

Strategic note

# **Expanding Inclusive Entry Pathways into the Green Economy**

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# Table of Contents

<i>Acronyms</i> .....	ii
<b>Introduction</b> .....	1
<b>Programme Description</b> .....	3
Selection .....	5
Curriculum.....	5
Delivery Approach .....	6
<b>Evolution of the Programme</b> .....	7
Supply-side Issues.....	8
Demand-side Issues.....	9
Programme Re-design .....	9
Programme Outcomes.....	11
<b>Programme Challenges and Achievements</b> .....	13
Laying the Ground for Demand-led TVET Programmes.....	14
Delivering Dual Training.....	16
<b>Lessons and Way Forward</b> .....	21
<i>About the Author</i> .....	24

# Acronyms

<b>ASDC</b>	Artisan Skills Development Centre (of the Ekurhuleni East College)
<b>COIDA</b>	Compensation for Occupational Injury and Diseases Act
<b>DHET</b>	Department of Higher Education and Training
<b>DSPP</b>	Dual Skills Pilot Programme
<b>EEC</b>	Ekurhuleni East College
<b>GIZ</b>	Deutsche Gesellschaft für Internationale Zusammenarbeit
<b>IOPSA</b>	Institute of Plumbing (South Africa)
<b>IRM</b>	Installation, Repair and Maintenance
<b>NBI</b>	National Business Initiative
<b>NQF</b>	National Qualifications Framework
<b>PIRB</b>	Plumbing Industry Registration Board
<b>QCTO</b>	Quality Council For Trades and Occupations
<b>SAIDE</b>	South African Institute of Distance Education
<b>SD4GE II</b>	Skills Development for the Green Economy Programme
<b>SMEs</b>	small and medium enterprises
<b>SWH</b>	solar water-heating
<b>TIPS</b>	Trade & Industrial Policy Strategies
<b>TVET</b>	Technical and Vocational Education and Training

1

# Introduction

Persistent and increasingly high levels of youth unemployment in South Africa present one of the greatest obstacles to achieving equitable and inclusive economic growth. Many young people today find it impossible to successfully transition to the labour market, thus joining a growing proportion of people in our society who remain marginalised, and trapped in a negative cycle of exclusion from economic participation.

One major obstacle to successful transition is the profound disconnect between the technical and vocational education and training (TVET) system and the workplace. While significant numbers of school leavers enter the TVET sector every year, there are few pathways from the system into workplaces. In fact, the TVET system does not necessarily increase employment prospects, which further contributes to sustained youth marginalisation.

*“ While significant numbers of school leavers enter the TVET sector every year, there are few pathways from the system into workplaces.*

The Green Skills TVET programme, implemented by the National Business Initiative (NBI) together with a range of partners, seeks to intervene at the interface between the supply and demand for skills. This approach unlocks opportunities for dual training (integrated institutional and workplace training) and employment in the industrial economy, while addressing the disconnect between TVET provision and skills demands in the workplace. The programme forms part of the broader Installation, Repair and Maintenance (IRM) Initiative.<sup>1</sup>

Between January 2019 and October 2020, the NBI implemented a programme to expand opportunities for young TVET college students. This occurred in partnership with Mesopartner (on behalf of The Deutsche Gesellschaft für Internationale Zusammenarbeit's (GIZ) Skills Development for the Green Economy [SD4GE II] Programme), the Institute of Plumbing (IOPSA) and the Ekurhuleni East TVET College, with combined funding from the Nedbank Foundation, the SD4GE II programme and the Confederation of Danish Industries. The aim is to enable these students to enter into employment and learning pathways in the plumbing industry, with a specialised focus on solar water-heating (SWH) installation and repair. The programme represents the second iteration of this plumbing industry partnership, which first started in 2017.

This strategic note captures the achievements and lessons generated through this iteration of the partnership, and the implications for establishing more inclusive pathways into the green economy. The note then describes how these lessons are being consolidated towards achieving scalable outcomes.

<sup>1</sup> The IRM Initiative is a multi-stakeholder partnership established to expand entry-level learning and employment opportunities for young TVET students across the industrial economy, with a particular focus on the green economy. The IRM is a scalable model of employment creation, targeting entry-level jobs in artisanal small and medium enterprises (SMEs), and reducing barriers for youth who aspire to be artisans.

