled talents to research and develop the new-age market research device.

The ideas and preliminary designs were taken to ...XYZ Design to design and develop into a device that is comfortable and straight-forward to use, while being robust and made of material acceptable to users.

"Without ...XYZ Design's involvement in the development it is unlikely that Qbee would have had such a successful field trial. The respondents felt comfortable using it and it was robust enough to preserve the integrity of the data despite the rugged environment. The result was the exciting blending of high-tech first world electronics with third world needs," says Meintjies.

The Qbee consortium is awaiting the final academic evaluation of the device from the FAAR/CPUT researchers before finalising its design and taking it into commercial production late next year. It is likely to sell for US$300 per device.

As a multi-function interactive motoric survey and assessment hardware device it can be used for a wide range of data capturing including surveys, attitudinal assessments, multiple-choice tests and exams and census data.

It stores questionnaires in onboard memory. These questions are then transferred to a respondent via an audio stream that can be delivered via a speaker or audio headset enabling respondents to listen to the questions in private and then, using the motoric resistance device (a tensioned toggle button), record their answers or "expressions of feeling".

Cycle diversity

The North West Department of Transport first planted the seed for non-motorised modes of transport among the design community in 2005 when it requested the South African Bureau of Standards (SABS) Design Institute to develop specifications for tender documents for the building of donkey carts.

This prompted a two-week Interdesign 2005 workshop that brought to the North West Province 60 designers from across the world to examine non-motorised rural transport solutions. ...XYZ Design's Roelf Mulder led the bicycle and tricycle workshop at this event.

Following this event the ...XYZ Design was commissioned by SABS to develop its modular bicycle idea.

The modular bicycle.

The design criteria were that the bicycle should be easily built, maintained and repaired in an isolated rural environment; components should be uncomplicated and there should be no gears.

In mid-2008 the modular bicycle, along with other prototypes evolved from Interdesign 2005, underwent field trials in North West Province. ...XYZ Design's bicycle attracted a lot of attention and comment from local communities.

The modular bicycle can be assembled in a variety of ways depending on the user's needs. It could be a conventional two-wheeler, a tricycle, a tandem or two bicycles side-by-side with a materials-carrying platform bolted between them. The permutations are varied and numerous.

...XYZ Design's bicycle was designed to be symmetrical, irrespective of its final assembly and height. It can be built for both male and female cyclists. As gears were left out of the design – in support of the uncomplicated maintenance requirements – the bicycle is suited only to flat terrain.

Rugged rural conditions where access to suppliers is limited and skills are basic were uppermost in the designers' minds. The bicycles can be assembled without the need for specialised equipment and, if need be, can be repaired with scrap metal, wood, fence wire or whatever materials are at hand.

"The bicycles must continue to be useable if factory-made components are unavailable. We see these bicycles being used to carry water containers, building materials, patients to clinics and goods to market.

People's livelihoods will depend on them so they cannot remain idle because a component is unavailable. They must continue to be robust machines, even with makeshift repairs," Mulder says.

"The idea lends itself to a franchise operation geared towards rural entrepreneurial development. A franchisee could open a shop stocked with the bicycle's components and assemble them to order. If this person has basic welding skills, he could repair the bicycles as well."

The central building block of the bicycle is the back wheel frame including the saddle and the front headset which includes the front-wheel fork and handlebar. The chain and braking mechanism are the components that cannot be left to local ingenuity and will be supplied by the manufacturer.

Many of the materials suggested by the design are re-cycled. For example, the rear mud guard is an old bicycle tyre turned inside out.

"We have put a lot of thought into designing this bicycle, but it lends itself to further ingenuity by the users as they adapt it to their conditions and needs. This is why it is modular, made from metal and held together with roofing bolts or pieces of wire," says Mulder.

...XYZ Design believes that African product developers are coming up with innovative solutions to universal problems because resources are at a premium. "We understand the robust environments in which our clients' products will be used and the comparatively little money they have available to buy them.

"This challenges our imagination. We get tremendous satisfaction knowing that the creative ideas we develop into worthwhile and useful products are increasingly finding acceptance in global markets." <

The materials-carrying platform can be bolted to the modular bucycle.