

# PERCEPTIONS OF STAFF AND STUDENTS ABOUT THE NC(V) MODEL OF WORKPLACE ENGINEERING ARTISAN TRAINING OFFERED BY SOUTH AFRICAN TVET COLLEGES

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## ABSTRACT

Vocational training is a contentious issue in South Africa, where large percentages are regularly cited for unemployment statistics, and in particular for youth and post-school unemployment. Vocational study programmes at Technical and Vocational Education and Training (TVET) colleges are often seen as one possible remedy to these problems. The Department of Higher Education and Training's (DHET) long-term objective is to increase the number of learners that will qualify as artisans, which represent a major scarce/critical skills area in South Africa. However, the throughput and certification rates of TVET students are disconcertingly low, with National Certificate (Vocational) (NC(V)) Engineering courses regularly cited as having some of the lowest rates.

This article reports on a small research study on the perceptions of TVET staff and students about NC(V) Engineering programmes, conducted at two TVET colleges in South Africa. Qualitative and quantitative methods were used to collect data from NC(V) Engineering students and lecturers. The most important findings of the study include that there is a critical collaboration gap between industry and the TVET sector and that both NC(V) staff and students experience the need for addressing the (im)balance of time spent on practical versus theoretical training as part of NC(V) programmes. A clear understanding of the perceptions and concerns of TVET NC(V) Engineering lecturers and students may assist in addressing issues locally, at individual TVET colleges, and globally, at national policy and Sector Education and Training Authority (SETA) level, that could in future serve to contribute to improved academic performance, including higher throughput and certification rates, of NC(V) Engineering students.

**Keywords:** Technical and Vocational Education and Training, TVET, NC(V), Engineering, vocational training, artisan training, South Africa

## INTRODUCTION

Vocational training is a contentious issue in South Africa, where large percentages (consistently between 20 and 30% during recent years) are regularly cited for unemployment statistics, and in particular for youth and post-school unemployment (Cloete 2009; Perold, Cloete, and Papier 2012; Rasool and Mahembe 2014; Powell and McGrath 2014; Ranchhod 2019; Jones 2019). Technical and Vocational Education and Training (TVET) is often seen as one means to address the national socio-economic problems associated with post-school unemployment, with the purpose being “to respond to the human resource needs of the country for personal, social, civic and economic development” (Terblanche 2017, 2). In their 2015 Performance and Expenditure Review of the TVET sector, commissioned by the National Treasury, Dawid-Willem Pienaar, Fouché Venter, Megan Govender and Amanda Jitsing say:

“A dichotomy prevails in the South African labour market where there is large youth unemployment juxtaposed with a dire shortage of scarce skills. Youth unemployment continues to remain stubbornly high at 36.1 per cent in 2014. The National Development Plan affirms that one of the nine challenges confronting South Africa is that *‘too few people work’*. The government has long recognised that the majority of the unemployed are poorly educated and do not have the requisite skills to gainfully partake in a technologically advanced economy.” (2016, 3).

To address this dichotomy, the South African National Development Plan (NDP) has set three target outcomes, namely to increase the TVET intake to 25 per cent of 20–25 years old in South Africa by 2030 (this is currently at three %), to increase certification rates at TVET colleges to 75 per cent or 2.5 million in 2030 (as opposed to the current 40%), and to produce 30 000 artisans per year to satisfy the existing industry demand (Pienaar et al. 2016, 1, 8).

To adhere to these targets, careful consideration must be given to the current TVET context and in-depth studies should be conducted to understand the dynamics operating and prevailing in this sector at the moment, especially also since public claims have been made, even in the South African parliament by the current opposition party (the Democratic Alliance), that 60 per cent of TVET colleges are failing or dysfunctional (“dysfunctional” here being defined as a 40% pass/certification rate, or lower) (Pretorius 2018). The need for research on the TVET sector is also emphasised by the NDP, which “notes that the sector is too small, ineffective and the output quality is poor ... [that] the quality and relevance of courses need urgent attention ... [and] that the unemployment rates among TVET college graduates (eleven%) is more than double (five%) that of university graduates”, that throughput rates are too low and drop-out rates are too high (Pienaar et al. 2016, 4).