# 2

## Programme Description

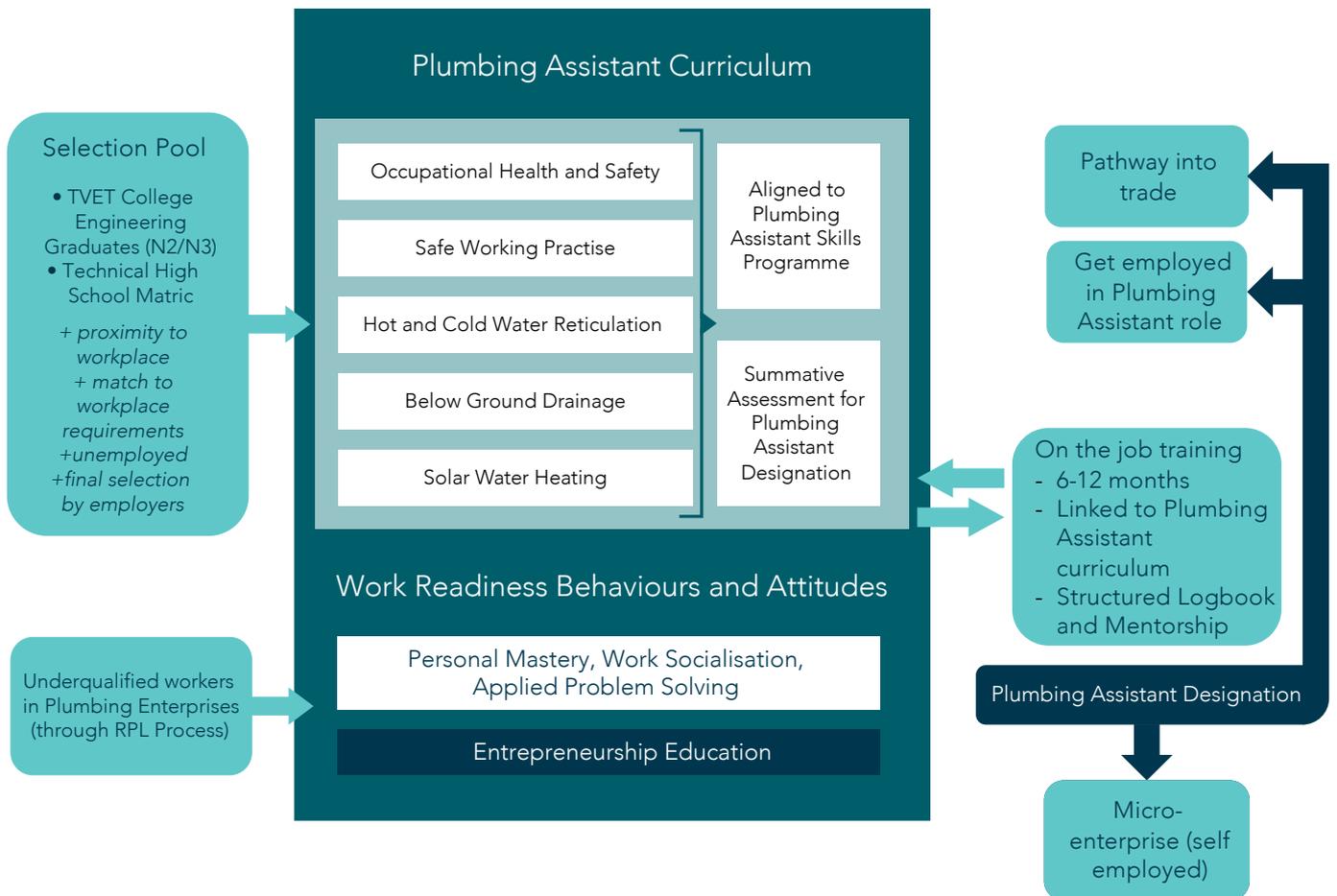
The Green Skills TVET plumbing programme seeks to expand opportunities for young people to enter the plumbing industry, gain employment and work towards becoming a fully qualified plumber.

The key objectives are to:

- Unlock the demand for entry plumbing skills across plumbing enterprises (in the form of “Technical Operator Practitioners”);
- Develop an appropriate and industry-recognised learning programme for TVET college students that aligns to in-demand Technical Operator skills, including a specialised focus on SWH;
- Equip TVET colleges to deliver this demand-led, dual learning programme, and prepare candidates for entry into these workplaces to be further trained on the job; and
- Create meaningful employment and self-employment opportunities for TVET college graduates, which can also provide a pathway towards plumbing trade qualifications.

The delivery model for the Green Skills TVET plumbing programme is shown below:

*12 weeks practical skills and work readiness*



## Selection

Harambee Youth Employment Accelerator was responsible for recruiting, selecting and matching trainees based on their likelihood to succeed, taking into account their attributes and interests. However, the final selection in many cases was made by the host employers. Trainees were interviewed and employers were consulted before the initiative began in order to find out what kind of candidates and skills they were looking for. This ensured that trainees met employers' expectations.

The programme adopted three criteria to ensure the best selection of candidates:

- That candidates should have some technical knowledge, either obtained through a TVET college or through a Technical High School. Ideally, this technical knowledge should be in construction-related subjects, although the selection pool was not restricted to construction. This ensured that candidates had a basic working knowledge of technical math and science, as well as a basic understanding of engineering drawings.
- That candidates should match to their workplace roles. This match is achieved by developing a diagnostic profile of the workplace role in which the Technical Operator performs in small- and medium-sized plumbing companies, and then identifying candidates who match this profile.
- The third criterion was proximity to the workplace. Given the high cost of transport, the intent was to ensure that candidates did not require more than one taxi ride to get to their workplace. This also meant that candidates who did not live near the TVET college at which the institutional training took place would require an additional transport allowance. Proximity to the workplace is an important consideration, as candidates must be able to afford transport costs – both during their workplace learning (using the stipend they receive), as well as after they complete the training, should they be retained in employment.
- Additional criteria for selection more broadly included that candidates should be unemployed, and had not previously been in meaningful employment. A particular emphasis was also placed on gender inclusion, and a minimum of 50% of selected candidates should be women.

## Curriculum

As there was no existing learning pathway to the Technical Operator Practitioner qualification, the plumbing industry embarked on a process to develop new entry-level skills programmes that were aligned to the full plumbing trade qualification. The Level 3 Plumbing Hand programme was designed specifically to provide the skills for the Technical Operator.<sup>2</sup> The SWH specialisation was added to the Plumbing Hand curriculum to expand employment and self-employment opportunities in the green economy.

In addition to the alignment of the curriculum to the Technical Operator qualification, the programme also sought to ensure that the learning material provided candidates with an accurate reflection of the tasks they would face in the workplace, and thereby emulate the dual training system. Therefore, the learning material was designed to facilitate project-based learning, using real-world simulations of workplace tasks.

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Finally, the programme curriculum and project-based learning material was complemented by online plumbing reference material. Given the core focus on practical skills and work readiness during the 12 weeks of institutional training, the programmes sought to limit classroom-based instruction, and enabled students to self-manage their theoretical learning. Therefore, the programme converted the core plumbing theory textbooks developed by the industry into interactive online learning content, which covered all the theoretical knowledge required by the students for the plumbing trade.

<sup>2</sup> Originally, the students were expected to be registered at the level of Technical Assistant Practitioner. On review, the Plumbing Industry Registration Board (PIRB) elected to register the candidates as Technical Operator Practitioners, which is a higher grading than what was originally anticipated.

