



**Work Process Knowledge as a Catalyst for
Occupational Competence Development in
Technical and Vocational Education and Training**

Dr Patricia Jacobs

University of the Western Cape



**10th PAN AFRICAN TVET
COLLEGES CONFERENCE**

Conference Theme:

**“Employability Capital for TVET College
Student Graduates”**

*The Table Bay Hotel at the Victoria & Alfred Waterfront,
Cape Town, South Africa*

www.iacsouthafrica.co.za

INTRODUCTION

SOCIO-ECONOMIC and INNOVATION EXPECTATIONS OF TVET



Primary school students in China wear virtual reality headsets
Image: Reuters



2030 - huge demand: higher cognitive skills such as creativity, critical thinking and decision making.

Image: REUTERS/Robert Pratta



The National Development Plan (NDP) 2030 has as one of its objectives the decreasing of unemployment rates from 24,9% in 2012 to 14% by 2030.

White Paper for Post-School Education and Training: The most important indicator for the *success of a (TVET) college is the quality* of education offered by a well-educated, capable and professional teaching staff (DHET, 2013, p. 16).



RESEARCH DESIGN AND METHODS

- **PARTICIPANTS : 715 Students and Artisans - 6 Public TVET Colleges (7– campuses); 3 Industry Training Academies; 2 Private TVET Colleges**
- **Male-69, 1%; Female -26,1%; No response – 4,8%.**
- **Dominant age group: 21-25**

STUDY PROGRAMMES: Mechatronics, Millwright, Welding and Electrical.

Quantitative and Qualitative research – Mixed method – Explanatory Sequential Design

DATA COLLECTION METHODS:

- **COMET Large-Scale Open-ended Test Task assessment**
- **FOUR CONTEXT QUESTIONNAIRES: Assessment Feedback; COMET Occupational Commitment and Motivational; Social competence**
- **Qualitative focus group interviews.**

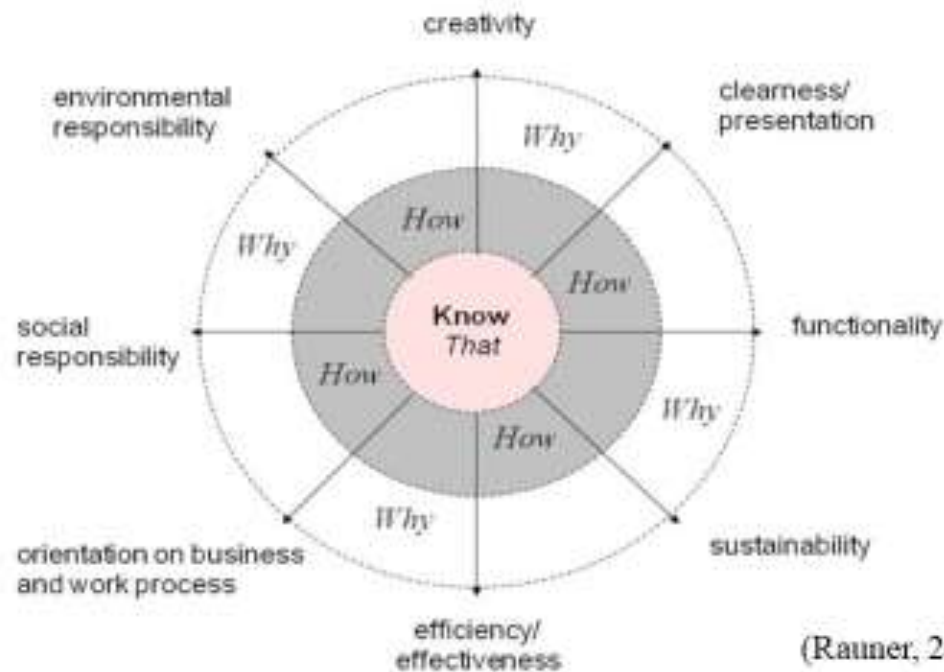
DATA ANALYSIS: SPSS ; COMET psychometric model; Descriptive statistics

COMET Raters identified and trained.

Test Task validity was established.

