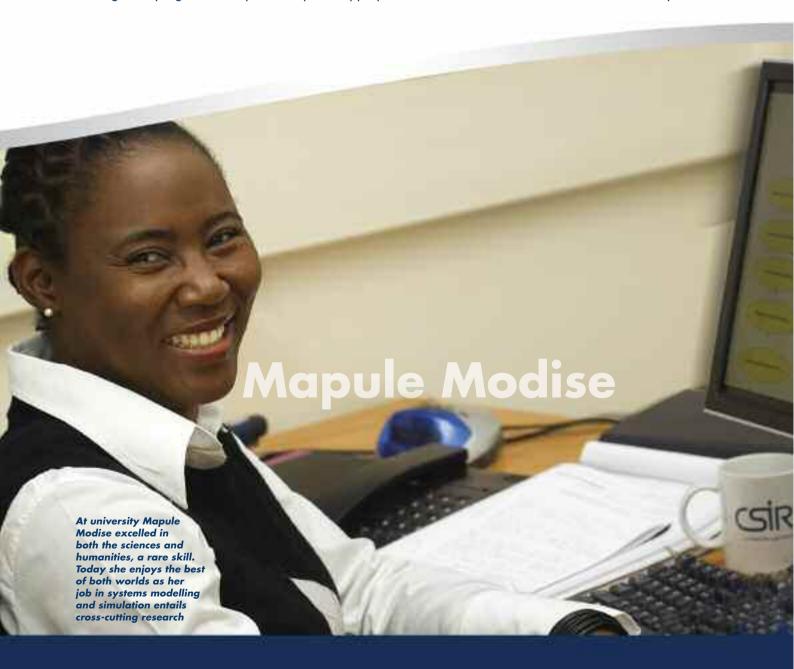# Cross-cutting HCD learning opportunities

THESE ARE LEARNING PROGRAMMES that address the whole range of competencies that are important to the CSIR; from research skills to professional management and leadership competencies. These could be delivered by way of group learning events (such as workshops, seminars, colloquia and conferences), or individual learning relationships that are tailor-made to address specific needs (such as mentorship and coaching programmes). The CSIR Innovation, Learning and Leadership Academy (CiLLA) specialises in conceptualising, designing and facilitating these programmes in partnership with appropriate stakeholders within the CSIR and external experts.

Mapule Modise

At university Mapule Modise excelled in both the sciences and humanities, a rare skill. Today she enjoys the best of both worlds as her job in systems modelling and simulation entails cross-cutting research

Jack of all trades and master of operations research: Mapule Modise

At school, CSIR researcher Mapule Modise was very conscious that most of her friends either liked mathematics and the science disciplines, or history and languages in the humanities domain. She loved and excelled in both streams. At university this duality continued as she majored in psychology and operations research. Today, working in the field of systems modelling and simulation, and specifically socio-technical systems, at CSIR Defence, Peace, Safety and Security, her worlds have come together.

MAPULE IS NO ORDINARY black woman, her story is not one of plain-sailing, but still she oozes with confidence and zest to succeed in life. Growing up as a teenager in Sharpeville in the Vaal Triangle, gunshots formed part of the background noises. "This hampered my studies because fear of stray bullets forced us to read our books while seeking refuge under the beds," she remembers. In the end it resulted in her having to redo her matric, says the woman who is now married to a chemistry professor at the Vaal University of Technology.

She is passionate about science and engineering: "Science offers a platform to continuously search for new knowledge that can be used to change things for the better," she says. "Specifically, I like operations research, as it cuts across several disciplines and attempts to tackle problems on their merit, using relevant tools from any source." She says her field of expertise draws heavily on physical science, applied mathematics, industrial engineering, social sciences, economics, statistics and computing.

Operations research is a well established field in South Africa; it's tried and tested and finds wide application in many sectors, including government, finance, production, mining and management. "It is, however, not well known as a career option, especially for attracting individuals from previously disadvantaged communities. Marketing the discipline remains a major challenge facing the operations research community in South Africa today," Mapule says.

She is the mother of two daughters, aged 17 and three. She boasts two Honours degrees, in psychology and operations research, which she obtained from the former Potchefstroom University, now known as North-West University.

Since joining the CSIR, Mapule has worked with a group of researchers on the National Poverty Alleviation System (NPAS). This project is aimed at using systems methodologies – developed in the natural sciences and engineering environments – and applying these to a better understanding of the NPAS.

The envisaged outcomes are twofold. Firstly, to establish a suitable framework for analysis, and secondly, to describe and analyse the system in such a way that stakeholders and decision-makers can engage in a more effective poverty alleviation system. Although the systems analysis framework to be developed will be specific to the poverty alleviation system, there are implications for a methodology based on systems engineering to be applicable to social systems in general.

According to her, this is a huge and complex project, involving many stakeholders with different objectives, which requires a multidisciplinary approach. Naturally, she has had to work with researchers from various disciplines across the CSIR. And the lessons learned within a short space of time, have been incredible.

"Environments characterised by strong social and technical components are often ill defined, with power struggles between stakeholders and poorly understood interaction between people and processes. There is fuzziness, put bluntly, it is often a mess. This is where the tools of my trade come in handy.

"For me, there is nothing as exhilarating as applying problem structuring tools such as Bayesian networks, morphological analysis, soft systems methodologies and system dynamics to clarify the concepts and gain a common understanding of the problem," she says.

Driven by a never-say-die-attitude, Mapule says she is also developing the system dynamics capability in CSIR Defence, Peace, Safety and Security. System dynamics aims to understand the underlying structures that cause dynamic behaviour and explores structural and policy changes aimed at improving resultant behaviour.

Mapule is studying towards her Master's degree through the University of South Africa and her topic is 'Using system dynamics to model the interactions and the dynamics of poverty dimensions over time, with the view to assist in the design of effective poverty alleviation policies and strategies'.

Her philosophy for life is: Failure is but a delayed success. When not working, Mapule likes planting and tendering her small vegetable patch. Although her job as a researcher is demanding, she enjoys working with and meeting new people with fresh ideas. "Operations research is a cross-cutting research discipline, so I push myself to constantly be involved with people outside my environment. My work allows me to be a jack of all trades and master of operations research," she smiles.

For Mapule, it is not her challenging past that inspires her, but rather her two girls – they are her reason for waking up in the mornings and going to work in the hope of making a difference in the lives of many, including her daughters.

– Mzimasi Gcukumana

"Science offers a platform to continuously search for new knowledge that can be used to change things for the better."