## Delivery Approach

The plumbing programme is an integrated learning programme, combining practical skills and work readiness at a TVET college, and workplace learning in a plumbing enterprise.

- The institutional training at the TVET college comprised 12 weeks. During this time, the Plumbing Hand curriculum was delivered, primarily through project-based learning. A work-readiness programme, delivered in partnership with Harambee, was woven into the 12-week syllabus, covering a range of work-readiness behaviours and attitudes. The combination of the work readiness and project-based learning optimally simulates the workplace context for which the candidate must be prepared.
- The workplace learning component comprised six to nine months of learning in a plumbing SME under the supervision of a qualified and/or experienced plumber. During workplace learning, candidates followed a structured programme and completed a logbook, which was regularly signed off by a mentor.

At the end of the placement period, graduates were either absorbed into employment or self-employment as Technical Operator Practitioners (which offers a pathway to a trade). With future cohorts, the plan is for those who demonstrate high entrepreneurial potential during the course of the Plumbing Hand training programme to enter into a micro-enterprise incubation process, support by the Alan Gray Makers programme.

# 3

## Evolution of the Programme

The 2019–20 plumbing programme evolved from the first iteration of the programme, which was implemented in 2017–18. The first implementation generated a number of lessons, on both the supply and demand sides, which informed the development of the 2019–20 programme.

## Supply-side Issues

The first iteration focused on increasing levels of employability for TVET college civil engineering/plumbing students by specifically developing SWH installation and repair skills. This comprised six weeks of practical training at a TVET college, followed by six months of on-the-job training in a plumbing enterprise.

The primary focus on SWH in the first iteration was premised on the belief that students who had completed civil engineering would have basic plumbing skills, and that SWH skills would make them more employable in the green economy. An important element was also the inclusion of a workplace learning component for a minimum of six months. This ensured that students were given sufficient opportunity to practically apply what they had learnt during institutional training, and to develop work experience and applied competence – which would make them more employable. However, the implementation revealed that the programme had underestimated the scope of plumbing skills.

It became apparent at the implementation stage that the TVET students required significant bridging of their foundational plumbing skills. This was not only

to ensure their successful entry into the plumbing industry, but also to increase their chances of progressing to a full plumbing trade qualification. The programme was therefore adjusted to include an intensive emphasis on plumbing skills, while still retaining its focus on SWH.

The first iteration also revealed the limited capacity of the TVET college to deliver the plumbing/SWH curriculum. A private training provider was brought in to deliver the programme within the TVET college. The intention was that the provider would develop the capacity of the college during the course of the curriculum implementation. Unfortunately, this capacity transfer was not effective, as the college did not dedicate sufficient resources to ensure the sustainability of the programme. Therefore, the programme was not continued at the college once the cohort completed their studies.

A survey of plumbing business owners, conducted by Trade & Industrial Policy Strategies (TIPS) on behalf of the GIZ SD4GE II programme<sup>3</sup>, confirmed the frustrations experienced in the plumbing industry with respect to the poor responsiveness of TVET colleges. In particular, complaints relate to low levels of commitment of lecturers and colleges towards working constructively with industry to improve the quality and relevance of the training. This context was clearly illustrated during the first plumbing iteration. It raised concerns as to whether shift colleges could shift to become more demand-driven and responsive – as expressed in a range of government policies and plans over the past couple of decades.

3 Skills Development for a Green Economy (2019) Industry Analysis of the Plumbing Industry, Pretoria:GIZ.

## Demand-side Issues

The 2019 survey of industry role-players emphasised the shortages of formal skills in the plumbing industry. The report highlights the large numbers of workers who are under-qualified, with no formal recognition of their skills and limited prospects to progress towards a formalised trade qualification. This impacts on costs and productivity in plumbing enterprises, where senior and qualified plumbers have to sign off on work conducted by lower-qualified staff.

“ *Large numbers of workers are under-qualified, with no formal recognition of their skills and limited prospects to progress towards a formalised trade qualification.* ”

This was a key concern raised by IOPSA following the review of the first iteration of the plumbing programme. This situation made young people vulnerable, especially if plumbing businesses closed down or were forced to retrench workers, as it would limit their mobility within the labour market. The delivery of SWH in the absence of sufficient formal plumbing skills would perpetuate this problem in the industry, rather than contributing to address skills shortages.

Therefore, the industry context called for more formalised skills programmes that could better equip new entrants to meet the requirements of plumbing businesses. These programmes could also serve to formalise the skills of existing workers in the industry, providing recognition of those skills, and reducing vulnerability in the face of changing industry conditions.

## Programme Re-design

The lessons outlined above informed the design of the 2019–20 plumbing programme.

First, the new design included an intensive focus on developing formal plumbing skills. This was intended to ensure TVET college students were optimally prepared for entry into employment in plumbing enterprises, while still providing the specialised focus on SWH and guaranteeing students a path to trade certification. This included adopting the Plumbing Hand curriculum, even though it was not yet formally registered with the Quality Council For Trades and Occupations (QCTO), while adding the SWH-installation skills towards the end of the 12-week programme.

The second key component was a focus on equipping TVET colleges to deliver the programme, to ensure colleges would have both the capacity and commitment to train students according to industry standards, and to do so on a sustainable basis. To achieve this, IOPSA played a central role in assessing and selecting appropriate colleges. For the 2019–20 cohort, the Ekurhuleni East TVET College was selected from the pool of colleges that were already delivering dual apprenticeships in plumbing (as part of the Dual Skills Pilot Programme [DSPP], through support from the GIZ SD4GE II programme), which meant that they should have the infrastructure and capacity needed to deliver plumbing skills to industry standards. The selection process still required IOPSA to undertake a further assessment of the state of readiness of the college.

The programme implementation is accompanied by a process of capacity building for college facilitators, both in the delivery of project-based learning and blended learning. For the 2019–20 cohort, a programme of action learning was put

in place with support from the South African Institute of Distance Education (SAIDE) to support facilitators with curriculum delivery, including the use of project-based learning. Due to the timing

of the implementation, online content was still in development and the programme was therefore delivered using printed material. All future cohorts will have access to online content.