In response to this need for better understanding of, and insight into, problems at TVET colleges, this article sets out to report on a small research study conducted at two South African

TVET Colleges offering Engineering courses, one located in the Eastern Cape Province and one in Gauteng Province. The aim of the study was to gauge the perceptions of TVET staff and students about the National Certificate (Vocational) (NC(V)) training in Engineering disciplines, which includes artisan training. The study was commissioned by the Manufacturing, Engineering and Related Services Sector Education and Training Authority (merSETA) who regularly fund the TVET and NC(V) sector through student scholarships, bursaries and learner-/internships. To adhere to national targets set for the addressing of socio-economic challenges, careful consideration must be given to the current TVET context and in-depth studies like this one should be conducted to understand the dynamics operating and prevailing in this sector at the moment. A clear understanding of the perceptions and concerns of TVET NC(V) Engineering lecturers and students may assist in addressing issues locally, at individual TVET colleges, and globally, at national policy and SETA level, that could in future serve to contribute to improved academic performance, including higher throughput and certification rates, of NC(V) Engineering students. This may then in turn contribute to achieving the NDP's three target outcomes and the broader goals of alleviating unemployment and poverty in South Africa and expanding the national pool of qualified scarce skills artisans.

A consistent and over-riding theme that emerged from this study and from lecturer and student responses is that there are extensive and critical gaps in communication and collaboration between role players in the South African industry/manufacturing training and employment context. It is imperative that urgent steps should be taken to improve the collaborative capacity and relationships between industry, as employers, and the education sector, as the home sites where future industry employees are trained and made employment-ready. This stakeholder gap was also emphasised by Naledi Pandor, Minister for Higher Education and Training, in August 2018, when she said that, "at the heart of the challenges facing the TVET system is the rupture that occurred between colleges and employers" (Phakati 2018). Pandor said that the SETA's, in particular, were significant in repairing this rupture (Phakati 2018), with the long-term objective being to increase the number of learners that will qualify as artisans, which represent a major scarce/critical skills area in South Africa (Mukora 2008; Jordaan and Barry 2009; Schlechter, Faught, and Bussin 2014; Moalusi 2018).

Other major findings of this study include: dissatisfaction about the proportion of practical and theoretical work included in the NC(V) programme, with a common desire among staff and students that there should be much more practical and much less theoretical work; frustrations around work placement and industry collaboration; concern about available resources and procurement processes; and problems around grade nine as entry level for the NC(V) programme and with the general standard and quality of students, who often do not have the

foundational (secondary school) knowledge and skills required for coping with the course content.

## **BACKGROUND AND CONTEXTUALISATION: TVET, NC(V) AND ENGINEERING**

State bursary funding of TVET students (through the National Student Financial Aid Scheme (NSFAS)) increased from R0.3bn in 2009 to R1.8bn in 2013, resulting in the national TVET college budget for 2013 amounting to the total of R9.1bn, with the stated aim of the South African government to increase the number of TVET students to four million by 2030 – in 2014 there were one million students in the TVET system (Pienaar et al. 2016, 1, 4, 18). In 2016, a grand total of 2.3 million students were reported nationally, across all manner of institutions and programmes (public and private, universities, TVET colleges and other institutions), with 1.1 million of these studying at universities and colleges (DHET 2018, 2). Approximately 31% of all South African students are enrolled at public TVET colleges (DHET 2018, 7). In 2016, 177 261 TVET students were enrolled for NC(V) programmes (25% of all TVET enrolments), as opposed to 429 026 for NATED ((Technical) National Certificate, also called Report 191 N1–N6, programmes), thus NC(V) students represent around 70% of all TVET enrolments (DHET 2018, 31). Of the above NC(V) enrolments, 56 131 (32%) were enrolled for Engineering-related NC(V) courses in 2016 (DHET 2018, 39).

TVET Colleges offer qualifications such as the newer NC(V) and the much older NATED courses, both of which are linked to artisan trades. The NC(V) was introduced in 2007 with the express intent to replace NATED qualifications, which would have been phased out by 2012 (Terblanche 2017, 4). This decision was, however, rescinded after intervention by industry and colleges (Stumpf et al. 2012, 103), with industry rejection of NC(V), implementation challenges, funding norms and standards, private sector competition, poor industry links and complications with programme accreditation cited as the reasons for the intervention (Terblanche 2017, 6, 7). Thus, both NATED and NC(V) programmes are now operational simultaneously and both are designed to provide both the theory and practical aspects of specific vocational training agendas. For both programmes the practical component of study may be offered in a real workplace environment or in a simulated space on college campuses. Thus, it provides students with an opportunity to experience real work situations during their period of study in order to increase their effectiveness and employability (thus called work-based learning (WBL) or work-integrated learning (WIL)). However, the longer NC(V) three-year programmes are currently being funded at an 80 per cent higher rate per student than the shorter semester programmes of NATED qualifications (Pienaar et al. 2016). Yet NC(V) throughput and certification rates, in the minimum time of three years, are reported as 2 per cent, compared

to 12,3 per cent reported for NATED qualifications (Pienaar et al. 2016). The fact that the secondary schooling entry requirement for NC(V) is grade 9, compared to grade 12 (matric) for NATED, is a large contributing factor to this throughput discrepancy between the two programmes.

