Professionalisation from Individual Perspectives of TVET Practitioners in South Africa - Challenges and Demands

Joint discussion paper and final report
on the CAPE-VET research results

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1. Introduction

1.1 Project Summary

The CAPE-VET project is one of 11 projects in the Meta-project on research on the internationalization of vocational training (MP-INVET) (MP-INVET, 2022). Table 1 presents the projects in the Meta-project.

Table 1 – The projects in the Meta-project

Nr.	Acronym	Project title
1.	CAPE-VET	Cooperative investigation of the prerequisites for the successful design of higher education qualification programmes for vocational training staff
2.	CodeVET	Competence development in VET. A comparative analysis of intended and implemented curricula in the field of business administration
3.	Cori VET	Costa Rican Vocational Education and Training

Nr.	Acronym	Project title
4.	DualReg	Locally rooted – worldwide linked up: Mexico – Success conditions for transfer of vocational education and dual practices
5.	efach	Factors for successful cooperation in vocational training with People's Republic of China – a comparison of state, civil society and private sector concepts
6.	IntVet	Success factors of international business models for the export of vocational training to Vietnam
7.	KuPraMex	Cultural Practice of Non-Academic Work in Mexico
8.	PeruDual	In-company training quality and role of trainers in dual VET in Peru
9.	ProWoThai	Progressing Work-Based Learning of TVET System in Thailand
10.	QualIndia	Quality Analysis of Indian Vocational Education and Training Institutions with a Focus on Industrial Training Institutes and Polytechnic Colleges
11.	VoCasian	Development of capacities and graduate schools as well as the implementation of a PhD program for vocational education and training research in Georgia

The CAPE–VET project was aimed at the cooperative and participative investigation of the prerequisites for a successful design of a higher education qualification programme for vocational training lecturers in South Africa. The project also intended to

achieve the binational strengthening of the professionalisation of TVET-Lecturers in South Africa in the Fields of Technical occupations in the Western Cape Region. Due to the high topicality and relevance of this project, the CAPE-VET project was financially supported by the Federal Ministry of Education and Research, Germany. The CAPE-VET project was realized as a highly beneficial contribution or, in other words, a Win-Win-Win partnership (in comparison to the Win-Win project), to the TVET society and its stakeholders. The project beneficiaries included:

1. **Cape Peninsula University of Technology (CPUT) in South Africa: This higher education institution would benefit from**

    a. The institutionalization of the training of vocational training staff at CPUT,
    b. Availability of qualified teachers with vocational pedagogical training, and
    c. Reliability in vocational education and training.

2. **Universities in Germany: The project partner universities and other higher education institutions in Germany would be able**

    a. To increase their internationalisation in the field of vocational education research,
    b. To strengthen their international cooperation networks,
    c. To reach the synergy effects such as:

i. Further exchanges of lecturers and students, and
ii. Follow-up projects - expansion of cooperation in education and research

3. **German enterprises in South Africa: South Africa is regarded as**

   a. A springboard to the African continent,
   b. The most important economic partner in the sub-Saharan Africa, and
   c. The country to invest in qualified personnel, especially in scientific and technical fields.

The CAPE-VET project goal was to develop scientific, participative and authentic recommendations for the design of academic professionalization for TVET lecturers at CPUT (with adaptions from the German VET-System).

1.2 Situation in Vocational Education in South Africa

The project necessity was revealed by the analysis of the situation in the TVET sector in South Africa.

The often-cited statistic of TVET graduate unemployment in South Africa is 33% (Mama, 2019). The unemployment rate amongst Business and Engineering graduates in South Africa is 47% (Mama,

2019). The COVID-19 pandemic has exacerbated South Africa's labour market woes. The official unemployment rate among young people aged 15 – 24 years recorded as 63,3% and 25 – 34 as 41,3% in South Africa in 2021 (Statistics South Africa {Stats SA}, 4 June 2021). About 3,3 million or 32,4% out of 10,2 million of young people aged 15-24 were not in employment, education and training (NEET) in South Africa (Stats SA, 4 June 2021).

The expansion of TVET has long been advocated as a solution to the problem of youth employment (Department for Higher Education and Training / DHET, 2021). Thus, TVET in South Africa is a key policy priority as TVET plays a pivotal role in developing a knowledgeable and skilled citizenry who are able to contribute effectively to the social and economic development of the country (DHET, 2013).

Since the demographic development in South Africa is positive (Stats SA, 19 July 2021), Technical and Vocational Education and Training (TVET) in South Africa is attracting concerted efforts from policy-makers, scientists and practitioners, employers and other stakeholders. Hence, TVET sector is to rise the enrolment numbers from 688.028 students in 2017 to 2.500.000 students in 2030 (DHET, 2019).

In these conditions, TVET teachers, also known as lecturers, are central to educational activity in institutions that offer TVET (DHET, 2013). However, TVET teachers' training in South Africa is under-explored and requires more attention from researchers.

The present contribution gives an overview of the research results achieved within the CAPE-VET project in the period bet-

ween 2019 -2022. The presentation of the obtained scientific results is crowned with the formulation of recommendations for the design of academic professionalization for TVET lecturers at CPUT.

The research results are built on the basis of the participatory approach. The participatory approach advocates the active engagement of stakeholders – TVET actors, companies‘ representatives, members of the government, experts, etc - in a collaborative decision-making process which can involve participation in planning, implementation and evaluation of a given topic (Slocum, 2003) as illustrated in Figure 1 (adapted from Ahrens, Foerster, Zaščerinska, Wasser, 2020).

Figure 1. Stakeholders in the participatory approach (adapted from Ahrens, Foerster, Zaščerinska, Wasser, 2020)

The involvement of stakeholders in the implementation of the participatory approach allows multi-perspective analysis of TVET in South Africa (Zascerinska, Melnikova, Ahrens, 2020). A par-

ticipatory approach encourages openness and equity in the sharing of knowledge, experience, expertise and ideas and provide diverse perspectives on an investigated topic (Hall, Gaved, & Sargent, 2021).

1.3 Corona-Situation and Adjustment of the CAPE-VET

However, starting from 2020 and up to the beginning of 2022, the implementation of the participatory approach within the CAPE-VET project was delayed and transformed by the worldwide impact of the COVID-19 pandemic. The global spread of the COVID-19 pandemic rapidly changed people's lives in an unprecedented way (Zascerinska, 2020). Social, cultural, public health, economic, political dimensions of people's lives were profoundly affected (Ahrens & Zascerinska, 2021). The pandemic COVID-19 compelled the human society to maintain social distancing (Ahrens, Bhati, Leshchenko, Zaščerinska, Gukovica, Zascerinskis, & Aleksejeva, 2021). Many people experienced the overnight digital transformation in most of their everyday activities such as working, shopping, business management, finance administration, event organisation, etc (Zaščerinska, Aleksejeva, Zaščerinskis, Gukovica, & Aleksejeva, 2020, 2021). Due to the pandemic situation in Europe and South Africa, the empirical study could not be carried out on site as planned. The participatory character of the CAPE-VET pro-

ject in the form of on-site visits was planned to start in spring 2020. As a result, the implementation of the participatory approach within the CAPE-VET project was shifted to the online mode in order to continue the project maintenance in a sustainable way. The online formats of the surveys were considered in order to preserve the dialogical-participatory approach of the project and to collect data on the perspectives of the TVET actors involved. Only in Spring 2022, the on-site visits in South Africa, a priority country in Germany for international cooperation in the field of vocational training, were renewed which helped avoid the risk of weakening the research results with only the online implementation. According to (Ahrens & Zascerinska, 2021) If only online methods are implemented, data collection and analysis could lead to

- the exclusion of the non-digital population from the study,
- the lack of the context understanding,
- the limit of discourse analysis,
- the issue of conventional fieldwork, and
- the problem of ethical and other relevant aspects of data collection and analysis.

Another important factor for a promising cooperation to explore TVET in South Africa was on-site visits to companies in South Africa to gain their perspective and to establish the communities of practice. These visits were particularly crucial for securing skilled workers in South Africa for long-term impact.

The CAPE-VET project promoted the participatory approach for

- conceptualizing TVET practices,
- learning from different perspectives, and
- continuous exchange.

All these measures have the potential to further develop the current TVET system in South Africa and contribute to the sustainable continuation of the MP-INVET project.

2. The CAPE-VET Project – Intention of Capacity Building for Vocational Training in South Africa

CPUT

The Cape Peninsula University of Technology (CPUT) in South Africa is at the heart of technology education and innovation in Africa. An internationally acclaimed institution, it is the only university of technology in the Western Cape and is the largest university in the Western Cape Province with an enrolment of more than 30 000 students. The university has six academic faculties offering a wide range of accredited undergraduate and postgraduate courses in the fields of Applied Sciences, Business and Management Sciences, Education, Engineering and the Built Environment, Informatics and Design as well as Health and Wellness Sciences.

Jacqueline Scheepers Searle's current position as Manager of the Service-Learning Unit and Civic Engagement Unit, Centre for Community Engagement and Work Integrated Learning (CE & WIL) at CPUT entails engaging with colleagues across the university from academic faculties to strategic support units. The Centre for CE & WIL was established as an institutional response to the 1991 Education White Paper on the transformation of higher education. In line with this mandate, the Centre seeks to strengthen CPUT's partnerships with industry, private organizations and the community to produce well-grounded and socially responsive graduates. CPUT defines community engagement as those activities and programmes offered by the institution which involve collaborative interaction with individuals, groups, and organizations external to CPUT at the local, regional, national and international levels to achieve economic and social objectives using engaged teaching and learning initiatives, like WIL, volunteerism, research, service learning and cooperative education.

Ms Scheepers is currently completing a PHD at the University of Flensburg in Germany. Her special interests are: TVET vocational education, Service-Learning, Trans-disciplinary work, Community Engagement, Education, Pedagogy, English for Educational Development, Communication skills, Partnerships, Sustainable Development, Social Innovation and Entrepreneurship, and the Theatrical arts. She works across multiple academic disciplines in fields such as Business, Design, Education, Engineering, Health and Science and youth leadership. For six years she was an executive member of the national South African Higher Education

Community Engagement Forum (SAHECEF), serves on the conference task team and is a board member. She has facilitated staff capacity building programmes at various universities, and lectured and presented abroad at universities in Europe (Norway, Sweden, The Netherlands, Holland, Portugal and Germany), in China and Thailand and at the Polytechnic Namibia. Ms Scheepers has published on TVET college lecturer professionalisation, Service-Learning, Language integration, assessment, partnerships and the Ubuntu philosophy.

HSW and RSI

Hochschule Wismar (HSW) located in Wismar in Germany is a state University with over 100 years of tradition. HSW builds upon interdisciplinary and practice-oriented concept integrating three disciplines of Technology, Business and Design, representing our 3 faculties. The enrolled students in 2020/21 amounted to 8.280 students, app. 4000 of which are distant learning students. HSW has 428 staff members. As a university of applied sciences, HSW works closely with the business sector in developing and delivery practice-orientated study offers. The collaboration with business and industrial partners is also an integrative part of their applied-research approach towards providing practical solutions for pressing societal challenges.

HSW is experienced not only in the field of education, science and research, but also as a knowledge transfer institution. One of the effective cooperation pilot projects is the university-business link. Important for the expertise setting up is a close cooperation with regional technology and industrial centres providing a critical tool for regional business growth and attraction and acting as an integrative part of Technology and Industrial Centre in Wismar and Schwerin.

Especially the Robert-Schmidt-Institute (RSI) is experienced in international education and research projects. Currently 5 international projects have been coordinated by RSI, among them Horizon 2020, Erasmus, PRIMA and DAAD.

Jelena Zascerinska was awarded Dr. paed. Degree from the University of Latvia, Riga, Latvia, in 2011. Since 2013 Dr. Jelena Zascerinska has been working as a scientific staff member at Hochschule Wismar, Wismar, Germany. In 1996-2005, she worked as an English for Vocational Purposes teacher at Riga Railway School and Riga Building College, Riga, Latvia. Dr. Jelena Zascerinska has been awarded a couple of research grants. The research results have been presented in more than 225 scientific publications indexed by publication databases – WoS, Thomson Reuters Conference Proceedings Citations Index, DBLP, Library of Congress and others, that demonstrates a high quality of her published contributions. In 2018 she became Expert at European Co-

operation in Science and Technology (COST) funding organization, Brussels, Belgium. In 2013, she was awarded expert rights by the European Commission Research Executive Agency, Brussels, Belgium. In 2017-2020, Dr. Jelena Zascerinska acts as an expert at National Science Centre, Krakow, Poland. In 2012-2019 Dr. Jelena Zascerinska was an expert of Latvian Council of Science, Riga, Latvia. Since 2013 Dr. Jelena Zascerinska has been actively acting as the Editorial Board Member and Reviewer in a couple of international scientific journals. Dr. Jelena Zascerinska belongs to a couple of international research teams interested in the investigation of the inter-play between education, innovations and modern technologies.

HSFL and cbta

Flensburg University of Applied Sciences (FUAS) has a broad range of fields where teaching, research and entrepreneurship are being implemented: maritime technologies, business and energy as well as biotechnology, communication and engineering.

All FUAS' professors have a track record of working in industry; the students benefit from this real-life work experience in application-oriented classes equipping them with what they need for a successful future. As a university of applied sciences these roots in application and industry are a relevant part of FUAS' identity and they extend into studies and teaching as well as into study and research projects.

Because of FUAS' firm roots and the long-standing tradition that comes with them, FUAS havs established partnerships and networks reaching far beyond the borders of the region. The university participates in numerous research projects exploring innovative approaches and defining standards. Working across borders as well as across disciplines is part of FUAS every-day work in projects, research institutes and centres.

The research carried out at Flensburg University of Applied Sciences (FUAS) is fueled by the people behind it as well as by the environment they work in. Students, professors, research and teaching staff in the four faculties work in state-of-the-art laboratories, testing and simulation facilities.

In case of the CAPE-VET project FUAS is represented by the Centre for Business and Technology in Africa. The centre strives at bringing together the various contacts and networks with its partners in Africa. This includes the sharing of knowledge through cooperation with African partners, initiating the exchange of students and lecturers and ultimately organizing events and courses with the focus on technology and business on the continent. The Centre for Business and Technology in Africa (CBTA) is hosted at Flensburg University of Applied Sciences (FUAS). The University has a strong and far-reaching network of partnerships with diverse institutions and in various industries on the African continent. Founded in 2013, CBTA bundles expertise and know-how in business, economics and technology. Principal topics include infor-

mation technology, logistics and supply-chain management, entrepreneurship and energy in African countries, regions, and economies.

Conscious of their shared history and key socio-economic parameters, CBTA co-operates with African partners to promote economic, environmental and social sustainability as well as gender equality in all its areas of expertise. This is reflected not only in the Centre's vision, mission and approach, but also in its projects and activities.

Fully funded by public and third-party means, the Centre is free to choose its content and has various projects funded by the government of Schleswig-Holstein, DAAD, BMBF and EU.

The Centre is currently operating with 8 Professors from Flensburg University of Applied Science as well as Europe University of Flensburg. Furthermore 4 more members in different positions complete the team.

The Centre is a member of UAS Africa and by its membership of the Flensburg University of Applied Sciences cooperates with the German African Business Association.

Martin Kühn has been working as a scientific staff member at FUAS since 2011 and is member of the Centre for Business and Technology. He has been studying general economics with a focus on international relations at Goethe University in Frankfurt, Germany. Martin Kühn was involved in several international projects of FUAS which included African partner institutions and companies in French and English speaking Sub-Saharan Africa, especially in Cameroon, Kenya and South Africa during the past

decade. He is CBTA's longstanding expert for Central, East and Southern Africa. His research focus is on modernization and further development of vocational education systems in Sub Saharan Africa, in the framework of the Cape-VET project and his PHD thesis especially the South African TVET system.

Prof. Dr. rer. pol. Kay J. Pfaffenberger, Dipl.-Ök. (born 1965) holds a Master in Economic Sciences from Leibniz University Hannover and a PhD in Business and Administration from the University of Leipzig. He started his career as a consultant at the S-- Kommunal Beratung in Hannover. As head of department he has developed and managed electronic banking services at the Cooperative Bank BremenNord. Furthermore, he has been a consultant for company communication at CardProcess. GmbH, Frankfurt. 2009 he founded the Institute for Communication, Finance and Good Governance. Since 2008 he has been teaching as visiting lecturer for different Universities, that is Bremen, Berlin and Hamburg. In 2012 Kay Pfaffenberger was appointed as Professor for Business Administration at Flensburg University of Applied Sciences. He is also the managing director of the Center for Business and Technology in Africa (CBTA). The main focus of his work is lecturing and applied research on business administration and political economics with a special focus on business in Africa and inter-cultural-communication, banking and finance, good governance and renewable energy. In these fields he has supported cooperative banks especially in transaction banking with strong relations to DZ Bank. He has a wide experience with projects in the financial sector and recently with solar industry

respective renewable energy companies in West Africa. The sustainable development and green energy are also in his focus. The CBTA held an online conference in 2021 about Green Hydrogen cooperation possibilities between Africa and Europe.