*The table below illustrates how the plumbing programme has evolved from its initial conceptualisation.*

	2017-18 COHORT	2019-20 COHORT
<b>PROGRAMME OBJECTIVES</b>	Enable young people to access increased levels of employment and self-employment as a result of a more responsive SWH programme offered at a TVET college.	Expand the opportunities for young TVET students to enter into employment or self-employment in the plumbing industry (with SWH specialisation) and progress towards the trade.
<b>TARGET GROUP</b>	Unemployed TVET college graduates.	Unemployed TVET college graduates.
<b>APPROACH</b>	Delivery through an existing public TVET college in the vicinity of industry with support from an industry training provider.	Delivery through an existing public TVET college that is already implementing plumbing apprenticeships.
<b>CAPACITY BUILDING</b>	Transfer of capacity from a private training provider to the TVET college facilitators.	Specialised support through a well-established educational NGO through a process of action learning.
<b>INDUSTRY FOCUS</b>	Focused on formal sector SMEs in and around central Johannesburg.	Focused on formal sector SMEs in and around Johannesburg and Ekurhuleni.
<b>RECRUITMENT / SELECTION</b>	Recruitment and selection by Harambee.	Recruitment and initial selection by Harambee, with ultimate selection by employer.
<b>PROGRAMME STRUCTURE</b>	Six-week technical training at the college, four-week work-readiness training, one-week entrepreneurship boot camp and six-month workplace learning. Comprises 34 credits at NQF level 2.	12-week technical training at the college, with interwoven work readiness and six months of workplace learning. The Plumbing Hand curriculum comprises 36 credits at NQF level 3.
<b>ASSESSMENT</b>	Formative assessment during institutional training. No formal industry recognition.	Formative assessment results combined with summative assessment after completion of workplace training. Formal recognition as Technical Operator when completed.

## Programme Outcomes

To date, a total of 66 TVET college students have been enrolled in the plumbing programme, with 57 completing the programme (institutional and workplace training).

	2017-18 COHORT	2019-20 COHORT
<b>NO. OF TVET COLLEGE GRADUATES ENROLLED</b>	29	37
<b>NO. COMPLETED</b>	25	32
<b>NO. OF PLUMBING COMPANIES</b>	7	14

The table above indicates the increased number of employers willing to take on IRM candidates. In addition, the completion rate of 85% is significant, considering the low completion rates generally seen in TVET programmes.

Both the 2017–18 and 2019–20 cohorts achieved over 80% on average for their in-college formative knowledge and practical assessments. The key difference with the second cohort was the introduction of the summative assessment after the completion of the workplace learning component. Candidates were brought back to the college for a three-day preparation/refresher period before undertaking the summative knowledge and practical assessments, which were set and overseen by IOPSA through the college.

All 32 candidates from the second cohort who completed their workplace learning component were successful in their summative assessment, which indicated competence in all aspects of the Plumbing Hand curriculum. This suggests that both the institutional training and workplace learning have provided the necessary competence for the Technical Operator Practitioner role.

Through IOPSA, additional plumbing companies in the Gauteng area have been brought into the

plumbing programme, and are demonstrating positive and enthusiastic commitment to the training and employment of young people.

The involvement of IOPSA, as an industry body, is seen by all partners as a key element in the IRM initiative collaboration, and as a significant innovation and success. The college acknowledges that the success and placement rate of candidates was much higher than what is usually achieved in plumbing courses. IOPSA also quality assured the technical content of the training course.

“ *The success and placement rate of candidates was much higher than what is usually achieved in plumbing courses.* ”

A survey of the 2017–18 plumbing graduates in July 2019 found that 10 of the 17 respondents were in full-time employment, one was employed part-time, five were in a learnership or internship, and one was studying. Only five respondents were employed or doing an internship or learnership in the plumbing sector. The remaining respondents were largely working in construction-related jobs, including fibre optic installation and road construction.

In a survey of the 2019–20 candidates towards the end of their workplace learning, nearly half indicated their intentions to search for employment following their placements. One quarter of candidates indicated they were offered placements at their workplace learning site. However, only half indicated their intention to accept these offers, and the evaluation assessment confirmed this finding. Eight candidates intended to pursue further study in a related field, while three planned to go into self-employment. A formal tracer study of the programme graduates will be conducted in June 2021 to assess the progress of these candidates along employment/self-employment or further learning pathways.

Working in partnership with IOPSA and the Plumbing Industry Registration Board (PIRB), the new entry pathway through the Technical Operator Practitioner designation represents a newly recognised entry-level occupation. This pathway can be used to upskill and recognise both existing workers and new TVET college graduates, and can be used as a stepping-stone to a full plumbing trade qualification. The level of Technical Operator Practitioner would normally take three years to achieve in the workplace, whereas the plumbing programme has enabled young people to achieve the same in nine months, while on a faster track towards the trade. This fast-tracked pathway is facilitated through the Plumbing Hand programme. The 32 candidates who completed the plumbing programme in 2020 have become the first group of TVET college graduates to be registered with the PIRB with this designation.

# 4

## Programme Challenges and Achievements

## Laying the Ground for Demand-led TVET Programmes

The plumbing programme is designed to be demand-led. It seeks to address the key disconnect between TVET colleges and the labour market, being that the majority of young people who enter into TVET colleges do not access occupationally directed skills or workplace learning. This is reinforced by many restrictions in the TVET and skills development system, which complicate efforts to address this disconnect and to make the TVET system more responsive to demand.

### *Responsive Curricula and Qualifications*

The first challenge relates to the development of new curricula and qualifications. Despite the intent in the qualification-development policy framework that the process should be led by industry demand, there were critical barriers to registering a new demand-led skills programme. The plumbing industry initially submitted two skills programmes in June 2019 – a Level 2 Domestic Water and Drainpipe Repairer and the Level 3 Plumbing Hand.