TVET colleges are often the option for those who do not gain access to universities, based on their secondary schooling results (matric/grade twelve), those who do not pass matric, or those who do not complete their secondary schooling to the highest level (matric/grade twelve) and leave school in grades nine, ten or eleven. The DHET (2018, 2) reports a 62.2 per cent average TVET graduate rate. However, it has been noted by other independent scholars and thought leaders in the field that very few of the students who enrol at TVET colleges actually eventually graduate, with Pienaar et al. (2016, 13, 14) citing as little as two per cent as the general throughput rate, with particularly low certification rates for Engineering programmes. This is difficult to confirm as the DHET changed their method of data collection in 2016, which results in the possibility that some students may be counted more than once (headcounts as opposed to the counting of enrolments) (DHET 2018, 32). Even historically, this type of data was difficult to obtain and Pienaar et al. (2016, 3, 12, 13, 30) also comment on these research challenges in their study's report (also referring to similar findings in the 2011 HSRC report by Cosser, Kraak, and Winnaar et al. 2011), thus difficulties in consolidation and analysis of data are common problems across all TVET research studies. Problems around accurate data collection further extend to the certification of students, for example, in 2017 20 colleges were shut down by protesting students because they had been waiting for up to two years for their qualification certificates, which impacts not only on their employment prospects, but also on reported throughput rates and the potential articulation of qualifying TVET students into universities (Govender 2017; Phakati 2018; Kahn 2018).

## **METHODOLOGY, DATA COLLECTION AND ANALYSIS**

Both quantitative (a survey questionnaire for students) and qualitative (personal semi-structured interviews with lecturers) methods were used in this study, which was based on a pragmatic, exploratory design. A combination of purposive and convenient sampling was used, since the commissioning entity (merSETA) identified the two participating colleges and only staff teaching Engineering subjects and students studying toward Engineering qualifications who were available at the time of data collection were included in the study. Ethical approval for the study was obtained through the university conducting the study's research ethics structures and from the two participating colleges. Data was collected during on site research visits to the six campuses of the two colleges during the second semester of 2018.

Semi-structured interviews were conducted with 29 college staff members (at which point data saturation was reached). Participation was voluntary and all staff respondents completed a written informed consent form prior to participating in the interviews. Interviews were audio recorded and two researchers collaboratively extrapolated and plotted data to themes from the interviews. Two pilot interviews were conducted at the start of the data collection process to confirm accuracy and appropriateness and are not included in the analyses presented here. Personal interviews allowed for elaboration, probing and descriptions, which are essential for obtaining rich and deep data. Staff participants were asked about their perceptions about the theoretical and practical learning components of the TVET NC(V) Engineering programme, as well as about available resources, workplace learning and the recruitment, selection, admission and administration processes associated with the TVET NC(V) Engineering programme. They were also asked to make suggestions and recommendations for the improvement of all of the above.

A survey method was used to extract data from 239 students who provided their input by completing hard copy paper questionnaires in writing. Students participated voluntarily and anonymously. A questionnaire consisting of 32 questions was compiled with the input of an independent expert statistician, who also conducted the quantitative analysis of the collected student data. Where applicable one-sample t-tests were used and Cronbach's alpha coefficients were calculated to determine the reliability and internal consistency of summated survey scores. Closed questions ranged from demographical questions to questions about motivation to study towards an NC(V) Engineering qualification and desired outcomes on completion of study. Questions were asked in a similar fashion about college recruitment, application, administration and communication processes, theoretical and practical components of the training, resources and facilities at colleges, instructional language usage, fair treatment, student guidance support, enjoyment of the study course, work life and career expectations after completion of the study course and whether the course of study will be recommended to others. Closed questions were rated on a five-point Likert scale, ranging, as appropriate, from "poor" to "excellent" or "agree" to "disagree". Open-ended questions were asked to determine which tasks students experienced as most challenging, which tasks they found most enjoyable, which tasks should be added or removed in future, what they experienced as most interesting about the training programme, and what they experienced as most frustrating and how this could be addressed.

## **FINDINGS: STUDENT DATA**

### **Demographical data**

A total of 239 student survey responses were analysed, 88 and 151, respectively, from the two

participating colleges. The majority of the student respondents in this study were male (57%) and the majority were between 21 and 25 years old (63%). Ninety-nine per cent were South African citizens. Home language distribution showed that the majority were Xhosa (33%) and Southern Sotho (33%) speakers, with 14 per cent Zulu speaking and other South African languages respectively representing between two and six per cent. A total of 85 per cent indicated that they receive financial assistance towards their studies, with 28 per cent indicating that they also receive financial assistance toward other costs. There was a mix of grade ten, eleven and twelve as the highest qualification prior to enrolment, with the majority having completed grade eleven (18%) or grade twelve (62%). The majority of respondents were enrolled in Electrical Engineering (31%) and Mechanical Engineering (38%) programmes.