EUF, biat

The Institute of Vocational Education, Work and Technology (short: EUF-BIAT) at the Europa-Universität Flensburg is a department of higher academic education. The biat qualifies vocational education teachers in the fields of Metals, Electrical, Automotive, and Information Technology and deals with issues regarding the development of technology, (skilled) work and vocational training from a vocational education and an educational scientific point of view (Master of Vocational Education). The Institute's main areas of research are closely related to the demands placed upon professional education experts working in vocational schools and other teaching environments. Issues pertaining to vocational education and educational science therefore deal with developments in technology, in the particular area of (skilled) work and in vocational training and also cover the interrelation and interaction between these areas – especially during the context of Industry 4.0 and digitization and the ongoing of crosslinked working-domains and new domains of ICT. The aim of EUF-biat is to focus on the human education and the humanwork, and not the pure realisation of new technologies. The EUF-biat has been researching in the last 20 years among the field of

vocational education, its vocational specializations and the current and future role of the human-work in the evolutions of technology. EUF-biat has approximately 60 students in different semesters and has 20 employees. All students follow full time on-campus courses of two years in duration to become Master of Vocational Education.

The different vocational specializations forms parts of the degree course „Master of Vocational Education/Lehramt and beruflichen Schulen“ (industrial technical sciences). Students can develop their occupational scientific and technical knowledge and didactic skills required (e.g. planning, implementing and evaluating learning processes) for their future occupation as teachers at vocational schools or working in the area of vocational education and training and advanced training. Students can attend project-based seminars to learn about a broad range of methods of teaching by way of higher education didactic training. Based on an analysis of the vocational and working worlds within the different specialization-sectors and its current changes, it is possible to lay down requirements for the design of skill-oriented training/learning arrangements and to examine those critically. For example, in the vocational specialization Information Technology, EUF-biat therefore carries out research and provides training on the historical and current developments in vocational work as well as in vocational training and advanced training in IT professions. Professionally acting teachers in vocational education and training form the foundation for a changed learning culture, as they must critically consider the vocational work

tasks and requirements in the context of Industry 4.0 and the underlying technological and professional contexts in order to design suitable learning based on this with the goal of optimal digital competence development among learners. The new work contexts require new ways of working which, among other things, call for creative thinking, interdisciplinary cooperation but also an expanded ability to reflect on attitudes and social values in an international environment. This requires new approaches to learning or a digital learning culture. Teachers in vocational education and training have to face these changes. However, in practice, this is associated with considerable difficulties. Often teachers are left to their own devices and have few resources to further develop their technological, didactic and methodological competences with regard to the requirements outlined. Day-to-day business usually leaves little room for this necessary further development. The biat has laboratory facilities for the vocational fields of automotive, metal, information, and electrotechnology (that is with 4.0 components of Lucas Nülle and a portable 4.0-Learning Factory by Festo Didactic).

The EUF-BIAT participates in nationwide evaluation and redesign processes for initial and continuing training occupations. European and international collaborations and studies supplement and further contributes to existing knowledge in the occupational field of Electrical Technology or Information Technology, which augments teaching and research in the professional specialization of Electrical Technology.

Since October 2014, **Axel Grimm** is Professor for the vocatio-

nal specialisations of ET & IT at the Europa-Universität Flensburg in Germany, where he worked as a Junior professor for the since 2011. From 2005 to 2010, he was seconded to the TU Berlin as a research assistant with the subject: Vocational education with a focus on electrical engineering and metal technology. Therefore, from 2001 to 2005, Dr. Grimm was a Vocational Teacher at the upper-level center of TVET-College of TIEM Berlin-Spandau. He achieved his doctoral degree in 2010 on teacher action in computer-supported vocational school lessons. His research and work areas in an international and national context include: Didactics of the professional fields of electrical engineering and information technology, teaching research, vocational training research, curriculum research, teaching and learning research, teacher professional research (subjective theories), specialist work in Industry 4.0 and social and technological impact on TVET and skilled labor.

Mr **Jonas Gebhardt**, is a diploma qualified pedagogue with two university degrees/master for school education and German and History as a teacher for secondary school and sixth form. He is doctoral student and research assistant at the Institute of Vocational Education, Work and Technology (biat) at the Europa-Universität Flensburg (EUF), Germany.

Since 2015 he is working as a researcher at the Institute of Vocational Education, Work and Technology (short: biat) under the supervision of Prof. Dr. Axel Grimm in the area of the professional fields of electrical engineering and information technology and its didactics. His research focuses are interdisciplinary context of future challenges and the design of vocational educa-

tion and vocational school teaching and the skilled work in the context of:

- Digital transformation and Industry 4.0
- International vocational training
- professionalization of TVET-lecturers
- International research cooperation in the field of innovative vocational training and capacity building
- Subject-oriented hybrid empirical research approaches in the fields of vocational training and skilled work

Since 2019 Jonas Gebhardt began cooperating with his South African counterpart Jacqueline Scheepers Searle from the CPUT in the bilateral research project CAPE-VET, funded by the German Ministry of Education and Research (BMBF).

Goals: The research activities of the project "CAPE-VET, Capacity building for TVET in South Africa are cooperative investigation of the prerequisites for a successful design of qualification programmes for vocational teachers (BMBF, 2021)". This work is aimed at improving structures for the qualification and professionalization of vocational training staff in South Africa, focusing on the Western Cape Province (WC) in South Africa. In terms of the partnership, the research is a collaborative process with the partners from the Western Cape (WC) Province in South Africa and universities of northern Germany, namely HSW, HSFL, and EUF. The partners, concerning the empirical research on the TVET-perspec-

tives, included the "Service-Learning and Civic Engagement Unit, Centre for Community Engagement and Work Integrated Learning" at the Cape Peninsula University of Technology (CPUT) in South Africa and the "Institute of Vocational Education, Work and Technology" (biat, Berufsbildungsinstitut Arbeit und Technik at the Europa-Universität Flensburg) at the Europa-Universität Flensburg (EUF, GER).

Structure: The remaining part of this contribution is divided into three major chapters:

- CAPE-VET Research Findings - Challenges and Demands for TVET-Lecturer Qualification and Skilled Workers
- Emerging Themes and Design-Recommendations
- Outlook and Further Steps.

The contribution chapter devoted to the CAPE-VET research findings, namely CAPE-VET Research Findings - Challenges and Demands for TVET-Lecturer Qualification and Skilled Workers, will present the three key perspectives to focus on when designing a higher education qualification programme for vocational training lecturers in South Africa:

a. Expert-Perspective: Literature Review on TVET Teacher Training in South Africa
b. TVET-Perspectives: Insights from Western Cape TVET-Practitioners / Empirical Results

c. Industry-Perspectives: Insights from Industry-Practitioners.

Each chapter has its own sub-structure with the emphasis on

i. **Study methodology,**
ii. **Study results, and**
iii. **Study findings.**

The presented work was presented and discussed in parts with the communities of policy-makers, experts, lecturers, entrepreneurs and other interested parties at international scientific conferences, project meetings, dissemination events, forums, panel discussions and other events.

3. What are the special features of the Cape Town region?

As in the framework of the project, the focus is on the Western Cape province, with the special features of the Western Cape province being presented in this section.

The Western Cape is the third largest province regarding population in South Africa with an estimated 6.3 million people – 11.3% of the total population in 2016. In comparison, the population of the Western Cape in 2011 was 5.8 million people. The population is relatively young with 51, 8 % of the regional population being younger than 30 years of age. Approximately 50.7% of the population is female (https://cs2016.statssa.gov.za/?portfolio_page=community-survey-2016-provincial-profile-western-cape-2016).

The Western Cape covers 10% of the total area of South Africa (approximately 129,462km^2) and is the 4th largest province of the country. The Western Cape province consists of six district municipalities: City of Cape Town, West Coast, Cape Winelands, Overberg, Eden and Central Karoo. The official languages are Afrikaans,

Xhosa and English. (https://www.westerncape.gov.za/assets/departments/premier/2012.06_western_cape_overview1_0.pdf) Besides these three official and predominant languages, more languages are spoken due to the integration of diverse cultures, both regionally and internationally, into local universities and colleges.

Regarding unemployment, the Western Cape province was the province with the second lowest unemployment rate of the South African provinces in the first quarter of 2022 (25,2 %) while the province with the lowest unemployment rate was the Norther Cape province (24,9 %). Regarding the expanded definition of unemployment which includes such unemployed persons who are available to work but not looking for jobs, the Western Cape records the lowest rate. https://www.statssa.gov.za/publications/P0211/P02111stQuarter2022.pdf

There are six public TVET colleges and four universities in the Western Cape Province which attract students from diverse provinces across the country and abroad Public TVET colleges are:

- College of Cape Town (Metro Central Education District)
- False Bay College (Metro South Education District)
- Northlink College (Metro North Education District)
- West Coast College (West Coast Education District)
- Boland College (Cape Winelands Education District)
- South Cape College (Eden & Central Karoo Education District)

Therefore there is a high level of migration into the region which is characterised by a young increasing population with low employment versus a high level of absorption of migrants from other South African provinces as well as from outside South Africa - the second largest shares in both cases of the South African provinces. (https://www.statssa.gov.za/publications/P0302/P03022019.pdf)

The province has been recorded as having one of the "highest enrolment in the TVET NATED programmes in the country. The region also indicates higher rate of graduate employments with regard to the same programme type" (Papier, J., et. Al., 2017).

In the Western Cape province, the largest investments in terms of Capital Expenses (capex) in million Rands (Rm) is within the digital and renewable energy (RE) spaces, followed by tertiary services. Most jobs have been created between 2015 and 2021 in the sectors of Software and IT services, communications as well as business services. Source: FDI Intelligence (sourced from Wesgro) https://www.gov.za/speeches/mec-mireille-wenger-fdi-renewable-energy-western-cape-28-jul-2022-0000 and https://www.gov.za/sites/default/files/gcis_document/202205/46426gon2118.pdf

The top three Western Cape tertiary services are: Real estate, Other business activities, Finance and insurance. (Source: IHS ReX 2022). The fastest growing sectors in the Western Cape from 2017 till 2021 were the finance and insurance sector (2,28 %), 'Other business' activities (2,28 %) and education (1,72 %) (HIS) https://www.gov.za/sites/default/files/gcis_document/202205/46426gon2118.pdf

As the Western Cape region Is deeply integrated in the global economy it is highly affected by events affecting the global economy. Regarding global GDP growth, the International Monetary Fund (IMF) projected to slow from 6.1% in 2021 to around 3.6% in 2022. As the World bank and the OECD have cut their 2022 forecasts to 2.9% and 3% it can be expected that GDP growth slows further down. The surge in oil prices caused by the Russia-Ukraine conflict has impacted on the Western Cape agriculture and food industries which were already experiencing strain due to the Covid-19 pandemic (FDI Intelligence, 2022).

The Western Cape province provided the second strongest contribution to South Africa's GDP after the Gauteng province in recent years (https://wesgro.co.za/uploads/files/Wesgro-IQ_WC_Economic-Review_2021.11.pdf). While the GDP growth in 2021 was 4.9 % in South Africa and 4.6 % in the Western Cape region, the IMF's forecasts a much lower GDP growth of 1.5 % in South Africa in 2022 and 1.8 % in 2023. For the Western Cape province, the respective numbers are 1.4 for 2022 and 1.8 for 2023. (International Monetary Fund, World Economic Outlook, IHS 2022). In addition, inflation increased globally and is on a similar level in South Africa (7.4 % in June 2022) and Germany (7.5 % in July 2022) (https://tradingeconomics.com/country-list/inflation-rate-).

4. CAPE-VET Research Findings - Challenges and Demands for TVET-Lecturer Qualification and Skilled Workers

4.1 Expert-Perspective: Literature Review on TVET Teacher Training in South Africa

4.1.1 Literature Review

A vision is required in order to build a TVET (Technical and Vocational Education and Training) teacher training programme (Oluwajodu, Blaauw, Greyling, & Kleynhans, 2015). South African Policy on Professional Qualifications for Lecturers in Technical and Vocational Education and Training (DHET, 2013) serves as a framework of training programmes for lecturers in the TVET system. According to DHET (2013), a training programme results in TVET lecturers' competences reflected in Table 2.

Table 2 TVET lecturers' competences (adapted from DHET, 2013)

Nr.	Competence	Sub-competence
1.	Subject knowledge	– How to teach – How to select, sequence and pace content in accordance with both subject and learner needs – How to integrate teaching of knowledge, practice and affective attributes
2.	Understanding of the TVET context in South Africa	– Policy environment – Contextual realities – Practice adjustment
3.	Knowledge of who their learners are	– Socio-economic background – Age – Culture – Life and work experience – Learning styles and aspirations – Special education needs – Accommodation of learner diversity
4.	Effective communication in the language of learning and teaching	– Speaking – Reading – Writing
5.	Effective management of teaching and learning environments	– Learning enhancement

Nr.	Competence	Sub-competence
6.	Learner assessment in varied and reliable ways	– To use the results of assessment to improve learner's learning – A variety of types of feedback – Improvement of their (TVET lecturer) own practice
7.	ICT literacy	– Competent user of ICTs – To integrate ICTs in an effective manner in teaching and learning
8.	Workplace knowledge demands	– To equip learners with the subject knowledge to meet the workplace demands
9.	Positive work ethics	– Appropriate values – To enhance and develop the vocational teaching profession
10.	Critical reflection	– To reflect in theoretically informed ways – In conjunction with their professional community and colleagues, – To reflect on their own practice in order constantly to improve it and adapt it to evolving circumstances

For the enhancement of TVET lecturers' competences, training programmes are recommended to be based on different types of learning as described in Table 3.

Table 3 Types of learning in TVET training programmes (DHET, 2013)

Nr.	Type of learning	Learning components
1.	Disciplinary learning	– The study of education and its foundations: philosophy, psychology, politics, economics, sociology and history of education; cross-cutting themes (professional ethics related to knowledge and relationships between, self and others in the life) – The study of specifics and specialised subject matter relevant to academic, occupational or vocational fields
2.	Pedagogical learning	– Principles, practices and methods of teaching – General pedagogical knowledge (learner, vocational education, learning, curriculum, instructional and assessment strategies, etc) – Specialised pedagogical content knowledge (how to represent concepts, methods, rules and practices, etc) – Inclusive education – Barriers to learning
3.	Practical learning or Work Integrated Learning (WIL)	– Skills, techniques and practices in Work Integrated Learning (WIL) – Learning from practice (case study, video records, lesson observation, etc) – Learning in practice (teaching in authentic and simulated lecturing environment) – Workplace or industry practice (technical skills associated with the subject)

Nr.	Type of learning	Learning components
4.	Situational learning	– Situation – Context – Environment – Prevailing policy, political and organisational contexts – Diverse challenges
5.	Fundamental learning	– Official African language – ICTs – Academic literacies – Basic life skills

After completing a TVET training programme TVET lecturers' learning achievements, or in other words, the development of their competences, are formally recognised and certified as a qualification by an accredited institution (DHET, 2013).

4.1.2 Methodology

The literature review was carried out in November - December 2021 (Zascerinska, 2022) and an Umbrella review was implemented (Zascerinska, 2022). An Umbrella review refers to review compiling evidence from multiple reviews into one accessible and usable document (Grant & Booth, 2009). It focuses on a broad condition or problem for which there are competing interventions and it highlights reviews that address these interventions and their results (Grant & Booth, 2009). The Umbrella literature review allows for the defining of gaps between known and unknown as well as proposing recommendations for further research (Grant & Booth, 2009). The Google search for literature was based on the use of the key words "TVET", "training", "teachers", "South Africa" (Zascerinska, 2022).

The type of articles that were selected for the literature review are theoretical papers, review articles, and empirical research articles (Ramdhani, Ramdhani, & Amin, 2014). Choosing literature with conflicting theoretical positions and findings along with the position or prediction, empowers the analysis and synthesis for formulating the research findings (Ramdhani, Ramdhani, & Amin, 2014).

The analysis of the literature is based on the criteria, namely TVET lecturers' competences and types of learning, shown in Table 1 and 2. Structuring and summarising the content analysis was founded on the collected data interpretation where the researcher is the interpreter (Ahrens, Purvinis, Zascerinska, Micevičiene, & Tautkus, 2018).

4.1.3 Research Results

The literature analysis assisted in revealing the context of TVET training programmes for TVET lecturers' training. The selected literature investigation disclosed that, despite the TVET teachers being the key actors, only 4% of staff are fully qualified, and only 15% of staff are deemed to be academically and professionally qualified (DHET, 2021). In 2015 only 131 TVET teachers were trained, in 2016 – 19 TVET teachers, in 2017 – 36 TVET teachers, in 2018 – 201 TVET teachers, and in 2019 – 36 TVET teachers (DHET, 2021). The data on the number of trained TVET lecturers' shows the situation with the development of the TVET lecturers' competences which are formally recognised and certified as a qualification.