The Plumbing Hand programme was specifically designed for the Technical Operators, but it was also designed to ensure that trainees could be recognised effectively by the PIRB as being on a pathway to the full trade qualification. As such, the candidates could retain credits obtained through the programme and progress to the next level of training. The QCTO registered the Level 2 programme, and rejected the Level 3 Plumbing Hand, indicating that the number of credits was too large for a skills programme.

A consultation process was held with the QCTO to achieve a better common understanding of the programme objectives. It was agreed that the skills programme could be resubmitted, but with a lower credit base. This resubmission was completed in May 2020. As of November 2020, the Plumbing Hand programme was still not registered with the QCTO due to bureaucratic delays.

The challenges around developing and registering new curricula and qualifications significantly inhibit responsiveness in the TVET system. The inflexibility and protracted timeframes in this regard restrict any attempts by colleges to be more responsive to the demand for skills. This is particularly the case for shorter skills, which are linked to entry-level occupations and do not require full qualifications.

In the case of the plumbing programme, training went ahead using the Plumbing Hand curriculum despite it not yet being registered. This was due to an immediate demand for these skills, and because they improve employment prospects for young TVET college students on their way to becoming a plumber. Fortunately, the PIRB has the authority to recognise these competencies through its delegated authority as a professional body. However, the lack of formal recognition for skills attained would pose a risk for demand-led programmes in other industries, for both colleges and students. There is no basis for formally certifying students for skills obtained, which limits students' mobility within the labour market as well as their progression to qualification.

### *Securing Demand*

A basic principle underlying demand-led vocational training is that such demand must be secured upfront before training begins. The relationship with IOPSA was critical for securing demand, for both the 2017–18 and the 2019–20 cohorts. As an industry membership body, IOPSA was able to mobilise and secure buy-in from its membership base. Many plumbing enterprises do not typically train young people in a structured manner, which results in many of their workers being underqualified and limited in their ability to progress towards a full trade qualification.

The project team was able to present the programme at various IOPSA meetings, and IOPSA sent broadcasts to its members about the programme. Those enterprises that expressed an interest were invited to an information session. In addition, individual meetings were held with plumbing enterprises to reach common agreement on expectations and responsibilities, address their concerns, and secure agreement on the number of candidates.

The intensive work required to secure demand places pressure on the timeframes for programme delivery to begin. This is particularly challenging in the case of a new programme that is disruptive, and which requires an enterprise to take on the responsibility of training young people in a structured manner. It is therefore important to build a strong value proposition for these enterprises, which includes the development of a well-skilled talent pipeline that can increase productivity.

In addition, SMEs are generally disincentivised from training young people due to the bureaucratic challenges associated with accredited training regimes, particularly in micro-enterprises that have limited capacity. In order to make it easier for enterprises to take on young trainees, the NBI acted as the lead employer, signing learning contracts with the trainees and taking responsibility for paying their stipends, registering them for UIF, and ensuring they were covered by the Compensation for Occupational Injuries and Diseases Act (COIDA) requirements.

“ *To make it easier for enterprises to take on young trainees, the NBI acted as the lead employer, signing learning contracts with the trainees.* ”

The enterprise would then act as the host employer, and their sole responsibility was to deliver on-the-job training in the most effective manner possible, using a logbook as a guide and reporting to NBI on attendance and any workplace issues that arose.

### *Preparing the TVET College*

In light of the challenges experienced in 2017–18, it was critical to find a college with the capacity and resources to deliver the plumbing programme. Yet again, IOPSA played an important role in supporting

the selection of the college. A decision was made to target colleges that had a track record of delivering plumbing qualifications and were involved in the implementation of plumbing dual apprenticeships through the DSPP.<sup>4</sup> This requires that the college has qualified plumbers and fully accredited plumbing training workshops. On this basis, Ekurhuleni East TVET College’s (EEC) Artisan Skills Development Centre (ASDC) was selected in consultation with IOPSA. IOPSA then conducted a due diligence site visit to ensure the college was in an adequate state of readiness – particularly in terms of resources and capacity to deliver the Plumbing Hand programme.

As indicated above, the Plumbing Hand programme was built off the full plumber qualification, which was being delivered by EEC as part of the DSPP. Therefore, it was assumed that the college would be well equipped to deliver the shorter skills programme. A key element of the DSPP was the development and implementation of a project-based methodology, shifting away from traditional pedagogy to simulate the workplace context and emulate the German dual-apprenticeship model. To this end, GIZ has supported the development of a substantial set of project-based learning materials, providing a range of projects that integrate theory and practice, and reflect the variety of workplace tasks that apprentices would face. It was expected that these projects would form the basis for the delivery of the dual apprenticeships.

This project-based teaching principle was similarly adopted for the Plumbing Hand programme so as to ensure a dual-training approach. However, through initial engagements with the college, it was found that the change in delivery approach had not taken effect. The college facilitators were still reliant on traditional textbook material, continued to separate theory and practice, and were not utilising the new learning material. The facilitators felt that the students found the new material too difficult, and

<sup>4</sup> The Dual System Pilot Programme is implemented through the GIZ SD4GE II programme, in partnership with the Department of Higher Education and Training (DHET). Its focus is on developing and implementing dual apprenticeships in TVET colleges in the plumbing and electrical trades.

as it was of a very high standard, the facilitators themselves did not feel equipped to use it.

The project team therefore struggled to achieve a common understanding amongst the college staff as to the purpose of the Plumbing Hand programme. Particularly, concerns centred around the fact that it was a new structured pathway into the plumbing industry, and that the focus of the programme was not simply on delivering the curriculum, but also on adequately preparing students for the demands of the workplace.

## Delivering Dual Training

### *Teaching and Learning*

SAIDE was contracted to observe and provide feedback to facilitators during the course of the programme delivery, in order to enable some level of action learning. Their findings confirmed the misalignment around the purpose of the curriculum and how it should be taught.