### **Reasons for enrolling, enrolment process and expected outcomes**

Students reported that they first learned about the NC(V) programme from teachers at school (34%) or from friends (25%), while they reported parents (31%) and school teachers (20%) as being most influential in their choices to enrol for NC(V) programmes. The majority (81%) were either at school (43%) or unemployed (38%) when they decided to enrol for the NC(V) programme. Others were studying towards something else or working full or part time. The majority (83%) reported that they applied in person at a college campus, while 9 per cent applied with the help of a teacher at school. Thirty-eight per cent reported that they were informed of their acceptance to the NC(V) programme via SMS, 21 per cent received a personal telephone call and 18 per cent indicated that they themselves had to contact the colleges to enquire about their acceptance and admission.

Responses to the question about reasons for deciding to study toward the NC(V) programme showed that students rated gaining practical work experience (86%) and job satisfaction (83%) as the most important motivations for enrolling for the NC(V) programme. Next were academic progression (the possibility of studying further at a university) at 82 per cent, with studying while earning a living following at 63 per cent and status and social prestige rated at 42 per cent. Salary expectations was rated at 39 per cent. The majority (54%) said that they disagreed with the statement that they are studying towards the NC(V) qualification because it is what their family wants them to do, thus this was reported as the lowest among the seven motivational factors supplied in the survey.

In relation to desired outcomes as a consequence of completing the NC(V) programme, student respondents cited practical job training and workplace readiness (93 and 87% agreement, respectively) as the most desired outcomes, followed by salary expectations (86%), academic progression into possible future study (87%), the personal sense that they had

accomplished something (78%) and that their family should be proud of them (86%).

### **Responses to questionnaire items relating to student experience factors**

In response to questions about recruitment, admission, administration and communication processes associated with the NC(V) programme, 66 per cent indicated satisfaction (rated as adequate, good or excellent) with the quality of information they received; 87 per cent was satisfied with the application process; 62 per cent with the registration and early communication processes of colleges; 77 per cent was satisfied with follow-up communication; 70 per cent was satisfied with financial aid and fees communication; but only 51 per cent indicated satisfaction with financial aid and fees administration processes. Notably, financial aid and fees administration received the lowest satisfaction rating, which corresponds with the general high frustration levels around NASFAS matters in the South African Education sector at the time when the study was conducted (*Business Day* 2018).

Students reported satisfaction (rated as either adequate, good or excellent) with the appropriateness of the theoretical and practical content of the NC(V) programme (86%), the quantity of theoretical work (87%), class and laboratory preparation (75%), the availability and quality of additional support and guidance (61%), the appropriateness of lecturers' knowledge and skills (77% for theory, 76% for practical and 82% for industry), the balance of theory and practice (68%) and the quality of safety training (85%). The (im)balance of time allocated to theory and practice clearly emerged as the greatest area of dissatisfaction, which corresponds with staff data and findings of other research studies.

In terms of resources and facilities, the quality of teaching equipment and facilities were rated as satisfactory by 68 per cent of student respondents, but answers to open ended questions indicated some concerns. Access to books and library services received a 51 per cent satisfaction rate and the quality of handouts were rated at 70 per cent. While at one of the participating colleges the least positive ranking was for resources and facilities, at the other college quality of work placements was ranked least positive.

Students reported their satisfaction (adequate, good or excellent) with matters relating to work placement, with the quality of workplace experience rated at an average of 69 per cent, while the appropriateness of workplace learning rated as 71 per cent; employer/colleagues' treatment of students rated at 74 per cent, and treatment by workplace supervisors rated at 68 per cent. The lowest score was for college support during work placement, which was rated as fair or poor by 46 per cent of the respondents who completed this question. Considering the centrality of work placement in vocational training, this is a significant concern, which is also corroborated by other studies of the TVET sector and by staff data.



Aspects included among the category designated as “other” generally received satisfactory responses from students; this included language appropriateness (82%); fair and equal treatment (79%); non-academic support (63%); general enjoyment of the programme (84%); social status and respect received as a result of the programme (81%); post-study career expectations (83%); as well as the likelihood of recommending the NC(V) programme to other people (82%). Non-academic support emerged at the greatest concern, which again corroborates staff data (with suggestions of feeding schemes, student counselling and extra classes/student assistance emerging from staff respondents) and findings from other studies of the TVET sector.