The literature analysis assisted in identifying two levels of TVET training programmes for TVET lecturers' training:

- TVET lecturers or, in other words, individual level
- TVET teacher education or, in other words, institutional level. It should be pointed that the institutional level of the creation and implementation of TVET training programmes also includes business and industry as well as other stakeholders.

Table 4 illustrates the results of the structuring content analysis of the literature review on TVET training programmes at the individual level.

Table 4 Review of TVET training programmes at the individual level (Zascerinska, 2022)

Nr.	Type of learning	A short description of the investigation	A short description of the investigation results	Reference
1.	Disciplinary learning	Knowledge in the subject	Cooperation with local companies	Zinn, Raisch, & Reimann, 2019
2.	Pedagogical learning	– Teaching skills – The theory and method of reflection levels	Cooperation with local companies – Reflection is a good tool for analysis, planning, and development of complex learning situations	Zinn, Raisch, & Reimann, 2019 Hartmann, 2016
3.	Practical learning or Work Integrated Learning (WIL)	– Integrating the world of work into initial TVET Teacher Education – Regular exposure of lecturers at public VET institutions to industry	– The development of a comprehensive curriculum framework for the industry-WIL component of the qualifications – The development of TVET lecturers' technical and pedagogical competence	Bijl, 2021 Dunkan, 2016

Nr.	Type of learning	A short description of the investigation	A short description of the investigation results	Reference
4.	Situational learning	– To shape the assessment of the state of innovation in TVET colleges in future – The policy recognition of the unique identity of TVET teachers and the relationship they should have with industry	– There are pockets of innovation practice in the TVET colleges – Innovation leaders may mentor those that are lagging – There is a willingness, and a need, to engage – The recognition of TVET as an essential actor – Training in pedagogy, in their subject knowledge, and have industry exposure/experience	DHET, 2021 Papier, 2016
5.	Fundamental learning	– Fundamentals of the development of Vocational Education and especially of the Further Education of VET teachers motivated	– The shaping-/competence-based and networked teaching and learning	Eicker, 2016

The structuring content analysis allows finding that the research in the field of TVET lecturers' training programmes does not address TVET lecturers' digital skills despite their impact on human being everyday life in the light of COVID-19 pandemic. Another finding is the entrepreneurship education is not embedded into TVET lecturers' training programmes, too.

Table 5 describes the results of the structuring content analysis of the literature review at the institutional level.

Table 5 Review of TVET training programmes at the institutional level (Zascerinska, 2022)

Nr.	Topic	A short description of the investigation	A short description of the investigation results	Reference
1.	University-based Further Education Programmes (FEPs) models	The search for models and the prospect of their use in upskilling VET practitioners	Four models, namely – Formal Apprentice, – Dual System, – Modularized, and – Viaduct	Ogwo 2016

Nr.	Topic	A short description of the investigation	A short description of the investigation results	Reference
2.	Technology-assisted, structured networking competency based Further Education among VET institutions	– Technology-assisted (cloud computing, intelligent tutors and software applications), – Structured networking (supported by regional bodies like African Union) competency	Technology-assisted and structured networking competency provides collective growth, shared resources, institutional/professional mentoring; which will be cheaper to fund and will promote transferability of knowledge/skills given the commonality in socio-cultural heritage	Ezekoye, 2016

Summarising content analysis allows finding that the design of TVET training programmes requires the synthesis of two levels:

- TVET lecturers' individual level, and
- TVET institutional level.

4.1.4 Conclusions

The literature review allows the conclusion that research in the field of TVET lecturers' training programmes in South Africa is an emerging area. Another conclusion is that the research done in the field of TVET lecturers' training programmes in South Africa is fragmentedly presented to the scientific community.

Literature analysis allows for the conclusion that in the light of the annually increasing TVET learners' enrolment numbers, TVET teacher training and its programmes of different qualification types are to become attractive for TVET lecturers. One of the ways for the creation of an attractive TVET lecturers' training programme is to put the emphasis on the enhancement of TVET lecturers' digital skills. TVET lecturers' digital skills are vital in the conditions of the COVID-19 pandemic. Entrepreneurship education in TVET training programmes could also enable the development of TVET lecturers' competences.

The presented research has some limitations. The inter-connections between TVET training programmes at individual and institutional levels, types of learning in TVET training programmes, TVET lecturers' competences and qualifications have been set. Another limitation is that only literature review was carried out. If other methods had been applied, then, different results may have been attained. Also, the focus of the literature review referred to South Africa only. In addition, the researchers' data interpretation was limited by the researchers' previous research experience in the field of TVET training programmes.

Future work will include the implementation of empirical studies in the field of the analysis of TVET training programmes in South Africa. An examination of the efficiency of TVET training programmes of different types of qualifications are proposed. The integration of the development of TVET lecturers' digital skills and entrepreneurship skills within TVET training programmes in South Africa will be considered too. Empirical studies to be carried out in South Africa intend to involve TVET lecturers, TVET teacher education institutions' administration as well as business and industry stakeholders. Comparative studies of their views and opinions on TVET training programmes are of great research interest.

4.2 TVET-Perspectives: Insights from Western Cape TVET-Practitioners / Empirical Results

The results of the inputs from the webinars indicated that college lecturers viewed their students as being the main focus of their work as illustrated in Figure 2.

This focus on students as being the centre of their professional practice was encouraging despite the many challenges being faced by the college lecturers. TVET, lecturers and teaching were the next most mentioned concepts and showed that the identity of staff at TVET colleges are firmly embedded in their teaching and lecturing practices.

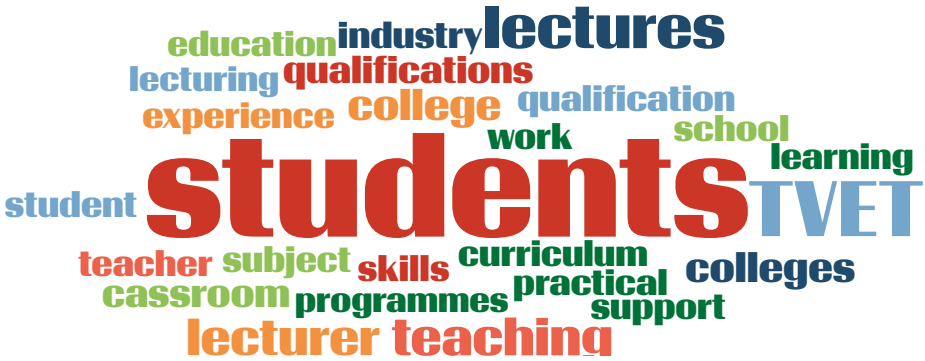

Figure 2. Word-Cloud "TVET-challenges": Visualisation of quantitative-frequented keywords of the qualitative data of TVET-practitioners (Source: the authors' own word-cloud)

The following perspectives and insights were interpreted from the qualitative data primarily collected in 2020-2021 and represents

- the perspectives of relevant TVET practitioners from different TVET colleges in the Western Cape Region (WC) around Cape Town, and
- the perspectives of TVET experts from the South African TVET Conference held by TUT in 2021.

Representatives from CPUT and DHET (Department of Higher Education and Training) in South Africa participated in the empi-

rical studies. In total 38 respondents with a TVET background, represented by mainly lecturers and TVET leaders, but also scientists and DHET representatives participated in four different virtual dialogical formats of the qualitative empirical study within the bilateral CAPE-VET project. There were the four steps in the process of the methodology applied to the empirical study to obtain the results as depicted in Figure 3.

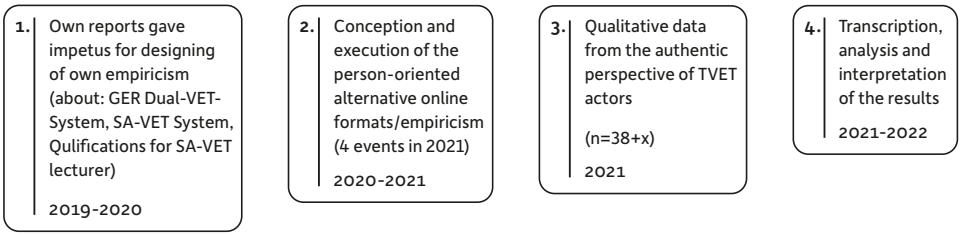

Figure 3. The methodological approach to the empirical study

In 2021, the online format of the data collection was a priority during the COVID-19 pandemic in order to continue the dialogical exchange and to carry out the qualitative empirical work. The online work was regularly organized and based on the guiding principle of exploring the current challenges and demands on the TVET lecturer from the perspective of the affected TVET practitio-

ners in Western Cape Region itself. Four key events were organized in 2021:

- 1st online colloquium on the "TVET-Leaders" in the Western Cape Region (April 2021)
- 2nd online colloquium on the "Professional development of TVET lecturers: Establishing a Community of Practice with the Western Cape TVET colleges" (May 2021)
- TVET-Conference @ Tshwane University of Technology (TUT), South Africa: Tasks with TVET Experts from South Africa (October 2021)
- Online "Speed-interviews" with TVET practitioners from Western Cape Region (December 2021).

The title of the event and the operational tasks/questions were presented to the respondents. These tasks/questions served as the basis of the dialogical exchange and at the same time as an operator for the empirical data acquisition. Here is a short description of the event and the key questions for the dialogical exchange:

1. **1st online colloquium on the "TVET-Leaders" in the Western Cape Region (April 2021)**

- What are the most critical needs and requirements for TVET lecturers entering into the colleges?

The meeting with the TVET leaders was difficult to arrange, as the researchers had to continually change the date, time and type of the meeting. Although colleges acknowledged that participating in the research project would be difficult, given the COVID-19 situation and teaching load of the college lecturers, there were also positive responses to the CAPE-VET research project. Many ideas were generated by the discussions and there was an indication that the researchers would explore creative and alternative research methodologies to meet the goals of the research project and to create an appreciative exchange format for all. The purpose of the virtual meeting with the TVET leaders was achieved as there was a broad agreement that colleges would work with the CAPE-VET researchers. Invitations to subsequent meetings and webinars received favourable responses.

2. **2nd online colloquium on the "Professional development of TVET lecturers: Establishing a Community of Practice with the Western Cape TVET colleges" (May 2021)**

- Discuss a day in the life of a TVET lecturer in 2021
- Characterise the ideal skills and qualifications required by TVET lecturers.
- What are your hopes for a good community of practice for TVET?

3. **TVET-Conference @ Tshwane University of Technology (TUT), South Africa: Tasks with TVET Experts from South Africa (October 2021)**

- 1) What are big challenges facing the TVET colleges at moment
- 2) Scale the 2 statements (strongly disagree to strongly agree)

Statements/categories and results of the TVET experts from the TUT TVET-conference were "mirrored" by the TVET practitioners from the Western Cape Region in the following sessions of the speed interviews, and at the same time served to form analyzing categories to frame the qualitative data for steps 3 and 4 as indicated in Figure 4.

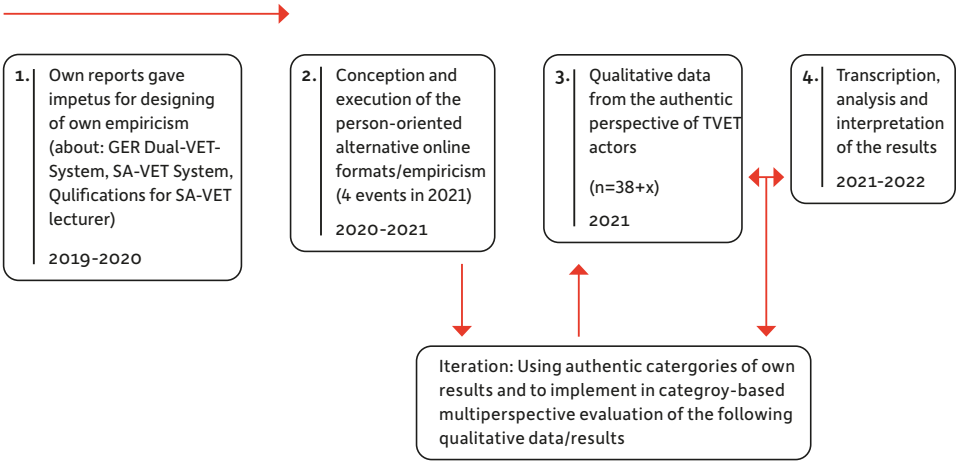

Figure 4. An updated methodological approach to the empirical study

4. **Online "Speed-interviews" with TVET practitioners from Western Cape Region (December 2021)**

- Provide details of the qualifications/training programmes which assisted you to become a TVET lecturer.
- In your opinion, what skills/competencies are required for a TVET lecturer?
- What suggestions do you have for future professionalism programmes?
- Comment the WORD-Cloud „Challenges facing the TVET colleges" from the TUT-Conference.
- Comment on the results of the 2 Statements from the TUT-Conference.

At the end of the speed interviews, the data was evaluated and jointly processed by the South African-German research team using existing categories and newly created categories. This was done with the intention of valuing everyone involved by identifying:

- existing categories along the research interest of the CAPE-VET application,
- existing categories along the reports and the experts of the TUT-Conference, and
- new categories emerged from the analysis and interpretation of the qualitative data collected from all TVET stakeholders.

The joint exchange in the presented virtual formats on the TVET-topic enables insights into the Mannheim's conjunctive experiential spaces (Bohnsack, R. (2018: 21); Nentwig-Gesemann 2018, p. 131ff.) of the actors, their orientation framework and relevant settings. Simply by appreciating the interviewed respondents and their collaboration, the participation in the knowledge gain of each participant is strengthened in the sense of a participatory character and the multi-perspective and individual consideration of the research object in the sense of a cooperative bilateral research understanding (Diekmann 2003, p. 456f., Meuser 2018, p. 151, Hopf 2015, p. 349ff.).

In this way, the codes/categories were created, to which the qualitative data, as the statements of the participants, were assigned by the research team or as these first emerged from the analysis of what was said. Attached is this "category tree". In the sense of a theoretical iterative understanding of research, this could also change continuously the more often the data obtained is interpreted and assigned or as different people take on the evaluation of the data. In the sense of a disclosed and non-binary understanding of research and interest in knowledge, the codes/categories included as shown in Table 6:

Table 6 Category tree

No.	Codes and categories	Sub-categories
1.	Access	
2.	Industrial linkages	
3.	Lecturer training and study programmes	– Exchange of Good Practice – Appreciation of academic backgrounds of TVET lecturers – Lecturer training – Lack of lecturer support
4.	Qualifications of TVET-Practitioners	– Qualification background TVET leaders – Qualification background TVET lecturers – Qualification demands TVET-Lecturer
5.	Resources and infrastructure	– Lack of Resources – Lack of Infrastructure
6.	Curriculum, Content, Classes	
7.	Current general challenges for TVET College	– Rural Areas – Overload and Overwork – Covid-19 / Pandemic
8.	Skills and Competencies for TVET Lecturer	– Pedagogy – Classroom-Management – ICT-Skills – English as 2nd Language – Interdisciplinarity and Reflection: Teaching & Learning Skills (e-learning/ Blended Learning)

No.	Codes and categories	Sub-categories
9.	Technical/Vocational Skills	
10.	Skills development	
11.	Soft skills	
12.	Skills mismatch	
13.	Intrinsic Codes of the Data (In Vivo Codes)	– „Post-Apartheid-legacy“ – Types of Lecturer (3 Cohorts) – Not generalising in TVET – Poverty/Hunger

In order to generate a summarized focus for this report, it was decided to present the results by the following categories/themes that emphasize the importance of i) Industrial and practical linkages; ii) Lecturer training; iii) Exchange of good practice; iv) Qualifications; v) Resources and infrastructure; vii) Language, culture and diversity; viii) “Legacy of the apartheid past impacting on the TVET college sector”; and viiii) Summary and conclusions. Each category is shortly described as following:

i. Industrial and practical linkages

The subject most mentioned in the virtual interviews with college lecturers was that of industrial and practical linkages. Lecturers emphasized the importance of young teachers who brought new ideas into the sector when they do their teaching practice in

the colleges. One lecturer mentioned that "it made us review our own practices if we have young people with different ideas coming into the sector". This indicated a need for constant renewal of teaching practices and exposure to new ideas and strategies for lecturers in TVET colleges.

Lecturers have technical qualifications and followed careers in industry before switching to lecturing in the TVET sector. One lecturer stated: "I switched to the education sector in 2014, after I decided to change my career path".

Although lecturers may have the relevant qualification and skills, "they don't necessarily have field expert experience", said one lecturer, who felt that this was essential " especially in practical subjects, for example agriculture, engineering". In fact, the lecturer also cautioned against the danger posed by just having a broad teaching qualification. Being a qualified subject expert in the discipline being taught was important. In addition, lecturers should also have "worked in the industry for a while".