SAIDE found that facilitators continued to teach theory based on the textbooks, while the practical instruction – while relevant to the workplace – was not aligned to the practical requirements of the curriculum, and was not derived from the GIZ learning materials. The facilitators also did not actively link the practical application and the theory from the textbooks.

Another key weakness was the inability of facilitators to plan, structure or manage learning processes. When teaching time ended during the teaching day, the textbook-driven process continued in the following theory session. There was also no critical awareness of the effectiveness of this teaching approach, or meaningful reflection about what the candidates had learnt, or struggled to learn.

In addition, because there DSPP plumbing apprentices were being trained at the college at the same time, the Plumbing Hand students were restricted in the amount of practical instruction they were provided on a daily basis. However, the

facilitators also did not make use of the time when students were not engaged in practical instruction to reinforce their work readiness or their self-managed learning, rather leaving them to work on their own. In fact, the candidates reported to SAIDE that they found it difficult to spend long hours working through the theory in the manuals at the Skills Centre. Candidates reported that for this reason, they had taken the initiative early on in the course and had negotiated with the facilitators to do practical work in the afternoons to avoid instances of entire days focused only on theory.

The candidates also reported that groups for practical instruction were too large, and it was not possible for all members of a group to have hands-on exposure to tasks. In some learning contexts there were insufficient tools and materials. This is particularly the case for female students, who felt they were excluded when shortages of space or tools arose. Students were particularly concerned that the practical tasks related to the solar component were insubstantial, and questioned whether they had, in fact, completed all of the theory related to this part of the course.

The candidates generally felt ready for the planned workplace experience, and were excited about the technical knowledge they had acquired. One student indicated they needed more time to master some aspects of the curriculum, while another expressed excitement about being able to take on a job to fix a toilet.

### *Work Readiness*

According to SAIDE, the candidates were observed to function very well in groups, and the Harambee monitoring and assessment model helped to develop these skills. There was also evidence of excellent leadership and collaboration. More competent candidates tended to drive the process in each group, but generally there was active participation by all members and vigorous discussion when a problem needed to be solved. The candidates formed strong bonds, and enjoyed learning from and with each

other. They liked the competitive Harambee approach, which spurred them on, and groups were seen to strategise carefully to tackle each week's tasks more successfully.

At the outset of the training process, the candidates indicated that they experienced difficulty in getting up early and adjusting to the requirements of the course, as set up by Harambee. They appeared tired and pressured by the strict 'boot camp' approach. The Harambee facilitator used individual questioning to ensure inclusive engagement, although initially the candidates did not enjoy being singled out for critique. However, by the sixth week, they had acclimatised and were noticeably energised and motivated by the structure and rigour of the Harambee approach.

However, the Harambee model contrasted strongly with the traditional teaching approach in the skills centre. While the candidates were more comfortable with this in the beginning, it became evident that they were growing increasingly impatient with the traditional approach. The incongruence between the Harambee intervention and the teaching approach in the college was thus a limiting factor in optimising the work-readiness intervention and preparing the candidates for the workplace.

The ASDC team were unanimous in their enthusiasm for the Harambee soft skills training component of the course. The impact of this training on candidates' punctuality and participation greatly assisted them in their task. They also felt this would have substantial impact on the likelihood of the candidates finding jobs. However, the facilitators did not feel able to take over this aspect of the training, as they did not have the skills and knowledge to do so. The initial intention was that the college facilitators were to be trained on the Harambee soft skills programme. This did not materialise, and the facilitators only attended an induction of a few hours. They were also not cognisant of the possibility that the Harambee methodology would disrupt their concepts about learning, teaching methodology and the curriculum content.

The candidates expressed great enthusiasm for the 'personal management' component of the course. Apart from making them feel professional and more confident about entering the workplace, they were very excited about the personal transformation they had experienced. Taking responsibility for their own learning had been an empowering experience; they were excited about their new-found agency. Candidates cited time management, communication skills, energy awareness, group work skills and mutual respect as being particularly valuable learning outcomes of the course. Being able to contact potential employees via email with their CVs was regarded as extremely important. Candidates also mentioned that the score-card strategy was very useful, specifically the process of reflection and strategising on how to improve their performance.

### Workplace Learning

JET Education Services was contracted to manage the monitoring and evaluation of the plumbing programme. During the workplace learning component, JET undertook surveys and interviews with 28 candidates and nine employers. All nine companies are classified as micro or small businesses, and have been in business for at least three years, although many had existed for 10 years and more.

From the evaluation, 89% of learners interviewed felt that before the start of their workplace-based experience, they were confident in their ability to plan and prepare for work on a daily basis. A large majority rated the different components of the institutional training as relevant to workplace learning, as indicated in the diagram below.

Profession		Personal		Practical	
Plumbing practical knowledge 88%	Hand and power tools and equipment 87%	Time management 91%	Work socialisation 91%	Prepare for work 89%	Occupational health and safety 88%
Plumbing theory knowledge 84%	Reading and interpreting plans and drawings 79%	Personal mastery 88%		Applied problem solving 84%	

Relevance ratings of college component training to workplace-based learning based on candidate survey responses.

However, only 11 candidates indicated they were able to practice all the skills that they had acquired in the programme in their workplaces. A more refined analysis highlights the particular aspects of the Plumbing Hand curriculum that were actually used in the workplace:

- More than 90% of candidates indicated they practiced health and safety measures and installed and tested sanitaryware fixtures or appliances.
- More than 80% of candidates indicated experience maintaining and repairing plumbing installations and working with cold and hot water distribution systems.
- More than 70% reported installing below-ground drainage systems and installing and maintaining basic sanitary fixtures, such as taps and valves.
- Only 57% of candidates indicated they practiced maintaining below-ground drainage systems.<sup>5</sup>

Most of the host companies engaged candidates in installation and repair work, closely followed by maintenance work. Two companies also engaged candidates in office work.