### **Responses to open-ended questions**

A variety of responses were received in answer to open ended questions and only those reported by five or more per cent of student respondents are reported here, as this can be seen as a critical mass and relatively generalizable opinion. In terms of challenges and frustrations, answers to open ended questions showed that students find Mathematics the most frustrating module (seven per cent), but that they are willing to attend extra classes if these are available. This corroborates staff perceptions about Mathematics and Mathematics Literacy and is also supported by Pienaar et al.’s (2016, 15) findings. Twenty-one per cent of respondents who completed this open-ended question section said that they found practicals the most challenging part of the programme, with Filing rating especially high for difficulty (16%). A large number also indicted that they found practicals the most enjoyable part (41%) and the most interesting or satisfying part of the programme (41%). Capacitation for employment was also mentioned as the most interesting or satisfying aspect of the programme (eleven per cent). Greatest frustrations and challenges were cited as insufficient practicals (eleven per cent), programme duration (six per cent) and resources and facilities (seven per cent).

Suggestions for the improvement of these problems and addressing these challenges included extra classes (five per cent); staff capacity development and training (five per cent); the improving of resources and facilities (eight per cent); employment placement (ten per cent); industry exposure (16%); and increased stipends (13%). “More practicals and less theory” emerged as the most significant suggestion for improvement (at 16% in one question and 13% in another question).

Life Orientation, English, Mathematics and “theory” stood out as suggestions of what should be left out of the programme. How students would conceptualise of an Engineering qualification without mathematics is not clear from the responses. The response about theory should be read as a corroboration of other comments (also from staff) about the fact that there is an imbalance between the time spent on theory learning, as opposed to practical training.

This finding was also corroborated by Pienaar et al. (2016, 26). Suggestions from students about what should be included in the programme were more practicals (cited by 26% of student respondents who answered this question), industry exposure (19%) and upgrading of facilities and resources (nine per cent).

## **FINDINGS: STAFF DATA**

### **Theoretical and practical components of the NC(V) programme**

The vast majority of staff respondents were of the opinion that there was a discrepancy between the amount of time dedicated to theory and practice in the classroom. It is intended that practical training should occupy more time than theory for a vocational skills-based training programme such as this, yet the reverse was, in fact, true. This was exacerbated by the fact that classes were often too large, with an imbalance in student : staff ratios in especially practical sessions.

It was reported that often not enough dedicated practical work space existed for individual students, which meant that rotation, observation or group work were often employed as attempts to remedy the problem. Another challenge was that limited resources for practical work often impeded the work, for example the late arrival and insufficient provision of safety clothes and equipment. Staff respondents felt that students also generally rather attended practical classes, but would more often be absent from theory classes. This, of course, creates problems when theory needs to be applied in practice and for maintaining class discipline.

Though staff respondents generally felt that the theory being taught was mostly relevant and up-to-date, they did feel that the programme may be too broad in its scope and the duration too long. It was mentioned that the theory component is especially too broad in its scope for students who enter the NC(V) programme at a grade nine secondary schooling level. It was felt that some modules could possibly be combined and offered as one module. There was general consensus that students often struggle with Mathematics, especially those who enter the NC(V) programme with only a Mathematics Literacy schooling background. It was suggested that there should be much stronger correlation between school and college Mathematics syllabi. One respondent mentioned that he picked up errors in text books and that this complicated his teaching experience as he had to inform students that the information in their text books were incorrect, leading to some teaching and learning incongruences.

There was also a general feeling that the compulsory modules in English and Life Orientation take up valuable time that could otherwise be dedicated to Engineering modules. Though some respondents acknowledged the usefulness of these modules for students (particularly in adapting to student and college culture), the majority was of the opinion that

they were irrelevant and unnecessary and there was a very definite sense of hostility towards these generalist modules. One respondent suggested that students who passed English and Life Orientation in matric should be exempted from doing these modules at college level. It was also suggested that a general Safety module should be introduced as compulsory for all students and that they should be required to keep a log book of what they have learnt about safety and how they implement it in practical sessions.

It was thought that the NC(V) curriculum was generally of a good quality and high standard, for example, as compared to NATED programmes, but that NATED was often preferred by industry and employers, because they were unfamiliar with the NC(V) programme. One respondent mentioned that NATED was outdated. The knowledge and relationship gap between industry and employers, on the one hand, and colleges conducting NC(V) training, on the other hand, emerged as a common recurring theme throughout the interviews. A minority of staff respondents felt that the NC(V) curriculum was somewhat outdated and could be more relevant to latest technological developments. These comments, however, seemed to mostly come from lecturers who themselves were in possession of higher university degrees.

