

# **FROM TECHNICAL SKILLS TO ECONOMIC OPPORTUNITY: TUT'S INTEGRATED TECHNICAL AND ENTREPRENEURSHIP TRAINING PROGRAMME**

## **SUBMITTING UNIVERSITY**

Technology Station in Electronics (TSE)  
Faculty of Engineering and the Built Environment (FEBE)  
Tshwane University of Technology (TUT)

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## **SUMMARY OF THE IMPACT**

South Africa's high levels of youth unemployment are compounded by limited access to practical technical training and the business knowledge required to convert skills into income. Since 2021, the Technology Station in Electronics (TSE) at Tshwane University of Technology (TUT) has trained more than 3,400 people through applied programmes in smartphone and appliance repair, automotive electrical systems, robotics, electronics and related technologies. The programmes are designed particularly for unemployed youth and women and combine practical technical competence with entrepreneurship education, assessment and certification.

A 2025 follow-up survey of 331 participants conducted by the TSE shows that the intervention produced outcomes beyond training attendance. Of the respondents, 84.6% were aged 18–34, and 54.8% were women. Among the 328 people who answered the post-training application question, 219 (66.8%) reported using their new skills, where 176 had undertaken small private repair jobs, and 43 were applying them through a business. In a separate question, 113 of 327 respondents reported that they had started a business using the skills they had learned. Participants also described greater confidence, the

ability to diagnose and repair devices, reduced personal repair costs and new opportunities to earn supplementary income.

## **UNDERPINNING ACADEMIC WORK**

The impact arose from interdisciplinary, academically based teaching and societal engagement undertaken by the TSE within TUT's Faculty of Engineering and the Built Environment (FEBE). The underpinning fields are **Engineering and Technology**, together with entrepreneurship and business development. TSE staff used their expertise in electronics and mechanical engineering, manufacturing, maintenance, product development, and technical training to design applied learning programmes focused on industry-relevant tasks. The training model combines technical theory with extensive hands-on work using real devices, components, diagnostic tools, soldering equipment and workshop tools. Participants learn safe working practices, fault identification, dismantling, component- or assembly-level repair, reassembly and functional testing. Learning is reinforced through formative and summative assessment and competency verification.

Technical instruction is complemented, where applicable, by structured entrepreneurship training that develops communication, pitching, and leadership skills; cultivates a positive entrepreneurial mindset; introduces participants to small-business operations and structures, including cooperatives; and helps them assess their potential as future entrepreneurs. Participants are also guided to identify community needs, generate viable business ideas and develop practical, actionable business plans aligned with their individual goals. This integration was deliberate; technical competence alone does not automatically create livelihoods, while entrepreneurship training without a marketable skill provides limited opportunity. The programme therefore creates a pathway from practical capability to private repair work, self-employment or enterprise development.

## **NARRATIVE DESCRIPTION OF THE IMPACT**

The programme responds to a persistent South African challenge; many unemployed people have the motivation to work or start a business but lack access to specialised equipment, experienced facilitators and practical training. At the same time, households and small enterprises require affordable services to maintain smartphones, appliances and other technologies. The TSE designed its programmes to address both sides of this problem by building local technical capability and helping participants understand how to offer that capability as a service to their local community.

Beneficiaries are recruited through TUT and partner networks, including public agencies, municipalities, community organisations, and enterprise development partners. Participants are onboarded, receive practical instruction, complete assessment

activities and are tested for competency prior to certification upon successful completion. In selected programmes, participants also receive a set of starter tools intended to reduce the cost of entering repair work as a community-based small business. The learning environment is practice-based. Participants dismantle and reassemble devices, use soldering and diagnostic techniques and tools, identify faults, replace components where appropriate and test completed work. This provides direct experience of tasks that beneficiaries can perform after training, rather than limiting learning to theoretical knowledge.

