



Universities as Living Labs for sustainable development: A global perspective

Walter Leal Filho, Baltazar Andrade Guerra, Mark Mifsud and **Rudi Pretorius** use case studies from Brazil, Malta and South Africa to reflect on how the Living Labs approach can contribute towards a more sustainable future.



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Living Labs are conventionally not necessarily associated with universities. However, with the increasing pressure on universities to conduct research that has relevance to society, to assess regional development needs and beyond, and to address real-world sustainability issues, universities have a huge potential contribution to make in this regard. They frequently not only initiate innovation, but also work in terms of the longer time horizons required of sustainable development initiatives¹. The three case studies dealt with in this article present different approaches to university-initiated Living Labs for sustainable development from across the world, each illustrative of a different type of innovation, in a dissimilar context, with diverse actors, and with a variety of impacts and challenges.

THE CASE OF THE FIRST SOLAR SCHOOL IN BRAZIL

The University of Southern Santa Catarina (Unisul) was founded in 1964 in the city of Tubarão in Southern Brazil. Today, Unisul is one of the largest universities of the state, with nearly 30,000 students, and it develops and implements many strategies to achieve local sustainable development through research, teaching and outreach. One example of a Unisul programme is 'Promoting

Renewable Electricity Generation in South America' (REGSA), an international collaborative project in which Unisul was the Brazilian partner. Stated as "Contributing to increase the use of electrical energy obtained by means of renewable energy generation in South America as a way to improve the environmental conditions, enhance the energy security, and alleviate the poverty of the project areas", it was a partnership between the Hamburg University of Applied Sciences, the Catholic University of Bolivia, the University of Chile and Unisul, and funded by the European Union². Unisul was tasked to develop a pilot project to promote renewable electricity generation in Brazil, serving as a model of good practice.

A primary school in a Brazilian rural community was chosen by Unisul to create the first 'solar school' in Brazil. They did this by looking at generating solar energy, improving their energy efficiency, luminous and thermal comfort, and promoting awareness on renewable energy and sustainability. This project transformed the school into a Living Lab for sustainable knowledge development for both Unisul academics (the students and professors of the school) and the local community (**Figures 1 and 2**). The school currently has 20 collaborators and nearly 200 students with ages ranging from 4 to 15 years old³.



▲ **Figure 1. View of Roberto Schütz School, showing the grid of solar panels used for electricity generation** (© Wellyngton S de Amorim).



▲ **Figure 2. Cultural festivities at the Roberto Schütz School form part of the sustainability triad consisting of the physical, economic and sociocultural environment** (© Wellyngton S de Amorim).

To improve energy efficiency and luminal comfort in the school, Unisul made aesthetic reforms in the classrooms and in the library, replacing 48 lights, 192 lamps, and painting the walls and ceiling; this was also found to help with improving students' performance and concentration. Additionally, a solar water heating system was installed to provide occupants with warm water in the kitchen and bathrooms. The installation of 27 photovoltaic panels supplied the school's energy needs and any surplus is shared on the grid⁴. A garden and an orchard were also developed so students could grow their own food and develop better eating habits.

The REGSA team, led by Unisul, also gave several lectures and workshops to the students and the community on photovoltaic panels, energy efficiency, and sustainable technologies. The school, supported by Unisul, also promoted several programmes, lectures and workshops that discussed the challenges of sustainability, the limitation of natural resources and the need to promote environmental conservation (Figure 3).

Additionally, the engagement of many stakeholders (i.e. members of the local community, the university's academic staff and the students in the school) allowed them to experiment with real-life practices linked to renewable and sustainable technologies, and education for sustainable development.

THE UNIVERSITY OF MALTA: A NEW DEGREE

The Centre for Environmental Education Research (CEER) at the University of Malta was initiated in 2004 with the intention of functioning as a centre of excellence for environmental education research in the Mediterranean. CEER seeks to stimulate change towards a sustainable society through provision of opportunities for environmental education that may empower citizens, irrespective of their age, gender or socio-economic status, to actively participate in forums for environmental decision making, and to take part in initiatives aimed at the promotion of a good quality of life. The Centre recently launched its first Masters in Education for Sustainable Development (MESD). This is a three-year course that targets teachers and education experts, and aims to provide different perspectives on sustainable development, contextualised with reference to the interaction of environmental, societal and economic concerns⁵.