There was a strong indication that irrespective of the educational qualification of lecturers, they would need to experience a stint in industry as reflected in the statement: "whether you have the qualification in IT or whether you have a broad bachelors in education, it could be beneficial to use, or take those lecturers and place them in an industry role for a short period of time to get that expertise". It was felt that only through this exposure to industry, that the lecturer would understand "what needs to be taught to the students" and could keep updated on current trends in the field.

Students appear to fare better in tests than in practical as-

sessments which shows a gap between the theoretical knowledge and the application of that knowledge. Industry expects TVET graduates to be work-ready as they "do not have the time to teach the students to do the work". This expectation does impact on students and their ability to meet the demands and expectations of the workplace.

There was an acknowledgement from one interviewee that employers were not providing jobs to students in the IT industry due to the curriculum not being aligned to the mainstream needs of industry. What is covered in the curriculum does therefore impact on how industry views the colleges. Those students who go beyond what they are taught can still be placed in industry but for the majority of students an irrelevant curriculum will impact on their future opportunities for placement in industry.

One observation is that TVET students need to be better prepared for the workplace and should be provided with the "relevant job readiness programmes". However, many colleges do not have the funds to implement their job readiness programmes so this remains a big challenge in the sector. It is important for students to be prepared for the world of work and these programmes have the potential to impact positively on the readiness of students for the workplace. A participant observed that TVET college students are not aware of what to expect when they go into industry. In her view, it is not enough for lecturers to have a teaching diploma. Lecturers should use adult education principles and should prepare their students for industry.

Work Integrated Learning (WIL) was considered by TVET staff

to be an important part of compliance as according to TVET staff, it was a directive from DHET. Some lecturers have "never been exposed to industry at all. They don't know what is current". There was an acknowledgement that lecturers could improve their knowledge of current industry trends through conducting research. However, especially in disciplines like Travel and Tourism, Hospitality, and so on, lecturers need to "speak from an authentic place … {which} creates a greater meaning in the interaction in the classroom between the lecturer and the student. But many lecturers in the sector – {have} no exposure to industry."

The view of a practitioner is that there should be a "set time for the lecturers to go into the work placement and due to the workload there's not really the correct time to place the lecturers into the sector, but we need to do that, we are non-complaint on work-integrated-learning." Although some lecturers are placed in industry there were some challenges associated with this practice. The challenges posed by providing lecturers with work placement experiences are that one would need "to set time for the lecturers to go into the work placement". One lecturer proposed that lecturers should go into industry during the examination period to minimise the impact on the teaching and learning programme. One college is planning to send lecturers to industry for one or two weeks during the examinations.

One lecturer narrated an experience of time spent in industry and how this had been of great professional benefit. The impact of this experiences was expressed as

- Being introduced to all role players in that business on all levels;
- Gaining hands-on, practical experience of the factory;
- Skills transfer from the industry into the classroom;
- Industry experience leading to a change in pedagogical practices;
- Building an understanding of the infrastructure of that particular industry; and
- Networking opportunities in the profession leading to placement of TVET students in industry.

These factors indicated how the industry experience impacted positively on the professional practices of the TVET lecturers.

There appears to be a dissonance between the call to lecturers to get industry exposure and the reality on the ground for many of the TVET colleges. When lecturers request substitutes to stand in for them when they are in industry, then the response is: "there's no funding to pay that person to stand in for you for a week or two". The lack of funding for WIL in some colleges does hamper the professional development of lecturers in terms of their understanding of the industry context. This in turn affects their ability to understand their discipline within an industry context. As the workplace is everchanging the impact of not kee-

ping up with current trends will in most probability filter negatively down from lecturers to students. To ensure that there is retention of knowledge, one lecturer posited that practical experience should always be added to theoretical concepts and that "You can't have one without the other."

Feedback from one college indicated that industry linkages were lacking. Partnerships with major organisations should be developed as they will be most willing to assist the colleges. Without resources and infrastructure, it becomes difficult to teach in disciplines such as engineering and science. One college programme leader reminisced about a time when there was no Internet and how they as learners were told to close their eyes and to use their imagination. But now that there is the Internet, it has helped. Also expressed was a desire to purchase additional infrastructure to improve on the practical learning experiences of students. Despite submitting requests for additional infrastructure and resources this was not provided which had a negative impact on teaching the practical components of the course. One participant observed that it was essential that lecturers are "taught how to create strategic linkages" and "how to formulate my partnership, how to nurture my partnership, how to identify my partnership". Industry partnerships are important for the TVET college lecturers in terms of their professional practice and to maintain the relevancy of their teaching activities. A suggestion was made by one participant that lecturers should invite professionals to the classroom so that connections and linkages could be maintained between industry and the students in the classroom.

A lecturer expressed: “we can show our students the practical application of Mathematics” and that inviting companies to visit the college to talk to students about these concepts was inadequate as there was no practical application. The lecturer used an example when she was working in the testing lab in a company. Students from two universities visited the factory where they could experience concrete manufacturing. According to the lecturer, there are no funds to implement this with the current college students.

There are college lecturers who come from a school teaching environment. In addition, many lecturers entering the TVET college system have a formal teaching qualification but do not have industry experience. The need for lecturers to be exposed to the workplace was considered an important aspect for lecturers.

However, one lecturer did mention that industry experience was gained by working in industry before commencing a lecturing career at a TVET college as stated: “When I left my teaching profession I went into industry. So I worked in industry for a while and obviously began to get good insight into how industry operates, functions, and expectations of work output”. It is important for lecturers to gain Industry experience by spending time in the industry of their specialty. This will assist lecturers to keep abreast of current trends and practices. Lecturers should have subject knowledge, understand pedagogy and knowledge of industry.

Staff who have a broad range of skills have an advantage in the TVET sector. One participant mentioned that industry expe-

rience combined with education experience and having a career counsellor qualification provided knowledge of the whole process from an "understanding of the journey from beginning to end, which is how to place a student at the beginning appropriately and … what informs the correct placement of a student in a study programme". The lecturer used this combination of skills to develop "a workplace system … a work integrated learning placement system for the college".

It was encouraging to learn that one college is setting up a Work Integrated Learning (WIL) programme which was informed by CPUT's model of WIL and is conducting research on the relationship with industry.

Lecturers need time in industry in their specific field as "practical work industry experience" was critical, argued one lecturer. Industry persons are considered to be "very competent and skilled in their subject area" and are therefore recruited by some of the colleges.

Sometimes lecturers who come from industry have to adjust to the very different contexts and profiles of the TVET college students. The national certificate vocational student can range in age from 16-20 years old. They may also be teaching adults who have had some industry experience; and therefore the context varies considerably. Lecturing adults who come from industry needs adjustment on the part of the lecturer as they may already know how to do the practicals. Therefore, some teaching adjustment is required.

Lecturers who teach theoretical aspects of the TVET programmes and directly from the textbook may lack industry experience and therefore cannot make relevant connections with industry. They are unable to use actual examples of industry in their teaching yet they are expected to prepare their students for the workplace. It is important that lecturers have "knowledge of applied learning, of applying the skills". One participant held the view that "The quality of authentic task design in TVET classes is the key". In the words of a lecturer: "Where the alignment and the close working relationship between lecturing staff and their experience of industry – there's such a seamless integration there."

A most interesting suggestion was that constant upskilling is vital as there are ongoing changes in industry. An example was used where well-equipped schools would collaborate with Model C schools thereby creating an opportunity to learn best practices. The suggestion was made that under-resourced TVET colleges could benefit from similar collaborations with more affluent colleges.

ii. Lecturer training

Lecturers responded to the instruction from the Department of Higher Education in 2016 which stated that it is mandatory to have an educational qualification. One lecturer therefore enrolled and did a postgraduate diploma in education specialization in ICT after being appointed as a subject expert in the IT department.

TVET college staff have varied qualifications and professional development experiences. Some have gained their formal qualifi-

cations at a university while others gained their formal educational qualifications at a university of technology. There appears to be a concerted effort towards life-long learning and continuous development.

Lecturers leave industry and enter the TVET sector for various reasons. When they do enter the TVET sector, it is incumbent on them to get a professional teaching qualification. There may be varied reasons why they leave industry to occupy a lecturing position at a TVET college. One lecturer said that industry "was not challenging me. When you do things over and over again you eventually get bored, this is why I have changed the sector".

There appears to be a disjuncture between lecturers who have "worked in industry for many years and now they're coming to teach and train in a college environment", particularly in the National Certificate Vocational (16-20 years), according to one participant. Although there was an acknowledgement that some lecturers who come from industry may teach adults in the college setting, the profile is generally that of younger students as indicated.

The prior professional life of lecturers interviewed span across various sectors, giving lecturers broad experience and diverse skills. One lecturer stated that she is registered for a Honours degree at a University and has taught at a high school for eight years, which she found challenging. After working in industry and the private sector for many years, this lecturer went back into teaching but in the TVET sector.

There is a clear distinction made between lecturers and

school teachers who have had experience in teaching at a school in comparison to lecturers with no prior teaching experience. This experience was important for this particular lecturer leading to the choice of "I want to be a teacher or I don't want to be a teacher".

Having practical phases in study programmes for lecturers is essential. One lecturer reported that practical teaching experiences were provided from the 1st year of teacher studies so that students were provided with practical experiences of teaching. One strategy used was for the students in these teaching programmes to act "as TVET students".

Lecturers from industry need a teaching qualification to prepare them for dealing with the needs of students at TVET colleges, according to one lecturer who states that students need "to be guided in how they need to understand learning material (the curriculum) and how to observe that". They need to be equipped with the knowledge so that they are able to prepare their students for industry. In one Masters course, there was a module on how lecturers could prepare their students for the workplace. Teaching qualifications should include a section on how lecturers can prepare their students for their future work placement. These courses should be based on adult education principles, according to one interviewee.

One view expressed by a TVET practitioner is that lecturers need to be trained by industry so that their teaching practices can be improved. According to one lecturer, what is lacking currently is the successful transition from the school setting to the

college and then to the workplace. There is the view that lecturers should "understand how the whole TVET system interrelates."

College lecturers should embrace a life-long learning approach to remain relevant and up to date with industry trends. An example from the school sector was used to illustrate how crossing the divide between colleges that are well resourced and those colleges which fall under the banner of 'previously disadvantaged', could lead to improved practices. This engagement could lead to a more equitable environment in the sector.

Like in many institutions of learning, lecturers occupy management positions after a few years of lecturing. This would perhaps require capacity building programmes which could assist new TVET managers in the sector.

There is a realisation that staff need to engage in capacity building programmes but the practical implications of implementing this seem daunting. Releasing staff from their classes to participate in programmes is a challenge as there is a concern that academic delivery may be compromised.

Qualifications need to be matched to programme needs. There is a mismatching of skills and qualifications as some programmes are being phased out. Staff who used to teach on these programmes are left behind and are then subsequently are moved to another programme.

Lecturer training needs to be ongoing and continuous. Some TVET leaders/lecturers may have a lack of reflective competencies, concerning adapting to the diverse socio-economic back-

grounds of their students. The use of middle class-discourse and othering may alienate students who are experiencing severe challenges related to their social and economic status.

Lecturer Workplace Exposure (LWE) in the specialty area is critical for lecturers so that they can familiarise themselves with current developments and industry trends. In fact, subject knowledge, comprehension of pedagogy and knowledge of the industry context is extremely important for TVET lecturers. In some cases, concessions are made when it comes to appointing lecturers for the occupational streams like the Engineering fields. There is a priority given to artisans who are qualified.

In South Africa it is common to find lecturers who enter the TVET sector as a lecturer to have no industry experience. Although many lecturers come to the college after teaching for many years in a school environment, and are engaged in research in the industry, it is inadequate to equip them to teach a student in a specific field like Hospitality, Travel and Tourism for example. One participant felt strongly that to teach, one has to "speak from an authentic place".

One important aspect mentioned was the diversity of students at colleges and that lecturers would need to be prepared for this. Lecturers will need to understand how to teach diverse students with diverse learning styles and that the "one size fits all" approach is not viable. One lecturer raised the point that lecturers are not trained to teach students with learning barriers within the mainstream group.

There are many challenges facing colleges. One college ad-

mitted that they could achieve more but that they required the DHET to help them to be more successful.

iii. Exchange of good practice

Lecturers understood the benefits associated with participating in programmes and activities where they exchange their ideas and strategies on good practices. Observations are that through engagement with lecturers and practitioners across the sector TVET staff can:

- gain an understanding of the workings of the TVET system and the interrelation of the respective components within the system
- listen to individual stories which share experiences
- share ideas and practices which work
- learn from diverse lenses and perspectives
- lead to the conceptualisation of new practices to improve pedagogy, and
- participate in research projects that can lead to implementation of recommendations that ultimately will improve the qualifications of TVET lecturers

Lecturers emphasised the importance of young teachers who brought new ideas into the sector when they do their teaching practice in the colleges. One lecturer mentioned that "it made us review our own practices if we have young people with different ideas coming into the sector". This indicated a need for constant

renewal of teaching practices and exposure to new ideas and strategies for lecturers in TVET colleges. According to one lecturer, "there are colleges in the country that have some fantastic practices relating to all of these areas – that we learn from." There was a concern posed regarding the retention of education students who are placed in the TVET sector. At one college 8 – 10 students are placed in that particular college for teaching practice. The college benefited from hosting CPUT students as they brought refreshing ideas which rejuvenated the TVET system. However, a concern raised was that university students who are placed teaching practice at this college do not come back as lecturers into the college.

There exist distinct similarities between the Universities of Technology and TVET Colleges. When colleges engage in research activities with universities it does impact positively on college staff. Lecturers benefit from engaging in conversations on methodologies which could assist with reimagining their professional practices. TVET college staff do participate in research projects, for example the University of the Western Cape (UWC) DHET research project led by Professor Joy Papier which has enabled TVET lecturers to achieve their Master qualification. Despite the demands on the lecturing staff to optimally engage with students, there is a positive impact on staff who engage in research projects that are led by universities. Research results should not be generalised for the whole TVET sector as colleges are diverse and their realities may differ from each other. The researchers and lecturers agree that the notion of the self-reflective practitio-

ner is one aim of the engagement. There was a willingness to assist with the research project and collaborate with the university researchers. It was established that lecturers should not just focus on teaching without exploring how to improve and what theories should guide their practice.

Staff participate in various platforms for example serving on provincial curriculum forums and on e-learning platforms. It was acknowledged that technology in fields like IT and Engineering for example, changes rapidly which often leaves the existing curriculum behind. Therefore, constant updating of the curriculum, and the adaptation of teaching content needs to be considered to keep up with these changing trends.

One lecturer expressed the wish that the implementation of the research recommendations could lead to more qualified lecturers. TVET college lecturers should ground their practice in sound pedagogy. A teaching qualification provides lectures with an "understanding of classroom management and how to manage educational delivery".

iv. Qualifications

College staff recall their time studying at the former Technikons where their practical teaching was done in the schools from as early as in their 2nd year of study. Student teachers received credits for teaching methodology. There was a suggestion from a participant that study programmes for TVET lecturers should have compulsory practical phases from the first year of study like in the case of some of the former Technikons. Student lecturers

would get teaching experience by teaching each other. The participant believes that competency in a particular area of learning can only be achieved when the theory and practical components are combined.

A college participant confirmed the importance of Work Integrated Learning (WIL) for lecturers and students so that they could have industry exposure. The view was that there cannot be quality education without having expertise in the specific subject field. Therefore, a qualification is of no use without the application of expertise within that particular field.

According to one lecturer, field experience is necessary particularly in practical subjects. Lecturers need to experience the practical aspects of the curriculum within an industry context so that they can adequately relay that knowledge back to their students. The knowledge would then be up to date.

Teachers who are trained at a college are taught "pedagogy, didactics, methodologies of how you need to take the student from this point from the unknown to the known". Lecturers receive students who do not necessarily have knowledge of the field related to their course. Given this context, the lecturer believes that having a teaching qualification is essential.

A college manager indicated how their Staff Skills Development Programme provided funding so that lecturers, who were qualified artisans, could be supported to gain a teacher's qualification. They prioritised this when allocating funding. The support and funding for achieving teaching qualifications therefore exists and shows a commitment by colleges to the professional development of their lecturers.

According to one lecturer, future lecturers should have soft skills and not only focus on their technological knowledge. One of these skills are communication skills and how to build connections with others. Other skills are how to work across disciplines in interdisciplinary teams and understanding various contexts.

Any TVET lecturer qualification or professional development programme for TVET college lecturers should consider that lecturers have different needs. According to one participant, there are three types of lecturers which need to be accommodated:

- lecturers from industry who need teacher qualifications and how to manage classrooms;
- lecturers with a formal TVET lecturer qualification but no industry experience and who need workplace exposure; and
- lecturers who are teaching on a purely theoretical level or who are teaching only in a "practical application workshop context".

Therefore, any qualification should have sound pedagogical components which need to have relevance for the TVET sector. The qualification should not be generic but should "relate to vocational educational training. Because this is a very specific environment." said one participant.