Some respondents felt that they do not have the requisite teaching pedagogy training for what is expected of them in terms of student and classroom management. Respondents with more theoretical training and qualifications themselves (such as university degrees) reported that they often preferred theory teaching, while those with more practical training (for example, qualified artisans) often preferred leading practical sessions over teaching theory. The need for continual and sustained staff capacity development was a universal need across campuses and colleges, both in terms of the development of technological advances and new equipment and in terms of pedagogical and teacher training.

The possibility of splitting theory and practical teaching duties between different staff members were also mentioned, with some accepting responsibility for theory only, while others could assume responsibility for practical sessions. Another suggested alternative was that there should be senior student assistants to assist with large practical classes. The possibility of a decentralised curriculum was mentioned, with the implication that colleges would be able to adapt and update their syllabi and module content in accordance with the skills and experience of specific lecturers and/or in terms of the industries specific to the geographical location of individual colleges – for example, the mining industry predominates in Gauteng and the motor manufacturing industry in the Eastern Cape.

### **Resources available for the teaching of NC(V) courses at TVET colleges**

There was general consensus that procurement was a major obstacle to teaching at both colleges

and across all campuses. Though some respondents felt that it had improved from what it was in previous years, it still remains a big problem. At both colleges procurement is managed from a centralised office on one campus and it was suggested that this should be decentralised so that each campus can manage its own procurement processes.

There seems to be a common suspiciousness among lecturers about the centralised budgeting and procurement processes, as well as about the management of funding and revenue, and its application, at the colleges, with suspicions about cross subsidization across programmes as a contributing factor to resource and procurement problems. The current centralised budgeting and procurement system at colleges is perceived to lead to delays that severely impede teaching quality, for example text books and safety equipment that were ordered sufficiently long in advance by lecturers for a new year's intake of students, yet only arrived in the second semester of that intake group's first year. Resources received are also often insufficient for the number of students registered by the colleges.

In some cases, NC(V) and NATED students are required to share classroom and laboratory space, leading to curriculum confusion, overcrowding and interpersonal frustration. The subsequent repercussions for classroom management, personal safety liability, disgruntlement among students and high stress levels among staff are obvious. It was mentioned that insufficient workshop recourses often meant that there was no room for students to make mistakes and to learn through repeated attempts, which should be a basic tenet of practical experiential and simulation training. Another comment was that for procurement purposes three quotes needed to be submitted, with the cheapest often then being purchased by the central procurement office. The cheapest materials and equipment are also often of the lowest quality and may have a short lifespan. This is often not what students would encounter in the workplace, which decreases their employability and work-readiness. It also impacts on the number of failures (with motivational and cost implications) in practical sessions due to poor quality materials.

Other resource problems mentioned are the absence of libraries on some campuses, as well as the lack of study space (such as study centres) for students to work outside of class times. In some cases, campuses closed daily between three and four pm and were not open over weekends, thereby preventing "after hours" student access. One has to also remain cognisant of the fact that the majority of TVET students are likely to be from under-privileged, low-resourced and previously disadvantaged communities, with often long commutes between home and campus (or walking the distance daily) and living conditions that are not conducive to home study, for example, lack of electricity and privacy, and often very challenging social and family conditions (Balwanz and Hlatshwayo 2015, 141). Counselling services are available

at all college campuses, but with the increasingly complex problems students have to deal with, there is a concern that underlying problems go unattended, with cumulative effects over time. More effective involvement of parents/guardians, especially those of younger students, was also raised, as was the possibility of extending college-school collaborations to mutual representation on governing bodies and committees. The need for more extensive student assistance through feeding schemes and counsellors, to help students deal with domestic and social problems at home, was also mentioned.

Lecturer and student access to computers or laptops was cited as a problem on some campuses and at all campuses intermittent, or a lack of, Wi-Fi access was a problem for both classroom teaching (as in the use of YouTube videos as examples in the classroom) and for independent out-of-classroom student work and staff preparation. Staff reported often having to share one centralised computer or not having computers in their class rooms and no laptops supplied by the colleges to take home for work purposes. Lecturers reported often using their own personal computers and funding mobile data from their own pockets for teaching purposes.

Some respondents felt that workshop equipment were outdated and that they were training students in old technologies and with old equipment, which they would never encounter in any workplace. This often also related to the infrastructure of colleges, namely old buildings or architectural limitations that did not allow for latest technology installations on campuses and in laboratories.

When compared to the prevailing student-centred and study-conducive agendas at the 26 universities in South Africa, the discrepancy is glaring and jarring. A comment that was repeated, either literally or by implication, on several occasions during this study, was that because of the conditions at many TVET colleges (in comparison to universities), students are “set up for failure”. Expectations that cannot be fulfilled and hopes that are dashed then play into the general sense of disappointment and disgruntlement with tertiary education in South Africa, which reached its apex with the 2015 and 2016 #FeesMustFall movement and violent student protests.