Work placement activities varied according to the companies at which candidates were placed. Candidates were either placed in a company that does construction work only, or in a company that does installation, repairs and maintenance. Tasks assigned to candidates engaged in installation, repair and maintenance included fixing drains, cutting pipes, carrying stepladders, installing bathroom basins and kitchen sinks, installing geysers and “chasing” (chopping recesses and channels into walls for the installation of pipes).

In the construction company, candidates were expected to interpret blueprints each morning and build specifications to map layouts for pipes, drainage systems and other plumbing materials.

All the candidates were responsible for preparing tools based on briefings from their supervisors prior to going onsite or into the field.

In one company, candidates only worked with electric geysers. They felt that this limited their experience,

as they did not work with solar geysers or engage in other plumbing activities such as construction plumbing. In two companies, candidates were also introduced to administrative work, including filling in job cards and accepting jobs through an insurance app, communicating with clients and making appointments, and sending quotations and invoices to clients. The candidates in both companies also ordered material for their teams.

When asked to rate candidates’ skills, employers reported excellent teamwork and communication, while solar water installation and maintenance was flagged as an area of weakness.

“ When asked to rate candidates’ skills, employers reported excellent teamwork and communication.

Employers felt that overall, candidates had developed notably in a range of skills (technical, content, occupational health and safety, professionalism, communication, teamwork and applied problem-solving) during their placement. Employers generally did not experience productivity challenges while candidates were in their workplace. They also said they did not experience any challenges with the candidates. None of the employers complained of tardiness, unwillingness to follow instructions, or missing work on Mondays. Overall, the candidates were said to be well disciplined.

Employers also provided some suggestions for improving the programme. Overall, increased integration and overlap between college and workplace activities was recommended, in addition to the following improvements:

- Better communication from the college about candidates provided to workplaces, and about workplaces to students;
- Extension of the programme, or a Phase 2 roll-out for students who want to continue beyond the initial six months of workplace learning;

<sup>5</sup> Given that not all employers conduct underground plumbing work, employers shared the view that candidates should be rotated between workplaces in order to gain the necessary exposure to below-ground work.

- Additional short courses so students can work towards qualification/certification;
- Assessments to monitor student progress during workplace-based learning;
- Better onsite monitoring by the programme or college;
- Training of plumbers (employees) to improve their mentorship capacity; and
- Having students return to college briefly to address skills shortcomings.

Candidates generally indicated satisfaction with their placements. Almost all candidates agreed that the workplace-based learning experience was organised and well-planned, was relevant, and that they enjoyed the workplace-based learning. The majority of candidates were also satisfied with each aspect of supervision. Candidates in all companies received feedback on their work from their supervisors while on site, so that they could identify and correct their mistakes. Candidates found this to be very useful, as it helped them improve their skills.

Employers and supervisors indicated that they had enough work for candidates, and none complained that they did not have sufficient time to provide supervision to the candidates. In all companies, candidates were given opportunities to do work on their own, and supervisors would check to see if the work had been done properly. The supervisors were all generally happy with the candidates and their work.

“ *In all companies, candidates were given opportunities to do work on their own, and supervisors would check to see if the work had been done properly.* ”

While all the supervisors had extensive experience, only two said they had mentored students in a formal programme before. As the programme was unable to provide mentorship training, all supervisors said they relied on their previous supervisory experience to mentor candidates.

All candidates shared work tools with the rest of their teams, and there did not seem to be any problems with access to tools. Candidates from two companies indicated that when one was busy with one tool, they would use a different one to finish another part of the work. Candidates from only one company indicated that they did not have enough tools, and used whatever tool was available.

# 5

## Lessons and Way Forward

The 2019–20 cohort of the plumbing programme represents a step forward in the development and delivery of demand-led occupational training through TVET colleges. The programme has created a strong foundation for a partnership between the plumbing industry and TVET colleges, which can realise entry-level pathways into plumbing jobs, as well as progression towards a plumbing trade.

“ *The programme has created a strong foundation for a partnership between the plumbing industry and TVET colleges.* ”