A participant mentioned that at their college they promote the notion of the self-reflecting practitioner. Their view is that

practitioners need to focus not just on teaching but also how to improve on teaching practice and to identify the theories guiding these practices.

v. Resources and infrastructure

Resources are a challenge for many colleges. There is a tension between the directive from the ministry (60 thousand students in TVET colleges) and the facilities that have not been updated.

When looking at the TVET sector, one should not generalise the results and opinions from research "for the whole TVET Sector" cautioned one practitioner. Colleges are diverse depending on where they are located, who the students are, and the prior history and legacy of that college.

It is evident that some colleges are better resourced than others. An interviewee stated that: "we've got fantastic open learning centres. Beautiful spaces where students can sit and study. These are like libraries combined with computer labs and so on. You can walk into any cafeteria in our college and you have Wifi access. There are Wifi access points all over the college campus." This however is not a reality for all colleges with some experiencing challenges related to the provision of resources for staff and students.

The facilities in some colleges are inadequate as there is not enough space to deliver programmes effectively. There are not enough computers for students and all subjects have a computer component. At one college there are no generators when there is load shedding. This impacts on examinations which are halted

until the electricity comes back on.

There is poor or no WIFI access at some colleges which has a severe impact on the delivery of programmes and access to students.

In colleges which are under-resourced and have poor infrastructure, there also exists a lack of informal learning spaces where students can engage with each other on campus outside of the classroom.

According to one interviewee, one of the skills required by lecturers in a TVET college is adaptability as lecturers "often need to hit the ground running and deliver curriculum and administrative duties, policy and budget changes to effect positive delivery by lecturers and students." Lecturers are required to adapt quickly to the college environment which differs considerably from the industry environment. Professional practices need to be aligned to policy directives and budget restrictions whilst delivering a curriculum service to students.

vi. Information and Communications Technology (ICT)

One interesting comment was that TVET lecturers needed a "spirit for wanting to learn" when it comes to taking their teaching into the digital age. Lecturers who resist change and new technologies run the danger of being left behind and thereby impacting on the readiness of their students to operate effectively in the world of work, which has embraced the digitalisation of the industry.

The global pandemic created a further emphasis on the use of technology in teaching. One interviewee emphasised that going

forward “lecturers would need skills in online teaching and how to better use technology to augment their teaching and then pedagogy of teaching … we envisage that more and more that they are going to teach online”.

One college was prepared for blended learning when the Pandemic struck as they had already implemented distance learning as early as 2012. The college had an e-learning platform called a Blackboard Learning Management System in place with a dedicated unit with staff.

A practitioner from a well-resourced college stated that switching to online teaching during the Covid-19 pandemic: “wasn’t a great leap for us. But one of the things that we did not issue at the time was that we didn’t give everybody, every lecturer a laptop, being able to prepare lessons and then plug into the classroom … with a data view projector and so… or even taking a laptop from home and transmitting it online.”

A lack of basic ICT skills in both lecturers and students does pose a challenge for colleges, particularly when it comes to the development of digital content as an essential component of teaching and teaching today. Of particular concern is that many lecturers in colleges still require technological skills so that they could implement blended learning approaches including using technology in the classroom. The feedback from college staff is that basic ICT skills are non-negotiable for college lecturers.

In fields like “IT and engineering the technology is moving so fast, that the curriculum can`t keep up. It is definitely important for lecturers to make sure that they are updated and capable of

doing what they are teaching."

Another participant also expressed concern that "They do not have the basic skills for ICT {which are} a definitive must for lecturing" at a TVET college. One lecturer reflected on how lecturers could make use of social media like Tik Toc as making video clips would appeal to young students.

There was a prediction that online teaching will increase in the future as reflected by a participant. This would create a need for lecturers to develop skills to teach online and to improve their technology. Learning how to use technology to enhance teaching will contribute to the preparation of lecturers for a future world.

Capacity Building for lecturers on blended learning was identified as many "lecturers don't have the skills to use technology in the classrooms as a blended learning approach". This impacts on the professional practices of the lecturers as technological skills and programmes would need to be kept relevant and updated in response to the demands of a highly technological present and future workplace. A question posed by one lecturer showed the need of lecturers in terms of capacity building: "How we do maximise the technology that exists out there to inform and engage the debate around TVET Education and training?". The lecturer reflected that by sharing information "staff would engage with each other about practices".

vii. Language, culture and diversity

South Africa is a very diverse country with many languages and cultural groups. In the Western Cape Province, there are three dominant languages spoken which are Afrikaans, English and isiXhosa. The student population in TVET colleges in the Western Cape is very diverse in terms of culture, language, background, and so on. However, the language of instruction at most post-school institutions in South Africa is English. There was an observation from a college that English is mostly a 2nd/3rd/4th language as most students do not speak it outside the college environment. This poses many challenges for students and lecturers who have English as a first, second or even third language. Practitioners are often not trained to teach their discipline in English to students for whom English is not a first language. This has the potential to create adjustment and comprehension difficulties between lecturers and students and between learning materials and students.

viii. Legacy of the past impacting on the TVET college sector

The Western Cape region is geographically composed of urban, peri-urban and rural towns. Unemployment and poverty is a reality in the Western Cape, especially in rural communities. As a result, informal settlements exist on the outskirts of the urban and industrial areas as many people migrate to cities in search of employment opportunities. In addition, many people in the Western Cape reside on farms and in small towns which are far removed from the resources of the city.

The legacy of the Apartheid era in South Africa is still experienced by many citizens in the Western Cape. This is no different in the TVET sector in the Western Cape. The research indicates that TVET colleges which are situated in the city or in well-resourced towns (previously "White" sections of the towns) are better resourced than rural colleges. There are also distinct differences between the needs and resources experienced by the different colleges in the Western Cape Province, South Africa. TVET colleges therefore differ considerably in respect of their challenges. Many historical educational institutions in South Africa inherited their infrastructure from the Apartheid era. Inequalities in distribution of resources may be attributed to their locations (urban, peri-urban and rural) and also to the remnants of an Apartheid past where there was an unequal allocation of resources to educational institutions, depending on which geographical areas and students they were servicing. The socio-economic challenges experienced by students were observed to have a negative impact on the teaching and learning at some colleges. These may be attributed to inherited infrastructure from institutions of learning that were historically more privileged than others.

There is a wide gap between colleges which have inherited resources and sound governance and those colleges who grapple for resources. Historical inequalities are evident in the resourcing of colleges and the poverty experienced by some students who attend these colleges. There is great disparity between the rich and the poor which is still a reality in the Western Cape today. There was a call from one participant to "really assess the realities of the urgency to move education forward and the crude

realities of South Africa, and the impact of Covid on poverty". The socio-economic barriers experienced by many South Africans, particularly in impoverished communities, impacts on the education delivery in TVET colleges. Students who experience these challenges are often hampered in their journey towards realising their true potential. Access to the very basic needs is a reality that is faced by many college students. This is an added concern for college staff who from a humanitarian perspective attempt to address these needs like clothing and food. For lecturers teaching in this environment, it can be difficult to implement their curriculum effectively.

ix. Summary and conclusions

The following summary and recommendations are presented based on the data which emerged out of the data as collected, analysed and interpreted by the researchers from the CPUT/SA and the EUF/GER:

- An educational qualification for lecturers is critical for teaching and learning success and for meeting learner challenges in the TVET sector. This is also a DHET requirement.
- Lecturers who have experience in special education will be able to assist learners who have learner difficulties.
- It is an advantage for lecturers to have experience of teaching at a school before entering the TVET sector so that they have an understanding of pedagogy and didactics.
- The Postgraduate Certificate in Education (PGCE) should

contain enough teaching opportunities to prepare lectures for teaching at a TVET college and should include didactics and methodology.

- Training for teachers should follow a holistic approach which includes a psychology component to prepare lecturers for the complex challenges encountered in a TVET environment.
- Lecturers should be trained on methodologies which prepare students for the World of Work.
- Adult education principles should be applied when teaching in the TVET sector as the demographics include adult learners, many who are from industry.
- Lecturers should be able to teach students study methods and strategies and should be aware that the reason why students perform poorly is often because they misread or misunderstand the question.
- TVET lecturers should be made aware of the diversity of the students that they will encounter in their classes at colleges.
- TVET colleges should use external consultants to train lecturers if the expertise does not exist in the TVET college.
- Industry partners should be called upon to train lecturers so that lecturers are kept updated on industry developments.
- Strategies should be devised to bridge the gap between the school sector, the college and the workplace.

4.3 Industry-Perspectives: Insights from Industry-Practitioners

Methodology

The purpose of this partial study was to analyse authentic views and insights of companies in different industries on TVET in South Africa. The qualitative survey included semi-structured interviews which have been conducted with companies to identify demands and requirements regarding competences of graduates of TVET colleges and which competences companies of different industries look for in graduates of TVET colleges. Another aim of the study was to identify best practice examples regarding the training of students and lecturers / facilitators by companies and cooperation between industry and TVET institutions.

Figure 5 gives an overall view of the methodological process of the study.

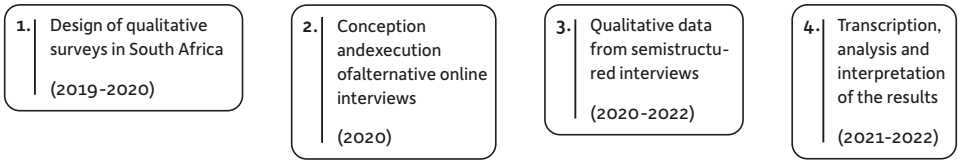

Figure 5 Methodology Process

In the first phase of the research process, the conception of the qualitative survey to be conducted in South Africa was designed in the period 2019 to 2020. Based on literature research and talks to experts the categories on which the questions for the interview guidelines were based have been developed.

The interview guideline included questions regarding recruitment, competences of TVET students/graduates such as subject competence, personal competence, social competence, methodological competence, communication skills, learning competence, and so on. Furthermore, it included questions about the role of training in the companies, examples of best practices which might be transferred to/ implemented by TVET colleges, cooperation between industry and institutions as well as the framework and conditions in which Technical and Vocational Training takes place.

Twenty industry staff members were interviewed. The interviewees belonged to 18 companies and were experts, professionals in the vocational / technical education field. These companies belonged to diverse industries and were located in different provinces of South Africa, namely the Western Cape, the Eastern Cape, Gauteng and KwaZulu-Natal. The companies were of different sizes from 6 to several thousands of staff members and from 2 to several hundreds of apprentices and interns. The companies belong to the industries of car manufacturing, mechanical engineering, plastic manufacturing, the chemical industry, contractors in the electrical industry, motor franchise workshops, automotive industry suppliers and companies in the construction and maintenance industry.

As different industries and different companies were expected to have different needs regarding the competences of TVET graduates, the focus was on such competences that were expected to be relevant for all sectors. As an entry point, the model of action competence according to the Standing Conference of the Ministers of Education and Cultural Affairs of the Länder in the Federal Republic of Germany 2017 was used to provide examples of competences to the interviewees during the interviews.

Action competence can be interpreted as ‚empowering the individual to undertake independent and wide-ranging vocational activities in a variety of contexts' (Hensen & Hippach Schneider 2016). Action Competence comprises

1. Subject Competence which includes e.g. knowledge, apply knowledge, act in a workmanlike manner, solve problems based on professional skills and knowledge.
2. Personal competence, which includes e.g. motivation, take responsibility, know own strengths and limitations, provide and accept support, accuracy, deal with failures, self-reflection
3. Social Competence, which includes e.g. team skills, ability to accept criticism, accept responsibility, tolerance

and the overarching competencies:

1. Methodological competence: which includes the ability to apply a planned approach to solve problems and tasks,

2. Communication competence and
3. Learning Competence which includes willingness and capacity to assess information about issues and linkages and sort them into structures of thought

Originally, the interviews should have been conducted in the companies in South Africa during visits to gain insight and a better understanding of the situation regarding practical work and training of TVET graduates in the companies. But the meetings with representatives from industry/companies were difficult to arrange as it was described above regarding the meetings with TVET leaders. First, the South African Protection of Personal Information (POPI) Act and the German equivalent Data protection regulation (DSGVO) were a challenge when attempting to contact relevant individuals at the companies. Secondly, the outbreak of the Covid-19 pandemic made it even more difficult to reach or stay in contact with companies. In the authors' opinion, the pandemic situation shifted the focus of a large number of companies towards securing their daily business. Our research was not a priority during the ongoing pandemic situation. During phases of lower incidences, contacting interviewees became easier.

In the second phase of the research, due to the Covid-10 pandemic, the resulted travel ban, shifted priorities in the companies etc. most of the interviews had to be conducted online. In September 2021, between two waves of the pandemic, a short trip to Cape town was possible during which interviews were conducted. For evaluation purposes, interviewees were visited in April

2022 after the earlier online interviews were conducted. During this trip, two planned visits to training centres in the car manufacturing industry were visited after a delay of two years. Two more interviews were conducted during this trip as well.

In 2021 and 2022, the interviews were transcribed and analyzed using the MAXQDA-Software and the results were interpreted. The qualitative content analysis followed the structuring content analysis by Mayring to categorize the data. The content was coded using a mixed approach, which is a combination of deductive and inductive category application.

As it was the case with the material gained by conducting the meetings with TVET practitioners and leaders of the TVET-colleges, in an iterative process, the list of categories were extended by adding such categories, which resulted from analyzing the material gained by conducting the semi-structured interviews.

The word-cloud being Figure 6 indicates the relevance of topics as they occur in the transcribed interviews based on their frequency.

Figure 6 Word-Cloud "TVET-challenges": Visualisation of quantitative-frequented keywords of the qualitative data of TVET-practitioners from industry (Source: the authors' own word-cloud generated by MAXQDA from the interviews with companies)

Findings

The findings are sorted into the following categories:

- Theory and practice
- Communication competence
- Business Understanding / The Big Picture

- Further competences which are a challenge
- Exposure to Industry
- Cooperation as a key to success: Industrial and practical linkages
- Resources and infrastructure
- Lecturers

In the framework of this report, the categories used in 3.1 will be partially used in this part 3.2.

The interviewees provided also support for some findings which fit into the categories used for analysing the discussions with TVET lecturers and experts described in 3.1 TVET-Perspectives: Insights from Western Cape TVET-Practitioners / Empirical Results. Examples are the challenge imposed by the categories 9.4 "English as a 2nd language" or category vii) "Language, culture and diversity."

TVET graduates competences

Theory and practice

Regarding foundational subject competence including theoretical knowledge about the subject, some interviewees stated that they are fine with the competencies that the TVET colleges' graduates bring, at least to a certain extent. One interviewee stated that compared with a "standard learner" which is assumed to be student with matric, "the TVET learner is at a much higher level." According to the interviewee, they are "more experienced, are more knowledgeable [...] because they've spent already 3 years at

the TVET college, so they've completed the theory of the qualification". This statement leads one to assume that the graduates being referred to by this interviewee bring the competencies according to the qualification they have acquired during the 3 years. Another interviewee states that "to a big extent", he is happy with the foundational learning. But he limits this statement to the field of automotive and adds that for the field of electronics the graduates' knowledge could be improved. Another interviewee stated that he was surprised by the extent of the graduates' theoretical knowledge and expected that he had to retrain them on the theoretical aspects as he had to do on the practical aspect.

This leads to a statement shared by the majority of the interviewees that practical skills and the understanding of graduates are limited: "The gap we find, is that the apprentices may have the theorical knowledge but they do not have the link between the theory training and what happens in industry."

According to one interviewee, the ability to apply practically what students have been taught in college is limited: "The one is critical thinking, they find it very, very difficult to take a situation, evaluate the situation and then apply what they've learned. So, one of the things is that they get taught in TVET college in the practical is how to terminate various items like isolator or a circuit breaker. And when they come into the field, if the situation changes a little bit, they cannot see the difference between what they've been taught and how to apply it in real life."

Interviewees stated that they had to "re-train them on the whole practical component" before they may send them to the

workplace where they are expected to get the workplace exposure which was planned for them.

One interviewee stated that the lack of practice leads to cases in which tools that are used in industry have never been used by the graduates: “It’s the first time for them to see these tools in industry.”

It has also been stated that working under pressure is a problem for the graduates as this is not dealt with during the practical training in the TVET colleges.

The same is valid for problem solving. A statement supporting this is: “I think, problem solving is what they lack most…” while another interviewee mentioned, “So, they do not have any other competencies except the theoretical which the college gave them through the last 2 or 3 years. They came in with that. They have that competency. But problem-solving skills, it’s only theoretical.” It has been stated that if the graduates came “with the knowledge and basic problem solving, understanding, and hazard identification” it would improve the situation for the companies as conveying this competence is something the companies “spend a lot of time on”: “So that is something that could help us. It takes quite some time…”.

Interviewees stated that in some cases TVET-colleges provide some practical training to convey practical competences to their students, “which is fine: They’ve already done some practical on the simulator model that the college has. It’s limited but, you know, they have got some practical experience already “.