The MESD aims to present students with different perspectives of: i) the environment; ii) environmental education and education for sustainable development; iii) the interaction between the environment and society; and iv) sustainable development. The course is structured through a philosophy that will enable students to study issues relating to education in sustainable development in the context of different environmental realities, and to experience different environmental, social, cultural, political



▲ **Figure 3. Projects on renewable energy by students at the Roberto Schütz School (© Wellyngton S de Amorim).**

and educational perspectives. Additionally, students are able to access and critically evaluate research on education for sustainable development and to develop the skills and attitudes necessary to promote sustainable lifestyles.

As part of the MESD, students are required to work on realistic practical projects with real end users in mind. Therefore, their studies have direct relevance to improving local people's lives. This includes reference to the concepts of nutrition and sustainability, sustainable transport, waste and recycling, engaging locals in sustainability and creating more effective teaching and learning frameworks. The focus is mainly on the local scenario, but the results and methodology will also be useful in the wider context.

The first cohort of students for the course contributed extensively to the evolution of the MESD. As the taught component was nearing its end, several discussions on how the course should be improved for its second intake were conducted. Through the analysis of a number of suggestions thus obtained, some potential improvements emerged. The most relevant to Living Labs included suggestions on the facilitation of interdisciplinary work, and the exchange of expertise on sustainable development both within the course and in the local community. Outreach to other communities, nationally

and internationally, and the production of educational materials were also cited. The Living Labs methodology was successfully utilised in the MESD because it provides a range of applied learning opportunities, linking students to the wider community and facilitating behavioural change.

UNIVERSITY OF SOUTH AFRICA: OPEN & DISTANCE LEARNING

Engaging students in real-world situations and to get in touch with sustainability issues, has a unique meaning in open and distance learning (ODL). Since these students are typically not on campus, teaching and learning takes place in the living or working contexts in which they find themselves. This creates a unique application of the Living Labs approach. The University of South Africa (Unisa) is well known and focuses exclusively on ODL, ranging from short courses and certificate programmes to three to four year degrees and up to doctorates. Unisa currently offers study opportunities to more than 400,000 students, mostly from South Africa, but also other African countries and the rest of the world.

The vision of 'The African university shaping futures in the service of humanity' drives Unisa to make authentic contributions to society, and to nurture a critical citizenry to ensure sustainability⁶.



▲ Figure 4. Workshop on community asset mapping conducted by staff members of the Department of Geography in Koffiekraal/Brakkuil, South Africa (© Rudi Pretorius).

“Students, academic staff, researchers, estates or facility staff and external stakeholders are brought together in a collaborative framework to contribute to real-world sustainability knowledge.”

At Unisa, the Living Labs approach features prominently in terms of the focus areas of teaching and learning, research and community engagement, through which students, academic staff, researchers, estates or facility staff and external stakeholders are brought together in a collaborative framework to contribute to real-world sustainability knowledge. Taking some of the undergraduate study programmes in the School

of Ecological and Human Sustainability (SEHS) at Unisa as examples, the transformation towards e-learning and the development of the associated information and communication technology infrastructure play an important role to facilitate collaborative learning between students and also between students and lecturing staff. This type of interaction encourages students to reflect not only on their own frames of reference, but also to learn about the viewpoints of others.

Furthermore, through inquiry-based and work-integrated learning, students can apply their insights to various local and employment contexts⁷⁸. This empowerment to make a contribution to deal with environmental issues at local level addresses an identified need in the African context. Undergraduate study programmes offered in the SEHS relate to environmental management, nature conservation and horticulture. These programmes utilise a blended approach to teaching and learning, which is unique due to the variety of ways through which ODL, practical sessions and work-integrated learning are combined to provide students with rich environments for active learning. At junior postgraduate level, this is taken a step further with the facilitation of student-driven research projects in the context of real-world problem scenarios.

associated with increasing enrolments, decreasing budgets, and ageing infrastructure. In this situation, Living Labs can facilitate experiential learning, reduce the carbon footprint, and use institutional resources efficiently¹². Thus Living Labs offer a framework to connect students to applied research, synthesise teaching, and bring social responsibility to realise universities' potential to address sustainability challenges¹¹.