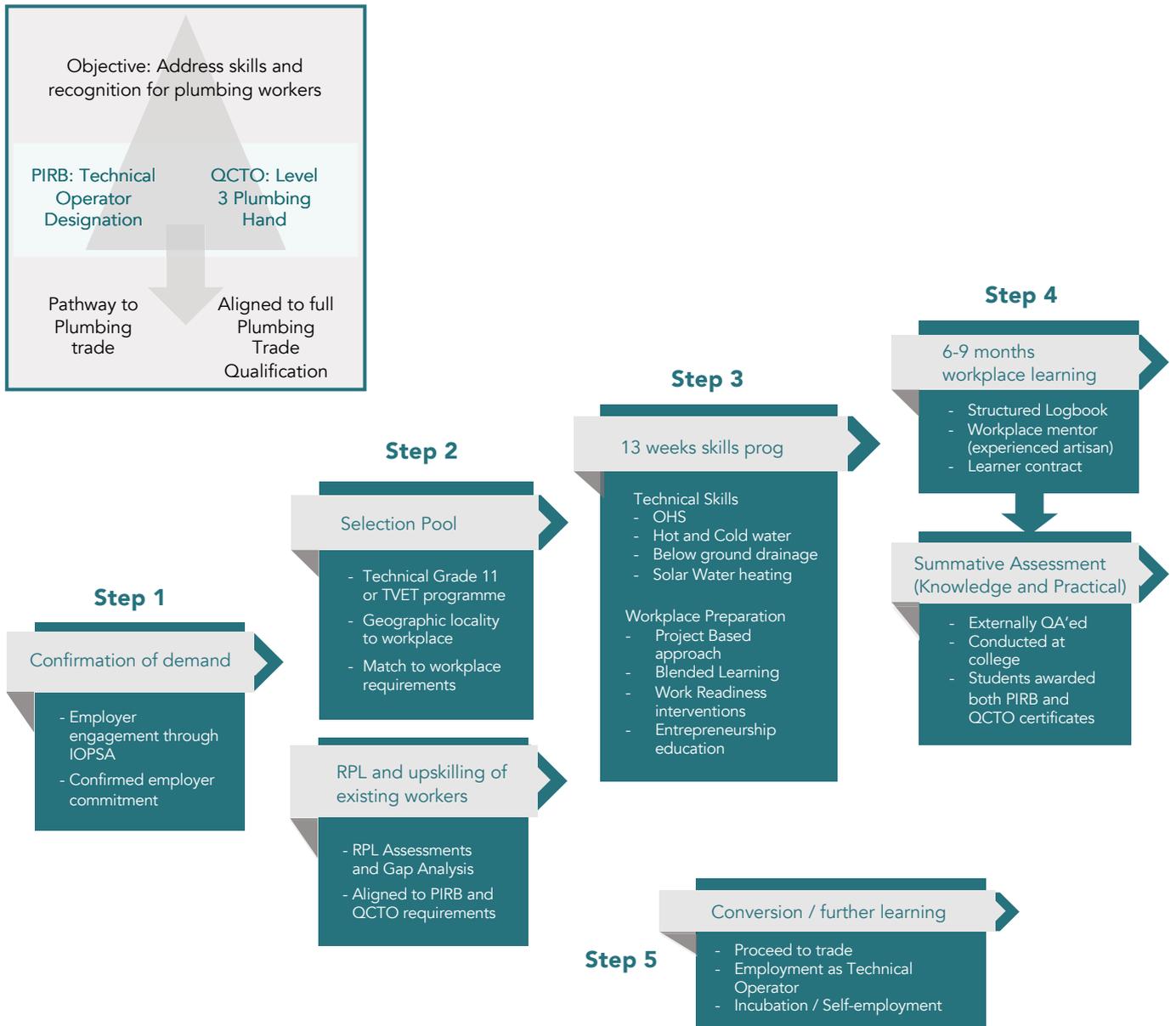
However, the full potential of the model has not yet been realised. While some shortcomings from the initial cohort were addressed in the 2019–20 cohort, a number of remaining issues must be addressed to ensure the efficacy and replicability/scaling up of the model. These are being addressed as multiple cohorts come on stream in 2021 and beyond. In addition, the lessons from this cohort are being applied to other related programmes.

These include:

- Achieving a common understanding upfront among key stakeholders on the objectives of the programme, the intended approach, and how the respective roles and functions intersect to create coherence.
- Ensuring communication with candidates is clear, and that they understand the purpose and approach of the programme – both in terms of the institutional training and the workplace training components. There should also be absolute clarity around certification, both in terms of the Plumbing Hand programme and the PIRB registration as a Technical Operator Practitioner.
- Ensuring the curriculum is properly structured and implemented, including:
  - The sequencing of the curriculum;
  - The integration of theory and practice, using the project-based methodology;
  - The integration of the work-readiness components into the technical curriculum;
  - The development of an appropriate assessment strategy;
  - Cognisance being taken of candidates’ recommendations regarding the division of time between theory and practical work, i.e. theory to be discussed in the mornings and the practical components to be undertaken in the afternoon;
  - Enabling maximum participation by properly managing group sizes for the practical component; and
  - Sufficient provision of appropriate tools and equipment ahead of the course implementation.
- Ensuring college facilitators are adequately equipped to deliver the curriculum, including:
  - Being able to prepare and implement daily lesson plans that align with the curriculum sequencing;
  - Being able to apply the project-based methodology in a manner that links theory to the practical requirements of the workplace; and
  - Focusing on integrating work-readiness aspects into teaching to better prepare candidates for the demands of the workplace.
- Ensuring effective communication channels between the college and employers, so that there is a mutual awareness of student progress against the curriculum and proper monitoring of workplace learning. This includes regular feedback sessions with employers in an open forum, as well as site visits by college facilitators to observe how students are performing and engage with the employer/mentor in this regard.
- Structured mentorship training for supervisors in plumbing companies, which should be pitched and delivered in the most user-friendly manner possible. The mentor training should focus on equipping supervisors to work more effectively with candidates in terms of the application of their knowledge and optimising the experience in the workplace.

These lessons will become the basis for further roll-out of the plumbing programme in 2021 and beyond, with the anticipation that the skills programme will finally be registered and recognised, as indicated by the QCTO. In addition, the model will be applied across other industries that offer entry-level opportunities and a pathway to trade.

On the basis of the lessons learned to date, the diagram below describes the steps that guide the implementation of the Plumbing Hand programme.



These steps can be customised for various industries, which share similar challenges to those in the plumbing industry. The scalability of the programme is reliant on continuous demand activation in SMEs (Step 1) across various industries, including those that operate in the informal sector in townships.

The role of industry bodies, as exemplified by IOPSA in the plumbing industry, is a critical lever

for aggregated demand, as well as a high quality supply of skills. This requires industry bodies to take ownership of and drive the programme. The expansion of IRM pathways will have a fundamental effect on the transformation of relevant IRM industries and the realisation of large-scale employment for marginalised youth.

## About the Author



### Dr Anthony Gewer

Dr Anthony Gewer has for the past 20 years provided strategic and technical support to government, donors, industry and institutions, around strengthening pathways for successful youth labour market transitions. During this time he has worked with leading NGOs and in the areas of education, skills development and youth employability. He is currently Programme Manager in Social Transformation at the National Business Initiative (NBI), responsible for the Installation, Repair and Maintenance (IRM) Initiative, a national programme to expand opportunities for marginalized TVET youth across the industrial economy.

Through his extensive work in TVET and skills development, Anthony has designed programmes to improve institutional management, teaching and learning and workplace learning. He has particular interest in creating inclusive learning and employment pathways in the artisanal, retail and hospitality industries. He has written and presented extensively on labour market transitions and youth employability in a developing context. He has a PhD in Education Policy with a specific focus on vocational education and the transition from school to work.

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