The reason that some interviewees stated that graduates

bring in some cases little and in some cases no practical experience at all, might be explained by other statements, that in the interviewees' experience, while in the Nated courses no practical is conducted in the TVET-colleges, this is the case with the NC(V) programmes. An explanation given for that is, that the Nated programmes originally were created to provide the theory while the students should get the practical experience afterwards in the industry. In reality, today in a lot of cases students finish Nated-programmes at the TVET colleges without doing an apprenticeship afterwards as it was originally planned. For that reason the students are not exposed to industry before they graduate and so lack any kind practical experience.

A reason for the limited practical skills/competences of the graduates highlighted by interviewees are the Trade Tests which the students have to pass to qualify. The trade tests are seen as being of limited practical relevance. An important aspect regarding these tests which has been stated several times, is that if one element of such a test is switched to another position, a lot of students are unable to pass the test - even if they would pass the test in the setting that they have trained in before. In the opinion of a number of interviewees, the students are not trained to "pass or master the task on principles of understanding and knowledge" but they pass the test because they were trained to pass the test. It has been stated by several interviewees that they see the trade tests as outdated as in their experience they include the same tasks they included when the interviewees passed themselves decades ago.

A recommendation resulting from this is to update the trade test to be more relevant "If we can get the trade test updated, then the colleges will focus more on updated practical and then the students would get more job opportunities." Further recommendations by the interviewees to improve the graduates practical competences include the implementation of project based teaching and learning, to train flexibility, to put a focus on problem solving and as a very important aspect to expose students to industry while they are still students of the TVET-college. One interviewee stated that if he would be responsible for training in a TVET college, he would "from day 1 pose problems, problems, problems" that students would have to solve.

The challenge, the relevance of which has been highlighted by a number of interviewees, is that while the students / graduates have the theoretical knowledge about their subject "they do not have the link between the theory training and what happens in industry."

One the one hand companies want the students to bring some practical experience but on the other hand, it should be provided only to a limited extent by the TVET colleges. It has been emphasized that practical experience must come from industry exposure to provide relevant experience.

Communication competence

Communication has been mentioned by the majority of the interviewees from industry as a critical competence on different levels, e.g. "So, if you look at guys coming from TVET colleges you'll

find that communication skills they still lack."

and

"So, they might still be a brilliant welder, but they might not have the communication skills done. And that you can notice."

Interviewees stated that they have to deal with conveying communication competence: "Definitely. Mainly communication skills. That's the most important one. Because with TVET colleges, they only focus on the technical subjects. And by the time the guys leave the college it's left on the organization to actually cover that aspect. And the organizations, they are expecting to get a product that is almost ready and that causes a lot of problems because it's basically the biggest gap ever."

An important aspect of communication competence mentioned in the interviews was writing skills which is required to write reports. One interviewee explained that according to their experience, communication is not covered at TVET colleges in technical programmes while it is part of business programmes which "explains why they are unable to write you a report, they are unable to give you like comprehensive feedback, ok, that also explains why they are unable to verbally explain themselves." Another interviewee supports this: "Because they can't... their reading skills and math and sciences, that's not up to the level that's required in business. Get that also as a minimum requirement for your institutions."

Interviewees from industry also support challenges stated in 3.1 regarding English as a 2nd language. To some interviewees the challenge is not limited to parts of the country but for one inter-

viewee located in the Western Cape, it is mainly a challenge for students from the Eastern Cape. Problems occur in reading and writing as well as the vocabulary needed to understand literature e.g. on electronics which hinders students from understanding the principles: "But it also comes down to, you may understand what you are reading unless there is electronics, where it's {...} involved and then you lose the plot because you don't understand the principles of the electronics." One interviewee describes the relevance of English: "And then I think, is definitely your basic communication skills is very important. {...} South Africa, has got eleven official languages, so everyone communicates differently. But there is one language in Business, and that's English. So you have to have a good comprehension of English and a understanding and reading comprehension of what I am reading here and I can interpret and convey my message to someone else in an effective manner"

Besides the challenge which English as a second language imposes to communication regarding "how to respond to emails, how to handle information within the business" was mentioned. Several examples were provided for the importance of communication competence in technical trades e.g., understanding the relevance of confidentiality of information and non-disclosure agreements. Regarding intercompany communication, an interviewee mentioned the relevance of communication competence to ensure proper communication between departments to prevent "very costly" consequences.

Interpersonal communication was mentioned as well as the

competence to communicate with customers and the public. As soon as customers are involved the relevance of communication skills is emphasized. One interviewee mentioned a lack regarding the basics of how to address customers when entering their home including wiping your feet or taking your shoes off. Another interviewee provided an example of a staff member of a car workshop going on a test drive with a customer. This technician "needs to have that communication and interpersonal skills to be able to talk to a customer with the necessary rapport and respect and {...} to ask the right questions to get the right information to be able to do his job properly". According to this interviewee "that is lacking from all our colleges, from wherever we get the students from".

A recommendation is that "they should look at incorporating a module of communication, basic communication skills." Another one is to include English in the course material: "Be it like a basic English communication course, a computer literacy, small stuff like that. To include it in your general basic course material" and adds "That's why I think, irrespective, I think as an entry level add-on to course material must be communication skills {...} "

Business Understanding / The Big Picture

This category is derived from the material gained by conducting the interviews.

Interviewees stated that it is of importance that graduates of TVET colleges have a basic business understanding and ability to see how they and their actions fit into the bigger picture.

Interviewees would like to see that when graduates enter a company they have a basic understanding of "what the different departments do and what their functions are. And how they actually interlink".

According to one interviewee, students/graduates should have an understanding of "a sort of global environment and how business decisions are made and the need for a company to be competitive because they need to understand that unless a company actually makes money the company will close. And that understanding has to be taught because if you working in industry, that's foundational to everything."

Graduates should be able to understand the impact of their actions on the company as a system. An example of a welder, who is working in a power station and welding things together and does not know what he is actually doing, was provided. This welder may be a qualified welder but does not understand what the company that he is working for actually does. That might lead to a situation in which the staff member is unable to determine the consequences of his actions to the company or to a larger system.

Another example provided was, that if something has to be repaired, if "you repair something and you do it badly, that's gonna affect the viability of your company whereas if you repair something and you do it properly, then that breakdown will not happen again."

Furthermore, the importance of an understanding of economies of scale was emphasized. If the graduate has to decide which consumables should be procured, there should be an understan-

ding that if the cheaper option is procured, “it might be cheaper, but I use more”, which eventually leads to higher total costs for the organization he or she works for. The interviewee who provided the example stated that accounting or bookkeeping is not required from his point of view, but there should be an understanding of the economy. This includes economies of scale, supply and demand and to understand how the individual’s actions and decisions impact the greater organization.

Another interviewee stated that “a mechanic or technician doesn’t have to know the ins and outs of a balance sheet”. But he needs to understand that the only thing you sell in a workshop is labour. And labour is time. “So, all he’s got is time to sell”. This leads to further statements in which the relevance of an understanding of the position of an individual in the company and the position of the company on the market was emphasized as relevant.

The interviewee also stated that graduates should have an understanding of productivity and efficiency. He stated that they don’t need it before they are exposed to industry as “it will be a lot more difficult to explain it there, but somewhere during the process of training towards the middle or latter half of that, of that programme where he understands how a workshop works. And then he can understand why there are certain rules and regulations and why, you know, we run around trying to get vehicles out at certain times.“ The interviewee added that there has to be an understanding why there is a need to the task in a short time, so the business is able to make a profit out of it “So, when he gets

an hour to do a job, it doesn't help him doing it in an hour and a half. He needs to do it in 45 minutes because as a business I still need some, you know, to make a profit out of the deal." And added furthermore that "those types of skills I think are still lacking and are not being taught at colleges".

The situation experienced regarding the understanding of graduates and how it impacts on their situation, was described by one interviewee in the following way: "So, you basically have to hold them by the hand and when you absorb them into the organization you cannot treat them as individuals that have that mental alertness and awareness of what happens around them and how their job impacts the overall success or strategy of the company. So that's something that you have to indoctrinate on them on a day-to-day basis. And it takes most of the time because if you focus only on the technical aspects they will lack on the soft skills."

As a recommendation an interviewee suggests "to introduce some business studies is not a bad idea. So, at least students will actually know and understand what impact they have on our organization."

Further competences which are a challenge

Further competences which are a challenge according to interviewees are computer literacy, social competence, life skills and learning competence. Regarding computer literacy, the graduates should be able to use office applications to create reports or basic calculations. Regarding social competences a focus was put on

team work. It has been stated, that to some individuals team work "it actually comes natural" while others "don't have that, they don't know how to operate in a team, teamwork environment." Life skills, discipline and time keeping was emphasized as challenging. It was stated that starting at 8 am in a workshop means "ok, if I start at 8, I can arrive at 8 and then I only change and then I make my coffee and then half past 8 I report to my work station", which is according to interviewees different from the view of industry which expects employees to actually start work at that time. One interviewee also stated that simple things like understanding why to wipe your feet are sometimes challenging and suggests that wiping your feet before walking into the classroom might be considered a standard procedure because "one day you can have to do that in a factory as well."

Learning competence was stated as important which graduates of TVET colleges are often lacking it. One interviewee explained that "You basically need to teach them from scratch. Because they are used to that environment of everything being given to them in a classroom. So when you got to practical sessions where they need to do this they don't have that alertness to pick up things. If you were to hide things for them, they are not going to pick it up immediately. They will wait for you to come to assure them "Now you are supposed to this and this and this".

Exposure to industry

According to interviewees, some of the competences industry is looking for can be acquired by practical exposure to industry: "Af-

ter the combination of the vocational training and the practical training, their skills increase, it improves dramatically." It was stated that "What the colleges can show them in their workshops is good but it's not enough. [...] they need exposure to a real workplace. So that students can be exposed to industry before they qualify". The need to be exposed to industry before the students graduate was mentioned as a critical aspect.

It was suggested that students should be enabled to "steal with the eye", which means that they accompany a professional during their work in the relevant industry and see how activities are actually conducted in "real life". This activity is also called "shadowing". According to interviewees, the students should also experience the look and feel by conducting relevant tasks by themselves: "You need to look and feel. You need to see the product, you need to feel the product, you need to experience the product."

It was stated that exposure to industry could also help to enable students to work under pressure. Furthermore, it has been stated that exposure to relevant industry is required: "The last thing I would like them to do is to take a learner and give him to a contractor that does domestic wiring every day. "

Answers provided by the interviewees suggested that companies would be able to assist in developing programmes in companies' "facilities are always open for a college to bring students in to show them how to work etc. We don't have to hide anything."

Further recommendations included excursions to companies during the vocational time of the studies. These would help stu-

dents to see what companies in their industry do and how their studies fit into those companies.

It was stated that to provide exposure to industry, industrial and practical linkages are necessary, which leads to the next category. More interaction between TVET colleges and industry would help so "that students can be exposed to industry before they qualify."

Cooperation as a key to success: Industrial and practical linkages

The interviewees report a wide variety of possible cooperation between industry and TVET colleges. The quality of the cooperation differs and an intensification of collaboration is highly demanded. One interviewee stated: "That's where your TVET college actually does good is actually dealing with companies and dealing with real life exposure." But another one limits it by stating: "Some TVET colleges are really good, working closely with industry, even with all these problems but this is in my experience an exception than the norm"

One interviewee stated that cooperation with their local TVET college is challenging: "We might hardly work with the college we got here. So many changes in management, staff. I've been in training in this area for 20 years. Not a single lecturer who has been in the TVET for 20 years, all new people, all experienced people left, a lot of new people has not undergone an apprenticeship. So they don't have a foundation in sort of vocational education. "

It has been stated that linkages and exchanges are highly recommended by industry and the importance of an exchange on lecturer / facilitator level was emphasized. An experience described by one interviewee was that if an exchange takes place on lecturers' level, lecturers feel that they are taken seriously and private contacts help to improve the situation.
In the cases in which industry is cooperating with TVET colleges, a number of different types of industrial and practical linkages have been mentioned in the interviews:

- TVET colleges provide fundamental training for industries' training centres while training centres provide practical training for them.
- TVET colleges provide the possibility to register students for exams while staff of the training centre provides the training for students of the TVET colleges.
- Companies provide practical placements to students of TVET colleges as a form of cooperation. This helps the colleges to provide practical exposure for their students and the companies.
- Regular meetings like of advisory boards take place in some cases. Other interviewees state that no cooperation at all is taking place.
- Exchange for supervision during trade tests.
- Donation of machines by industry to support practical exposure at colleges.
- Curricula and even institutions as colleges were reported

to be developed in cooperation between industry, colleges and relevant bodies (MerSETA).

Regarding an example in which the company's trainers provide training for the local TVET college's students, the interviewee states that it works that way for the company and the college but emphasizes that in his opinion it is not the company's job to provide the training and adds that "they {the TVET college} don't have the capacity" to provide the training by themselves.

Another interviewee provided a further example in which he supported a TVET college by connecting it with a company which provided the technical training. The TVET college could not provide this training to its students due to limited availability of qualified staff. The support helped the TVET college to provide exposure to the students and the companies involved the "opportunity to get guys that have the basics, they have the safety, they have the health aspect, the health and safety aspects of the business and know what they should and shouldn't do". In other words, the opportunity was created to identify students with the competences that they were looking for while the students were still at the college.

Exposure to industry in the form of practical placements of students was described as a win-win situation as the students are seen as "cheaper labour" as long as they provide a minimum of competences while students receive practical experience in a real-life environment . In the example provided, the company was able to take eight students from a TVET college in addition to two

learners that are placed in the company as apprentices. As in this case the students go back to college after some months and the next 8 students are then placed in the company for practical experience. As a result, exposure is provided to even a higher number of TVET-students.

In this context, it was stated that companies in some cases are reluctant to provide exposure to students because there is a fear of sharing information which might enable the student to open a business by him-/herself in competition to the company. Another interviewee states that these practical placements as a cooperation between colleges and industry lead to employment for the graduates.

Even curricula and colleges were reported to be developed where there was successful cooperation between industry and colleges or relevant bodies such as MerSETA One interviewee reported on a successful cooperation between TVET institutions and industry in which the regional government got "all of the industry players as well as the colleges together" to develop a complete college and to "work out a structure of how the college will be run and how the industry will support the college to be able to do that".

Another kind of cooperation which was mentioned in the interviews was visits by companies in which a group of technicians from different companies provided practical training sessions to TVET students on a certain kind of technical product. During these visits, in a time slot of some hours, the students are exposed to relevant products which are in use in the industry at

the time of the visit. The interviewee who reported on the training called them a great success with a lot of interaction.

Cooperation with TVET colleges exist also in another way, e.g., from an "educational and marketing point of view" as an industry representative stated. In this case, the company which produces products with a "big safety concern with regards to the correct use of these products", offers training and assistance to the lecturers of the colleges regarding the use and correct identification of risks using these products.

In some cases, the cooperation between colleges and companies has been institutionalized while it was emphasized that effort has to be put in to keep such cooperation ongoing. Covid was mentioned as a challenge as meetings took place online but the more important aspect is "the person that heads that up" or in other words, as another interviewee states, the management aspect.

In the case of one company with several branches in South Africa of which representatives of two branches were interviewed, they reported that the quality of the cooperation between these two branches and their respective local TVET-colleges differs widely. While the representative of one branch described the cooperation between colleges and the company as very successful, as the college provides the type of students the company is looking for, the interviewee of the other branch with the negative experience regarding the cooperation with the local TVET college stated that there has been no memorandum of agreement or a service level agreement for the last 7 years because of "all the

things which failed. For example, management support from them: no commitment, administrative side: no commitment. The practical competency, expectation that practical competencies are in place, were not in place." In the case, where the cooperation works well for the company, the interviewee stated that "What we do experience is currently that what we want, because we are quite involved with the TVET college. We have supported the TVET college from interviews, so giving our interview criteria, our requirements aligning with the college that they do recruit the type of candidate that we expect. And we see the results. So, we do get very good candidates, we've had good success stories and overall, from business they're happy with the candidates." The other interviewee with the bad experience reported: "It was only from our side, we have done, we have walked an extra mile for the students because it is the students at the end of the day that is pulling on the back end and they will not achieve the competencies we had to beg and to ask for support for the assessment and moderations of our workplace component. We have signed off obviously on competencies but the final assessments and the moderations still was assigned to the college and at that stage it didn't happen. I am still, I am reporting today to you that I am still awaiting certificates of students who have completed back in 2014/2015 from the SETA."

The good cooperation is described as a partnership between company and the TVET institutions in which collaboration and meetings on a monthly basis play a vital role. The partners talk and if a challenge occurs, they meet and address the challenge.

The most important success factors are described in the following: “But I think the biggest part of the success is being partners with the college, working together with the college and regular communication, giving feedback, supporting the college, as I said we are on a monthly basis, we go to the college and we visit them, we visit the learners, we visit the facilitators and we support them where there is need required.”