Although the varied nature of and linkage to local contests of Living Labs for sustainable development are clear, their flexibility, simplicity and adaptability cannot be disputed. Despite these advantages, their implementation and execution by universities require careful, integrated planning. They should not be regarded as a panacea to deal with all sustainability issues in all contexts, i.e. they have limitations. An accessible platform is therefore required to be continuously updated and through which experiences can be shared and disseminated. This will feed a vibrant research agenda with results feeding back to current as well as future projects in a continuous improvement cycle. **ES**

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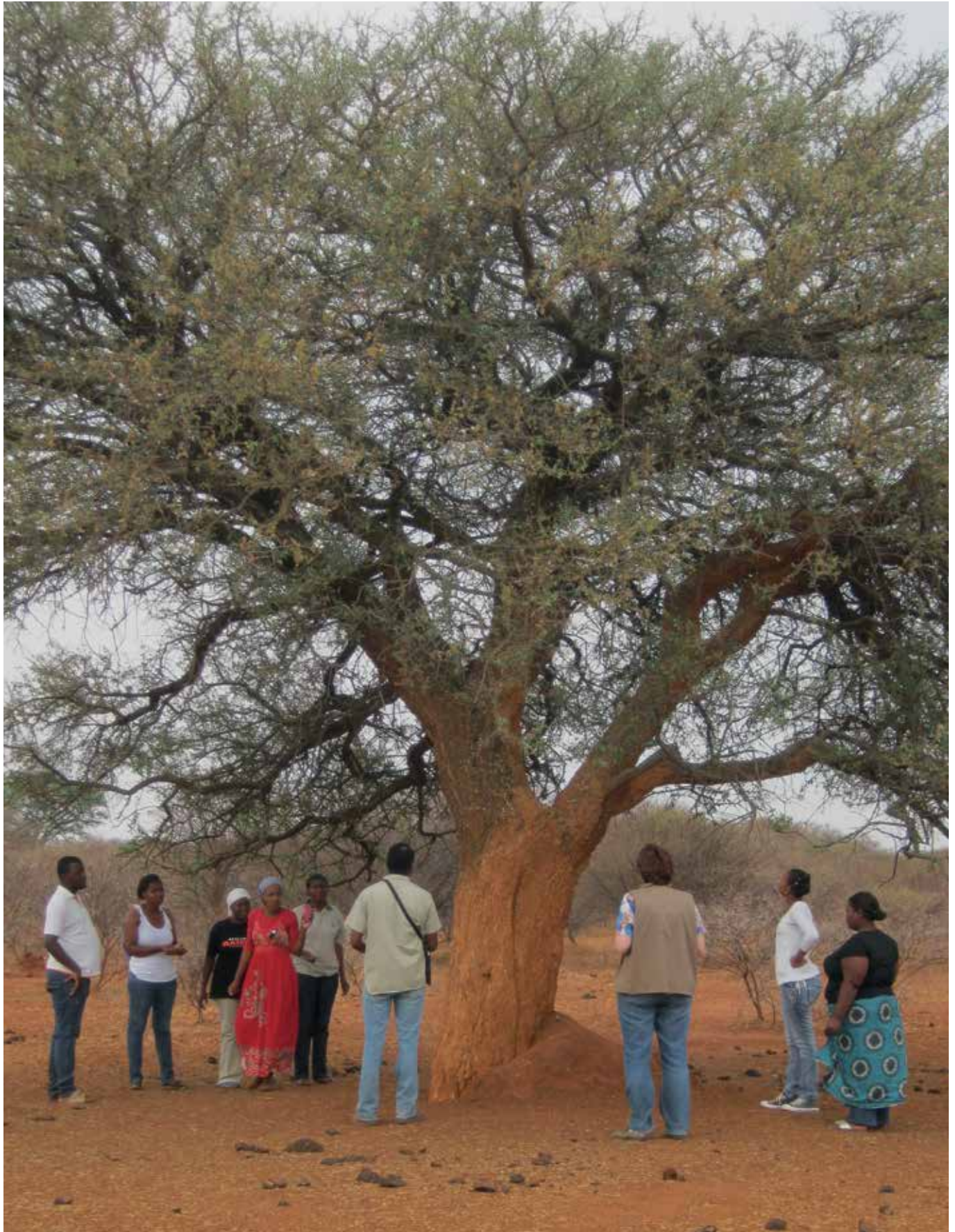
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▲ **Figure 6. A visit to a historic tree forms part of the village tour designed by the community interest group in Koffiekraal/Brakkuil (© Rudi Pretorius).**