The programme's reach is demonstrated by more than 3,400 people trained since 2021, including 839 during 2025. The 2025 survey provides additional demographic evidence. Of the 331 respondents, 280 were aged 18–34, 181 were women, and participants came from seven different provinces in South Africa namely Gauteng, North West, Limpopo, Mpumalanga, KwaZulu-Natal, Eastern Cape and the Western Cape. The intervention, therefore, reached beneficiaries beyond conventional university students and was concentrated among groups facing barriers to economic participation. The impact is most clearly demonstrated by the application of the skills after training. Of 328 valid responses, 219 participants reported applying what they had learned. The 176 respondents undertaking small private jobs were using their skills within households or communities, while 43 reported using them through a business. A separate question recorded 113 self-reported business starts.

Because participants may interpret the terms “business”, “side hustle” and “small private jobs” differently, the TSE uses the 219 respondents who applied their skills as the most conservative measure of behavioural impact. The 113 reported business starts are treated as a self-reported enterprise indicator that will continue to be monitored and verified through follow-up engagement. Participants' qualitative feedback provides insight into the nature of the change. Respondents described learning to solder and desolder, diagnose faults, identify electronic components, open and reassemble smartphones and repair household appliances. Several stated that they could now repair their own devices, undertake work for community members, earn additional money or pursue a small repair business. These outcomes demonstrate a shift from dependence on external repair services towards technical self-reliance and income-generating capability.

The programme also provides wider community benefits. Participants who apply their skills locally increase access to affordable repair services and help extend the useful life of electronic devices and appliances. Repairs may reduce replacement costs for households and small enterprises and help reduce electronic waste. The causal relationship to TUT's work is direct. Respondents attributed their new competence to practical training, access to tools and equipment, facilitator support, and the integration of technical and business content. Of 330 valid responses, 321 (97.3%) rated the skills

as useful or very useful. Furthermore, 319 of 331 respondents, or 96.4%, rated their overall experience as good or excellent, while 325 of 326 respondents, or 99.7%, indicated that they would recommend the programme to others. These satisfaction measures are not presented as societal impact. Still, they corroborate the relevance and accessibility of the educational intervention that led to the reported skill application.

The survey also supports continuous programme improvement. Participants requested longer courses, more practical time, exposure to additional devices and fault conditions, advanced repair content, and stronger post-training mentorship. The TSE uses this feedback to refine course duration, practical activities, progression pathways, and links to enterprise development support.

## **EVIDENCE AND SOURCES TO CORROBORATE THE IMPACT**

1. TSE training attendance records and certification records for programmes delivered. Redacted documents available to protect individual privacy as per the Protection of Personal Information Act.
2. TSE annual performance reports and reports submitted to funders confirming participant numbers, programme delivery and participation by targeted beneficiary groups. This includes the Technology Innovation Agency Quarterly and Annual Reports and the merSETA Chair of Intelligent Manufacturing Progress and Close-Out Reports.
3. Training Feedback Survey 2025: 331 responses collected between 14 May and 26 June 2025 that include demographic data, programme ratings, post-training skills application, self-reported business activity and open-ended beneficiary feedback.
4. Partner correspondence, photographs and public communications corroborating recruitment, programme delivery and beneficiary participation.

## **ANY OTHER INFORMATION CONSIDERED RELEVANT.**

The programme contributes to Sustainable Development Goals, specifically SDG 4 on Quality Education, SDG 5 on Gender Equality, SDG 8 on Decent Work and Economic Growth, SDG 9 on Industry, Innovation and Infrastructure, SDG 10 on Reduced Inequalities and SDG 12 on Responsible Consumption and Production.

Its significance lies in combining university technical expertise, specialised facilities and entrepreneurship education in a form accessible to people who are not necessarily enrolled as university students. The model is transferable across repair, electronics, robotics and emerging-technology programmes while retaining a common emphasis on practical competence, economic participation and community benefit.

**SIGNED OFF ON BEHALF OF THE UNIVERSITY BY A DESIGNATED SENIOR OFFICER**

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**Date**

**14 July 2026**