Further recommendations provided by interviewees for a good cooperation between industry and TVET colleges include that ccooperation must not be enforced, partners need to agree and sign service level agreements, the roles and responsibilities for each individual involved, including the learner, should be clarified, and industry needs to be involved within the recruitment and the selection processes of students. As a very important aspect, commitment from both sides, industry and the college was mentioned.

It was suggested that more input from industry should be accepted regarding curriculum design: “Input from the industry is minimal when it comes to curriculum design at the colleges. Therefor the input from the industry {...} is very little. I can tell you now, not one of my trainers or specialists was involved with any curriculum design at the college yet”.

Furthermore, in case that a cooperation is in place and advisory boards have been established, staff with a technical background was suggested to be part of advisory boards: “We have a good chance now, {...} I would just like one of the technical field. {...} There you must have somebody that’s strong in the technical field.

In such cases where students are exposed to industry while they are in the institution (the TVET-college) it was suggested that regular visits of lecturers / facilitators to their students' workplaces should take place to find out the students' gaps regarding the amount of exposure as an option for industrial and practical linkages. One interviewee suggested that such visits should take place at least once a month.

Regarding the establishment of cooperation, industry representatives would like to see the colleges addressing industry. While in some cases there is an exchange between at least one college and the company, others state that they are not addressed by the colleges. In some cases such a cooperation existed in the past but is not taking place anymore: "When I started here 20 years ago as an instructor, there was almost like a sales rep, a very experienced and qualified lecturer and he would come to us at least 3 times a year. {...} They used to come to us and say, 'How many apprentices do you have, what subjects would you like us to offer then next year or next block, do you have a need for night classes or part time classes.' For the last 15 years that's gone. There is no such contact anymore." and adds that "I really, really wish, we could have the sort of cooperation we used to have. So from us as industry, we would love to work more closely with the TVET colleges."

Another interviewee supported that view and expressed his hope that a good partnership with a local college would develop: "Hopefully at some point in time, it would become a proper partnership where you can sit around the table and you can imple-

ment a programme that is flexible in terms of what employer and what the colleges would benefit from both. {...} but there are still many, many gaps that we gonna have to look at."

Industry representatives are aware that Business also has to reach out to colleges to establish contacts as the following quotation shows: "Because we don't have business that's going out to schools anymore to say "Listen guys, this is the opportunities and this is what we need to do. And this is what the minimum requirement is."

Resources and infrastructure

Regarding resources and infrastructure, one interviewee stated that there is a huge difference between industry and colleges and that for TVET-colleges it is much more complicated to acquire machines or resources required to provide practical exposure during training while for training centres of the industry, "He can go into the plant, he can go and negotiate with the people in the plant to get one" while at a college to "buy something of a 1000 Rands is a difficult thing. It's not just he can go and get a 1000 Rands or get a purchase requisition done and it's done, he must go through so many stages and altogether." The interviewee added that "The procurement for colleges needs to be improved. You know, they can get things faster. If they need something, sometimes things break, they need performance management."

Lecturers

Regarding the competences of lecturers at the TVET-colleges, in-

terviewees stated that the theoretical knowledge of lecturers is fine in most cases, but what is missing according to their experience is their practical experience: "You can't tell him, he knows everything about the subject. But he doesn't know what is required in the industry."

As it is the case for the students of TVET-colleges, exposure to industry is seen by interviewees as a requirement for their lecturers as well. The situation has been compared to the situation of trainers in industry. Regarding trainers in industry, an emphasis is put on their expertise. A minimum of five years has been mentioned "So, if you want to become a facilitator, you first need to be a subject matter expert in the field, where you want to be a facilitator, so we take experienced people only, a minimum 5 years' experience in your field, you need to have the formal qualification".

Another interviewee stated that if his company decides to develop a trainer, "We will make sure that the guy goes into the plant and he goes and study or goes and do on the job training. I will also make sure that I give him projects as parts of his self-development. Then, the other thing what we do is, we will not take trainer if he hasn't spent more than 5 years in the field. If he spent less than 5 years, we don't even look at him."

Interviewees also state that trainers need didactical competence. Companies which do train their own trainers, include programmes "to become good with their didactic and pedagogic skills" and it has been recommended to include such trainings because "it's no good that people are just good technically, they

must also know how to teach."

One interviewee states that his company puts all their "management staff through training, through assessing and through moderating courses". Regarding lecturers with sufficient technical know-how, he suggests "that's what those facilitators would need to do. To go through proper facilitation courses, proper assessing courses and proper moderating courses"

Industry representatives who are involved in lecturer training for example electricians and plumbers stated that they experienced cases in which lecturers have no practical experience at all that is in line with the current situation on construction sites.

To the interviewees this means that facilitators should be subject matter experts that "know how specific equipment is working on the floor", but currently there is a share of lecturers that do not have the needed experience and expertise: "And then, I must say this, youngsters in TVET colleges, that is young they maybe got an N6 or a National Diploma, that doesn't make an artisan. If that guy was giving a subject, it's full fine. Because he can cover the full curriculum in that subject. But as soon as you now start talking about practical and all of that inclusive training, they are not fine. We have people here from TVET colleges, youngsters, never been in the industry. Now, how is it possible?"

It has been suggested to provide programmes for lecturers which focus on individual needs "because they are all individual people". As a starting point, "to be more experienced and apply more critical thinking skills" was mentioned.

In some cases, industry offers lecturers an opportunity to provide practical insight for TVET students on sites but are told by lecturers that they experience challenges to get the students there. Some industry representatives who are involved with training suggested to include virtual reality (VR) in training settings. According to another interviewee VR is also used in train the trainer programmes where up to 100 trainers are trained while only some are on site and where most trainers join online. In these programmes, problem solving plays a vital role. The programmes include cross-trade trainings in which trainers of different trades work together to solve a problem which leads to a lecturer / student perspective from both sides. This has been reported to lead to better results regarding communication between trades, practical experience, and so on.

It was stated that lecturers' practical competence would improve if most lecturers would undergo an apprenticeship. According to one interviewee "In the past, virtually all TVET-lecturers had undergone an apprenticeship themselves." He stated that the situation changed and "in the last few years, that has not happened. So, now you have a situation where you have many TVET lecturers who have only undergone theoretical training at a TVET as students. And then they actually get employed as lecturers. And this is a big, big problem because they've got no understanding of what it's like to have undergone an apprenticeship and to have worked in an industry and to understand some or other technique."

Further Recommendations

It was recommended that TVET colleges should focus on quality instead of quantity regarding their students to make sure that their graduates are able to find work once they graduate: "Rather take 10 and do a good job with that 10. That's what we do. Y is taking a 100. We take 10. In different trades. We split them and then we say, ok, we gonna make sure that these guys, and then they will have a 3-years programme. The college takes a 100. And now, where do they gonna go with them?"

According to interviewees, a dual system as it is demanded by various stakeholders existed in the past and was based on the Nated courses and an apprenticeship conducted in industry. With the introduction of new programmes which put a focus on practical training in the TVET-colleges, like the NC(V) programmes, this working system has been replaced. Interviewees recommended that to improve the situation, the Nated programmes should be updated and used according to their original purpose.

Additionally, it has been recommended that TVET-colleges improve on the marketability of their graduates and start marketing their graduates: "I also do think that it's very important that the colleges try and make their learners marketable. And when I say marketable that means they have the qualification but in order for you to have the qualification you need to be competent in knowledge, skills and attitude. Those are the three important things."

Summary and conclusions

Interviewees are fine with the foundational, especially the theoretical knowledge of graduates of TVET-colleges. But they are looking for improved practical skills. According to interviewees, these should be acquired by a limited practical training in the TVET colleges which might be conveyed in training centres that are connected to the TVET colleges. But the interviewees also demand practical exposure to industry before the students qualify while they are still in the TVET-institutions. According to industry representatives, the practical exposure is facilitated by linkages between companies and TVET colleges. There exists a wide variety of co-operation but the co-operation may be enforced in most cases and in the case of some companies there exists no cooperation at all. Industry is looking for high quality co-operation and expects good results if the cooperation is based on a commitment from both sides.

5. Design-Recommendations: Emerging Questions and Recommendations for Further Development of Study programmes for the Professionalisation of TVET-Lecturers @ CPUT

5.1 Evaluation of the Dialogical Engagement of the CAPE-VET Bilateral Webinar: Dialogical Session on Research Findings in the TVET-Sector of the Western Cape Province (17th May 2022)

On May 17th, 2022, a bilateral webinar titled "Dialogical Session on Research Findings in the TVET-Sector of the Western Cape Province" was held in the framework of the Cape-VET project at CPUT in a hybrid event format. Presentations were held on a) Capacity Building by Jelena Zascerinska and Regina Krause of HSW, b) TVET Qualifications at CPUT by Chukunoye Ochonogor, CPUT, c) Re-

search findings on TVET college level by Jonas Gebhardt, EUF/biat and Jacqueline Scheepers, CPUT d) Research findings on industry level by Martin Kühn, HSFL, e) Professional development of TVET lecturers from DHET perspectives by Sello Sethusha, DHET and f) Innovative Education Technology enhancing professionalization of TVET lecturers by Faiq Waghid, CPUT. The presentations were followed by a Dialogical Session on Research findings in the TVET sector of the Western Cape province and ended with a presentation on closing comments by Christine Winberg, PERI, CPUT.

The logic of a central relationship between enterprises and colleges was a theme that emerged in the conference. Furthermore, the historical connection between CPUT and the TVET colleges was emphasized. CPUT, as a University of Technology was established as a merger between the Cape Technikon and the Peninsula Technikon. In the pre-Technikon phase, both were technical colleges with a technical and vocational focus. The new Advanced Diploma in Technical and Vocational Education and Training Teaching offered by CPUT was presented as an important qualification and as a 'cross over' from an industry related qualification to an education qualification. The relevance of theory and practice in vocational education was highlighted as well as reflection as the key means of relating theory and practice. A focus was placed on work-integrated learning in vocational educator training. During the presentation by Sello Sethusha of the DHET it became clear that the ministry is aware of the multiple pressures on TVET lecturers. These pressures include facilitation, skills, bridging college and workplaces, policies, managing multi-stakeholders, and

so on. Some of the challenges highlighted in the TVET sector were skills shortages; Identity issues; and the burden of academic administration. Continuing Professional Development and Work Integrated Learning were highlighted as priorities by DHET. CPUT's Dr Waghid emphasized the difficulties/impossibilities of teaching competences as problem-solving and creativity can be best acquired through practice. Figure 7 shows the presentations and the dialogical engagement session that took place during the event (Source: Notes by Chris Winberg).

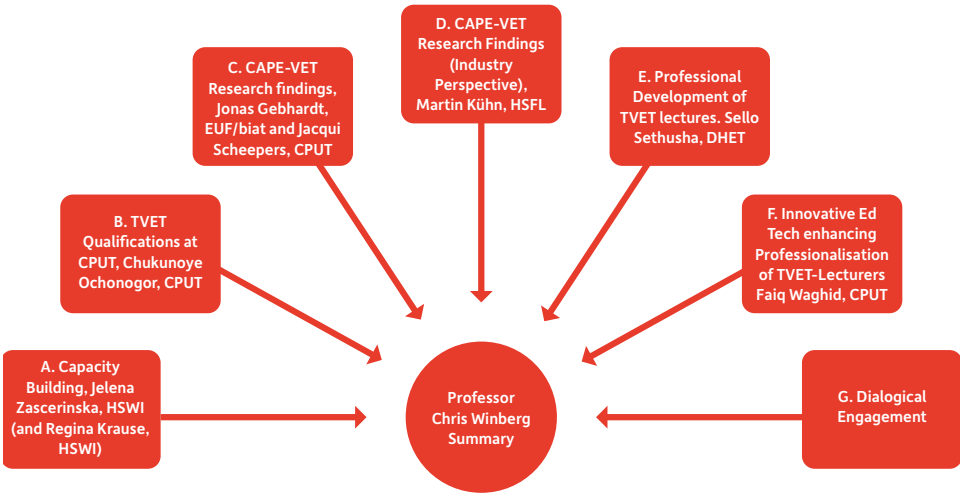

Figure 7 Closing reflections CAPE-VET Dialogical Session on Research Findings in the TVET-Sector of the Western Cape Province

Linkage to the research questions of the CAPE-VET Proposal

Under what general conditions can vocational training initiatives be designed in the partner country?

Certain general conditions are required for the design of vocational training initiatives for TVET lecturers in South Africa. The literature and research related activities related to the study yielded many aspects for consideration. Many of these recommendations stem from the TVET lecturers themselves. These contributions and observations are noted below:

- Internet access, connectivity, and electronic devices requires support from the Department of Higher Education (Speed interviews with TVET lecturers).
- Technical skills are required to capacitate lecturers (TUT TVET Conference 20th October 2021).
- Teaching resources like updated equipment are required and adequate space and facilities at the college should be provided to improve the professional practice of lecturers (TUT TVET Conference 20th October 2021).
- College lecturers would benefit from a DHET directive for colleges to implement a job readiness programme for students and to provide funding to support this.
- Opportunities for industry experience should be provided for staff and students through placements in industry (Speed interviews with TVET lecturers and interviews with industry)

- Practical experience of students should be acquired through the provision of limited practical training in the TVET colleges which might be offered at training centres that are connected to the TVET colleges and to a larger extent by practical exposure to industry (Interviews with industry representatives).
- Practical experience of students should be acquired before students qualify, so while they are still in the TVET-institutions (Interviews with industry representatives).
- Industrial linkages and partnerships are critical to ensure that lecturers are kept updated with changes and current trends in industry (TUT TVET Conference 20th October 2021 and interviews with industry representatives)
- Linkages between industry and TVET institutions facilitate exposure of students and lecturers (Interviews with industry representatives).
- Linkages between TVET institutions and industry should be based on commitment.
- Existence of advisory boards. Advisory boards should include members with a technical background
- TVET colleges should continue to engage with universities to exchange ideas on pedagogy (Speed interviews with TVET lecturers)
- TVET lecturers do benefit from participating in research projects like the CAPE-VET project and these engagements like the community of practice, should continue beyond the end of the project;

- TVET lecturers should have expertise and knowledge in three areas as stated below to respond effectively to the educational needs of a diverse student cohort and to remain updated with industry developments. These areas are primarily:
- Pedagogy and didactics
- Industry experience and partnerships
- Technical expertise in the teaching subject (Speed interviews with TVET lecturers and interviews with industry representatives)
- Capacity building programmes (training) should be aligned with the needs of the lecturers and the learning programmes;
- The research recommendations of the Cape-VET project should be implemented so that the needs of the TVET colleges can be addressed (Speed interviews with TVET lecturers).
- Inclusion of communication competencies and basic business and economics in TVET-curricula (interviews with industry representatives)

The current situation in education (WCP TVET colleges) calls upon practitioners and leaders to act with resilience and innovation in the provision of teaching and learning. Great motivation and willingness to teach and learn exist amongst lecturers and students which contrasts with the challenge of:

- Inequitable access and lack of decentralized online teaching and learning; and the
- Lack of internet access, communication devices and adequate data for lecturers and students.

Collaborative development and design of an appropriate sustainable model for the professionalization of the TVET lecturer education, as a key activity of the CAPE-VET project, is recommended.

The Cape VET research project has led to the identification of many challenges (see above) in the TVET sector. One of the main challenges is the further requirements of government as led by policy in relation to the reality of the implementation on the ground. Colleges vary significantly in terms of their available resources and their ability to implement the policy. Amongst these directives are the philosophy underpinning the delivery of teaching and learning (adapted from text in DHET 2019: 4-5; CAPE-VET 2019-2022: WP1 VET-Report SA & GER). The teaching and learning plan presents TVETs with a system to direct and ensure the quality of the pedagogical practices. To ensure effective teaching and learning, key delivery systems as presented by the plan is as follows (DHET, 2019: 1):

- Enrollment preparation
- Classroom teaching and support+
- Student practical application for on-course learning
- Student assessments: On-site and continuous

- Student academic support
- Lecturer support and capacity building
- Work placement (student and lecturer)

The plan should serve as a guide for colleges when strategically planning for teaching and learning. However, many colleges are grappling to meet these deliverables as the existing resources do not necessarily support the implementation of these key components. When the relevant resources are not in place, then the quality of delivery is compromised which poses challenges for the lecturers and leaders of TVET colleges.