### **Industry exposure and the work placement of students**

It emerged from the interviews that college-industry engagement is minimal, both for staff and students. It was suggested that industry should be centrally involved in syllabus design to enhance the relevance of training and student employability and work-readiness; also that staff should be more actively involved in programmes that expose students to industry. Lecturers consistently reported that they were not formally involved in work-based placement teaching and learning activities and that these were managed through central offices at each of the

colleges.

Some respondents mentioned that they informally inform their students of opportunities for work placement of which they may be aware, write motivations and testimonials for students who do vacation work, or take them on industry field trips, but that this happens on an ad hoc and personal basis and not as a part of their formal duties and responsibilities as NC(V) lecturers. The logistics of such undertakings are then often challenging, burdensome and time-consuming and lecturers are also astutely aware of not raising expectations with students in terms of employment placement which cannot be fulfilled by the colleges. Often students themselves seek opportunities and obtain placement through personal contacts or through referral by family, friends and acquaintances. David Balwanz and Mondli Hlatshwayo (2015, 133) consider the problem of the declining manufacturing industry (de-industrialisation) in certain areas, which, alongside the global recession and the South African economic crisis, impact greatly on the availability of jobs and subsequently also on student work placement opportunities.

Respondents felt that there are not enough employers to accommodate students for work-based learning and that companies who place students may even exploit them as, for example, cleaners or to perform other menial, irrelevant or unrelated tasks that do not provide practical training and exposure relevant to the NC(V) curriculum. Some of the respondents reported that they informally receive positive feedback from both students and industry about the quality of the NC(V) graduates, but that there are no formal structures or mechanisms through means of which lecturing staff can obtain feedback about the work experience of their students from industry or from students themselves. Respondents seemed to be of the opinion that NC(V) students performed better in the workplace than NATED students, but one needs to keep in mind that the staff respondents in this study were all NC(V) lecturers and therefore possibly predisposed towards the NC(V) programme.

However, respondents seemed to be of the opinion that industry and employers are predisposed to appointing NATED students rather than NC(V) students and that there are more work opportunities for NATED graduates, when considering that this is often cited as a requirement in job advertisements, while the NC(V) qualification is not as much of a sought after employment prerequisite. It seems that the general opinion is that industry is still more familiar with the older NATED qualification and less familiar with the newer NC(V) qualification.

### **Recruitment and selection for the NC(V) programme, admission and administration processes**

There was consensus among staff respondents that it was of great concern that grade nine was

set as the minimum entrance requirement for the NC(V) programme. They expressed grave concern at the difficulties grade nine entry-level students have in coping with the NC(V) programme and the difficulties this creates for lecturers if they have to accommodate such vastly differing levels of competence as there exist between, for example grade nine and grade twelve, in one classroom. As can be expected, they reported that students with grade twelve experience (irrespective of whether they passed or failed matric) usually outperform those without matric experience. They commented that students with higher levels of Mathematics (as opposed to Mathematics Literacy), English and Technical Drawing competencies fare better as part of the NC(V) programme than those who do not have these as a pre-existing educational foundation.

The ages and maturity levels in one classroom can also often range from fifteen (grade nine) to past mid-twenties, with some mature learners of an older age range also re-entering education at TVET colleges. Discipline problems, classroom management and interpersonal conflict between students are obvious problems that may emanate from these conditions, contributing in turn to declining staff morale and wellness, heightened stress levels and illness or absenteeism. Staff respondents were aware that colleges had centralized recruitment and marketing departments responsible for student recruitment, but none of the NC(V) lecturers participating in this study were formally involved in the recruitment process, though some did say that they had in the past been involved with college marketing visits to schools. Most indicated that they would not mind being involved in the recruitment process if it ensured better quality entrants and higher levels of entry-level competence.

Concern was also raised that some misperceptions may be created among prospective students around the differences between the NC(V) and NATED programmes, with some recruiters favouring one over the other or emphasising NATED more for prospective students with higher academic levels, leaving NC(V) as the avenue for those whom recruiters feel will not cope with the NATED programmes. Expectations are then often created among recruits (especially from grade nine) which cannot be fulfilled once they are enrolled and engaged in the course work and practicals, because they do not possess the appropriate foundational knowledge and skills. Staff respondents expressed the perception that the quality of students has plummeted since 2014 and that the drop-out rate has increased significantly. Another concern was that the majority of students who enrolled at TVET colleges applied at, but were not admitted to, universities, which meant the NC(V) programme was not their first choice and this may have a negative influence on how they experience their college and NC(V) study programme.