Amongst the needs faced by the TVET sector in South Africa, the training and development of teachers and lecturers are one of the most critical. Rudman & Meiring (2018) acknowledges that these needs include "the academic, professional and motivational preparedness of college lecturers" and that most attention seemed to be focused on the macro and systematic level instead of on the micro-level - daily challenges related to teaching and learning. Their research incorporates "principles of a humanising pedagogy" in the design and delivery of a professional development programme for TVET lecturers which led to the achievement of positive outcomes (Rudman & Meiring 2018). This article highlights the importance of providing professional development programmes for TVET college lecturers as one college lecturer had to begin teaching straight from industry with no teaching experience (Rudman & Meiring 2018). Learning to teach in a structured programme can only lead to an improvement in the quality

of teaching and learning and curriculum development in the TVET sector (Professional Development Programme case study CAPE-VET 2019-2022: WP1 VET-Report SA & GER)

The need for curriculum change in the college sector in South Africa appears to be eminent. Terblanche (2017) calls for the restructuring of the college curriculum so that it responds to the needs and requirements of industry, and in turn enhance the standards of TVET. The thesis investigates strategies towards curriculum change that is sustainable, in response to an identified knowledge gap in the curriculum (Terblanche, 2017). An outcome of the research led to the development of a curriculum change framework for the TVET sector. (Calling for curriculum change in TVET's from CAPE-VET 2019-2022: WP1 VET-Report SA & GER)

The methodology used for the collection of data was conducted in four phases which were:

- a document review;
- a questionnaire survey - #116 respondents;
- fourteen focus group interviews with #90 respondents;
- and data from Phase 1 – 3 was compiled into a conceptual framework for the transformation of the TVET's.

The study was confined to five TVET colleges in the Western Cape Province, South Africa, and consisted of an analysis of the trends, attitudes and beliefs of college employees (Terblanche, 2017). The thesis has led to several conclusions regarding the TVET sector. These conclusions were extracted from the collected data and are

as follows (Terblanche, 2017):

- College leaders should be provided with capacity building in management strategies to enable them to deal with the curriculum challenges which are being experienced currently and for the future (for example in the design and the development of the curriculum);
- Of critical importance to the TVET college sector is the support and involvement of industry to contribute to the renewal of the curriculum, to enhance student employability and to mitigate the gaps in the knowledge and experience of those who lead the colleges; and
- The opportunities for the graduates coming from the TVET colleges into the programmes offered by higher education institutions were unclear and not well presented .

So it does appear from this study that capacity building on a management and leadership level, as well as on the pedagogical level, is essential in order for the colleges to improve their offerings. On a systemic level, the system for the articulation of college graduates also needs to be clearly communicated and graduates should be guided in terms of their progression into higher education. Terblanche looks to the Germany TVET system to propose a "parallel- or two-stream curriculum" in response to the training needs of the colleges in South Africa (Terblanche, 2017). This study is particularly focused on the conceptualisation of a conceptual framework for leadership in TVET colleges and draws

a link between effective college leadership and how it can influence curriculum change.

There exist guidelines for Work Integrated Learning (WIL) practices which can guide TVET colleges in the incorporation of WIL into their academic programmes. The WIL approach "involves curricular, pedagogical, and assessment considerations that differ to those of general education programmes" (Winberg et al, 2011). The CHE Work-Integrated Learning: Good Practice Guide was developed to provide higher education institutions with "Successful strategies in the design and implementation of effective WIL curricula" so that students can integrate theory and practice "that allow them to connect university or disciplinary learning with workplace application" (Winberg et al 2011). In order to develop the curriculum, there are four common WIL modalities which can be used (hybrid combinations are possibilities):

- work-directed theoretical learning;
- problem-based/oriented learning;
- project based learning; and
- workplace learning (Winberg, et al, 2011).

Modalities of WIL are transformative pedagogical approaches that creates opportunities for students to make connections between the theory as part of their curriculum and real-world societal and industry-related issues. Students who have experienced WIL are better prepared for the workplace. WIL demands educators to develop creative assessments and authentic learning ex-

periences so that learning is meaningful for students. (Work-Integrated Learning: A pedagogical approach from CAPE-VET 2019-2022: WP1 VET-Report SA & GER)

A Typology of WIL was developed by Canadian researchers in Ontario's Postsecondary Sector. This typology can be useful for TVET lecturers when designing their curriculum. Service-Learning was strongly supported as a form of WIL in the typology as it linked "postsecondary institutions to community partners" (Sattler, Wiggers & Arnold, 2013). Research projects which contributed to solving problems in industry were seen as a method of strengthening relationships between institutions and industry as these projects focus on responding to specific industry needs. Service learning is a pedagogy which contributes to building stronger community relationships. This approach calls for the collaboration with communities on "innovative and emergent" approaches to community challenges. One informant stated that: "Learning in an industry environment is much more focused, while in service learning you gain broader knowledge" (Sattler, Wiggers & Arnold, 2013). Therefore both WIL and SL as a modality of WIL and as pedagogical approaches support the development of a broader range of skills and attributes which can enhance the employability of college graduates thereby contributing to the professionalisation of TVET lecturers. (Typology of Work Integrated Learning in Ontario's Postsecondary Sector from CAPE-VET 2019-2022: WP1 VET-Report SA & GER).

5.2 Insights from a German Master Programme: Master of Vocational Education @ Institute of Vocational Education, Work and Technology from Europa-University Flensburg

This part encompasses the following aspects:

- Internship-Programm of biat
- Practical Professional Studies of biat (Demand of developing knowledge and competences in the world of skilled workers (studies in occupational/vocational science)
- Linkage to research findings "Industrial Linkage" and "ICT": Theoretical-Input

Vocational pedagogical professionalisation processes through research-based learning at the Institute of Vocational Education Work and Technologie — Europa Universität Flensburg

Professional teacher/lecturer action at TVET-Colleges is characterised by a theory-based reflection of one's own actions at the levels of lesson planning, lesson implementation and lesson reflection as well as in the development of internal school curricula in educational pathway teams. For such reflection, students and teachers need subject-science, subject-didactic and educational-science competences. These must be acquired through study, continuing education and self-interest on the basis of scientifically founded theory. For the field of TVET, the complexity is increased by a further significant interconnection of different levels of ac-

tion. TVET lecturers must also have knowledge about vocational action competences and about vocational action with the knowledge, skills and abilities required for this in the vocational work of apprentices or skilled workers.

A widely known problem of university-based teacher training is the theory-practice linkage. The university as a place of learning theory and the training school as a place of learning practice are not linked well enough. The establishment of the practical semester in the degree programme can be interpreted as a current reform effort. The practical semester serves as an opportunity to test and establish the approaches of research-based and situated learning within the framework of teacher training programmes. However, the added value may not only lie in the improvement of the pragmatics of teaching practice itself. Only the linking and reflection of the (vocational) subject-specific, educational science/vocational pedagogy and vocational or subject-specific didactic elements of the study programme with teaching and school practice experiences can lead to a further development of the professional self in former TVET-Lecturer. This can support a sustainable and theory-guided professionalisation process.

For students of vocational teacher training, the challenge is to develop a professional self with a double reference to practice - firstly, the practice of professional work in the respective vocational subject and secondly, the practice of teacher action. Research-based learning has already established itself as a method of higher education didactics in teacher training programmes. Ho-

wever, this should not be about doing research for others. It should be about researching one's own teaching and studying research. In this way, the daily work of teachers is perceived as an object of research and, at the same time, the complexity of this work is understood as a challenge for the development of a professional attitude towards one's own professional practice.

Flensburg study concept in research-based learning

In the study programme „Master of Vocational Education/Teaching at Vocational Schools" at the Vocational Institute Work and Technology (biat), students develop experiences in the area of research-based learning in three study-relevant contexts in the vocational subjects of electrical engineering, automotive engineering, information technology and metal technology in order to develop a reflexive professionalised self in the students.

4. For the school internships, the students develop questions in the seminar preparation at the university. These essentially deal with the question of what constitutes „good" teacher action at different levels of reference. On the micro level of teacher action, research into one's own and others' teaching, case work and one's own motivation and professionalism have emerged as reference levels and thus objects of research-based learning. At the meso level, school development and learning location cooperation between training companies and TVET-Colleges.

5. In the second semester of our Master´s programme, the students independently conduct an empirical study, the so-called vocational science study. In doing so, the future teachers open up the vocationally organised technical work, which is of great importance for their later teaching activities. The empirical research of the professional reality can be carried out through work observations or participatory analyses. Building on these results, it should be possible to design competence-oriented teaching/learning approaches in the vocational school that are oriented towards work and business processes typical of the occupation.

6. Two so-called subject area projects enable the students to familiarise themselves in depth with two technical subject areas of the subject work in the respective vocational subject area in the form of projects through research-based learning. Based on the expectation that graduates will help shape TVET-Colleges as innovators, these projects should take place as close as possible to future technical developments in the relevant occupational areas. Against this background, the students themselves choose a realistic, technical task or problem for the vocational work from the respective vocational specialisation for both projects. After an appropriate and targeted procurement of information, a project structure plan is drawn up and then the required work is carried out and documented largely independently in the laboratories and workshops of the institute. Finally,

a project report is prepared and the theoretical insights and practical results (products) are presented to the university public. To carry out the work, the laboratories and workshops of our institute must have modern and innovative equipment. The technical penetration is required in the project in order to design vocational education and training transformations, which are then presented in the project documentation and presentation, among other things. The projects thus enable the students to reflect on experiences that are immanently relevant to their later work in TVET-Colleges.

In the three constituent areas of vocational education, work and technology at the Vocational Institute for Work and Technology (biat), elements of research-based learning have already been established from the beginning of the study programme conception in the partial study programmes of the vocational specialisations, which stand for a holistic approach in teacher training and are intended to support the students in their professionalisation process.

The requirement for a Master's programme to become a teacher at vocational schools is not only to be able to give good lessons in TVET-Colleges after the studies. They also have to learn scientific work. The three examples illustrate how scientific learning and research have been implemented in the Flensburg programme. These study components are intended first and foremost to increase the reflective ability of future teachers. They should

be prepared for the fact that they are subject to a lifelong learning process. Teachers should be able to provide good teaching in terms of subject matter and didactics. In doing so, the teachers' own actions should be subject to a double practical reference. One level of reflection refers to the methodologies and media of teaching. The second level relates to the methodologies and media in the trainees' field of work. The linking of both levels can then produce teaching that is oriented towards the actual vocational work tasks in the occupational field and plans learner-oriented motivating teaching scripts.

6. Outlook and Further Steps

6.1 Importance of participative and collaborative projects/methods for the acceptance of international research projects for international VET-Research

Considering the complexity of TVET in South Africa, the multi-perspective analysis is found to be the base of the design of a complex ecosystem (Zascerinska, Aleksejeva, Zascerinskis, & Abjalkiene, 2022). The multi-perspective construction of a higher education qualification programme for vocational training lecturers is beneficial as the multi-perspective view facilitates the use of the whole approach for designing a modern and relevant higher education qualification programme for vocational training lecturers in South Africa (Ahrens, Zaščerinska, Amanzholova, Aleksejeva, Zaščerinskis, Aleksejeva, Gukovica, & Abjalkiene, 2021) in order to build a higher education qualification programme for vocational training lecturers based on the synthesis of different

perspectives. Thereby such a higher education qualification programme for vocational training lecturers would satisfy the needs of each stakeholder and the society on the whole. The multi-perspective analysis can be only implemented within the participatory approach.

The participatory approach allows the discussing of new ideas, sharing good experiences, creating new knowledge and integrating innovations into a novel higher education qualification programme for vocational training lecturers in South Africa. The participatory approach

- strengthens cooperation between the participating stakeholders,
- fastens the achievement of better common results, and
- makes each stakeholder benefit from joint values and efforts.

The integration of the participatory approach into international cooperation will increase the quality of TVET in South Africa (Zascerinska, Aleksejeva, Zascerinskis, Gukovica, & Aleksejeva, 2020). The use of the participatory approach in international projects will advance the professional development of TVET lecturers in South Africa (Ahrens, Gruenwald, Zaščerinska, Melnikova, 2019). The application of the participatory approach in internationally implemented research will create an effective strategy for the development and growth of societies since it leads to technical and innovative changes and causes economic growth as well as con-

verts the new knowledge to modern products and services (Melnikova & Zaščerinska, 2017).

6.2 Transferability of the CAPE-VET methodology and results:

The transferability of the CAPE-VET research project methodology, the participatory approach for the multi-perspective analysis, contributes to the sustainability and quality of TVET institutions in South Africa and other interested countries. The CAPE-VET research project is based on joint work done between South African and German institutions and was one of the pathways to transfer the CAPE-VET methodology and results to VET specialists in South Africa and Germany, to participants of the Metaproject, wider research community, as well as general public.

The participatory approach of the CAPE-VET research project was based on active involvement of all the relevant stakeholders interested in the modernisation and harmonisation of TVET in South Africa. The engaged stakeholders represented the different levels of TVET. The stakeholders were TVET students, TVET lecturers, industry representatives, policy makers, designers and trainers of higher education qualification programmes for vocational training lecturers and other TVET supporters. This broad involvement of stakeholders makes the CAPE-VET research project methodology and results easily transferable to other TVET

institutions located in South Africa and other countries.

The multi-perspective analysis relied on the close connection between TVET and industry in South Africa. The partners' wealth of ideas served as the driver for fostering sustainability in TVET sector in South Africa. The active participation of the TVET stakeholders while implementing the participatory approach of the CAPE-VET research project assisted in developing the TVET sector in South Africa in a sustainable way. Sustainability in the TVET sector in South Africa implies the consideration of the unity of two aspects:

- a higher education qualification programme for vocational training lecturers on the one hand, and
- students'competence as the combination of knowledge, skills and attitudes, on the other hand.

The CAPE-VET research project proposes the transfer of innovative practices identified in the TVET sector in South Africa to the other TVET colleges in South Africa and other countries. The findings drawn from the implementation of the participatory approach in the CAPE-VET research project emphasised the importance, high relevance and necessity in

- constant professional enrichment of TVET lecturers,
- Work Integrated Learning (WIL),
- strong links between the TVET institutions and industrial companies,

- organisation and implementation of internships for TVET students, and
- TVET sector digitalization.

6.3 Demands for a future bilateral TVET-Cooperation between South Africa and Germany

The ever-going processes of globalization, re-organisation, digitalization and overall harmonization in the world in general and in TVET in particular increase the demand for a future bilateral TVET cooperation between South Africa and Germany. From the global perspective, mutual inter-connectedness and dependence can strengthen the importance, relevance and necessity in bilateral TVET-Cooperation between South Africa and Germany.

Global trends in modern economics such as competitiveness, innovation, demographic situation, labour market and others (Ahrens, Grünwald, Bassus, Andreeva, Zaščerinska, Melnikova, 2018) emphasize TVET internalisation. Bilaterial TVET cooperation in the field of TVET internalisation between South Africa and Germany could assist in solving a couple of issues. Internalisation of TVET in South Africa might serve as factor towards the expansion of high standards for the quality of TVET (Ahrens, Foerster, Zaščerinska, Wasser, 2020).

Bilaterial TVET cooperation between South Africa and Germa-

ny could be beneficial in terms of TVET graduates' employment. Approximately 600 German companies are located in South Africa (Federal Foreign Office, 2019). Among these are for example BASF, Bayer, Bilfinger Berger, BMW, DHL, Deutsche Bank, Lanxess, Mercedes Benz, MTU, SAP, Siemens, ThyssenKrupp, Volkswagen and Schaeffler, and so on (Federal Foreign Office, 2019). These companies have production plants in the country and offer training for their staff and in some cases to externals as well (Kuehn, Zascerinska, 2022). German companies in South Africa have created over 100.000 jobs in the country (Federal Foreign Office, 2019).

The COVID-19 pandemic has essentially accelerated the pace of the teaching transformation (Zascerinska, 2020). The COVID-19 pandemic stimulated hyflex teaching. This hybrid and flexible approach provide learners with the choice to either attend class in person or to join the class remotely (Beaty, 2019). The novel hyflex teaching approach requires TVET cooperation in terms of the enhancement of TVET lecturers' skills in designing scenarios of hyflex teaching (Aleksejeva, Zascerinskis, Abjalkiene, Gukovica, Zascerinska, Ahrens, 2021) and their efficient implementation.

Along with the development of the Information and Communication Technologies and Artificial Intelligence, a digital teacher assistant – robot teacher - is becoming a reality (RītdienasEs, 2021).

Gradual incorporation of Activity Recognition (AR) into runtime teacher evaluation (Ahrens, Gruenwald, Zaščerinska, Melnikova, 2019) would need the joint efforts of TVET policy makers, TVET teachers, computer specialists and other supporting staff

members from South Africa and Germany to start and maintain such a system.

The integration of virtual reality into the TVET educational process so students feel that they are immersed in their surroundings, has to be based on the cooperation between South Africa and Germany in the field of teacher professional development.

The processes of TVET harmonization in the field of the introduction of entrepreneurial education to the TVET sector in South Africa (Zascerinska, 2022) could be supported by Germany which has a vast experience in fostering the entrepreneurial minds of TVET students and lecturers.

Together with these aspects, Work Integrated Learning (WIL) and connections with industrial partners aimed at the TVET efficiency, could be detailed in joint discussions between the TVET sector specialists in South Africa and Germany.

Also, cultural exchange between TVET students, lecturers and stakeholders from South Africa and Germany plays an important role in contributing to the mutual understanding of TVET sector issues and their possible solutions. This decisively impacts on the capacity building for vocational training in South Africa.

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