Concern was also expressed about the general low quality of primary and secondary

education in South African schools, which are long-standing complaints that are often and widely reported elsewhere as well (Parker 2012; Swanepoel 2017; Bailey 2018). This has very significant implications for tertiary education, both at universities and TVET colleges, as bridging courses and other corrective measures must then be implemented to develop students to the required level for tertiary study. Concern was also expressed that NC(V) Level Four assessments are conducted at national level, with the danger that student marks could be inflated to improve the outputs. This reflects similar concerns around, for example, matric assessments in South Africa.

## **RECOMMENDATIONS AND CONCLUSION**

The most significant finding was that student and staff respondents agree about the unbalanced time allocations for theory and practicals. Both groups report that they want more time for practicals. Expectations around work placement are also clearly not being fulfilled and there is some dissatisfaction around the application and implementation at TVET colleges of this central tenet of vocational training. The discrepancies in the relationship between the students' motivation for enrolling in the NC(V) programme, their desired outcomes, and perceptions about the imbalance between theoretical and practical work, furthermore highlight a disconnection between the NC(V) recruitment processes and on-campus teaching and learning experience. Some of this can be attributed to challenges with budgeting, procurement, resources and facilities, as emerged from staff responses.

Students indicated that they find English as a medium of instruction appropriate. However, their lecturers indicated that students struggle in articulating themselves in both verbal and written assessments. This issue needs to be considered in relationship to the vast amount of existing and emerging research and scholarship about issues of language as teaching medium, for example in regard to debates around multilingualism(s), multiple literacies, mother-tongue education, multiple modalities and workplace literacy (Swart 2018).

Stigmas about college qualifications (as opposed to university qualifications) and NC(V), as opposed to NATED qualifications, still exist. There is a need for improved marketing and communication about the NC(V) course, which could contribute to improved perceptions about social status and respect. As students report parents and teachers as important influencers in their study programme choices, this needs to be a large scale and multi-levelled project of societal awareness and mind-set change, which will lead to the re-valuing of technical vocations as something to be proud of and to which one can and should aspire.

It can also not be overemphasised how important the buy-in and collaboration of industry is in such a project. Staff and student concerns about work placement are directly linked to the



general lack of effective campus-industry relations and engagement. There is an urgent need for industry to play a much more active role in shaping the NC(V) curriculum and in placing students in industry.

Corroborating recommendations from other authors (Pienaar et al. 2016, 39; Terblanche 2017, ii, 2), it is also recommended that priority be given to improving the quality and quantity of TVET data available at national level; that the TVET funding formula and application at individual colleges should receive attention, with individual college contexts receiving more emphasis; and that introducing bridging courses, while raising the entry requirements for NC(V) programmes, should be considered as a remedy for problems around high dropout rates and low certification rates. This should go some way to start addressing the problems around TVET education, in general, and NC(V) programmes, in particular.

NC(V) courses, generally, and NC(V) Engineering courses, specifically, are consistently reported as having alarmingly low throughput and certification rates, despite the large amounts of state funding awarded to these courses. It is essential that, in order to effectively address the issues at the root of these problems, there should be a clear understanding of how these courses are experienced by those who are most closely involved in their execution, namely lecturing staff and students. This article therefore set itself the task to report on a research study, conducted at two South African TVET colleges, about the perceptions of TVET NC(V) Engineering lecturers and students about their experience of the NC(V) study programme. It is suggested that this article should be read in conjunction with three other documents, namely the aforementioned 2015 National Treasury-commissioned Performance and Expenditure Review (PER) of the TVET Sector by Pienaar et al., the Department of Higher Education and Training's (DHET) most recent report on the TVET sector, Statistics on Post-School Education and Training in South Africa, which was released in March 2018 and is based on 2016 statistics, and Terblanche's doctoral thesis (2017). All three of these studies were conducted independently of, but at the same time as, the research study reported on here and together the three reports support and substantiate findings and make for high quality contextualised integrated analysis of the general TVET training sector. When read collectively these reports, as a body of evidence, should serve to inform at a national level the very necessary reform of TVET, and in particular, NC(V) programmes, curricula and college conditions. Effective collaboration and consultation between national government (DHET), relevant SETA's and industry are imperative for such policy and praxis reform to be successful and for the improvement of both the quality and quantity of TVET NC(V) Engineering graduate outputs and certifications, which will also contribute significantly to addressing the national scarce skills, youth unemployment and poverty crises in South Africa.

## STATEMENT

This submission has not been previously published, nor is it before another journal for consideration. It is the authors' own original work. Ethical clearance for the study was obtained from the two participating TVET colleges and from the Nelson Mandela University Ethics Committee, reference number: H17-Eng-MEn-001.

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