WORK PROCESS KNOWLEDGE - WPK

COMET OCCUPATIONAL COMPETENCE MODEL



(Rauner, 2011, p. 25)

WPK levels

Know that - knowledge to guide action

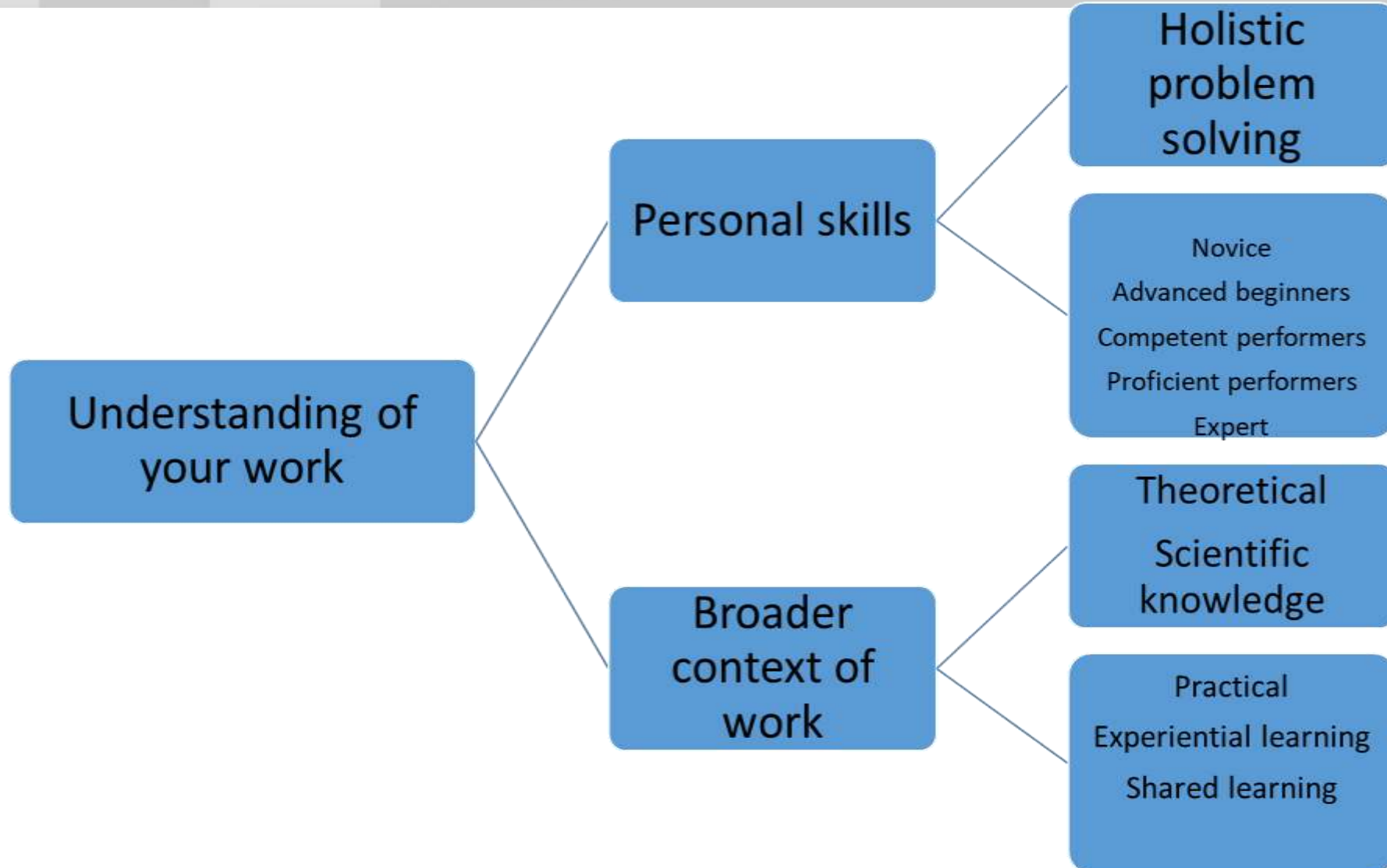
Know how - knowledge to explain action

Know why - knowledge to reflect action; essential for sustaining the capacity for holistic problem solving competence.

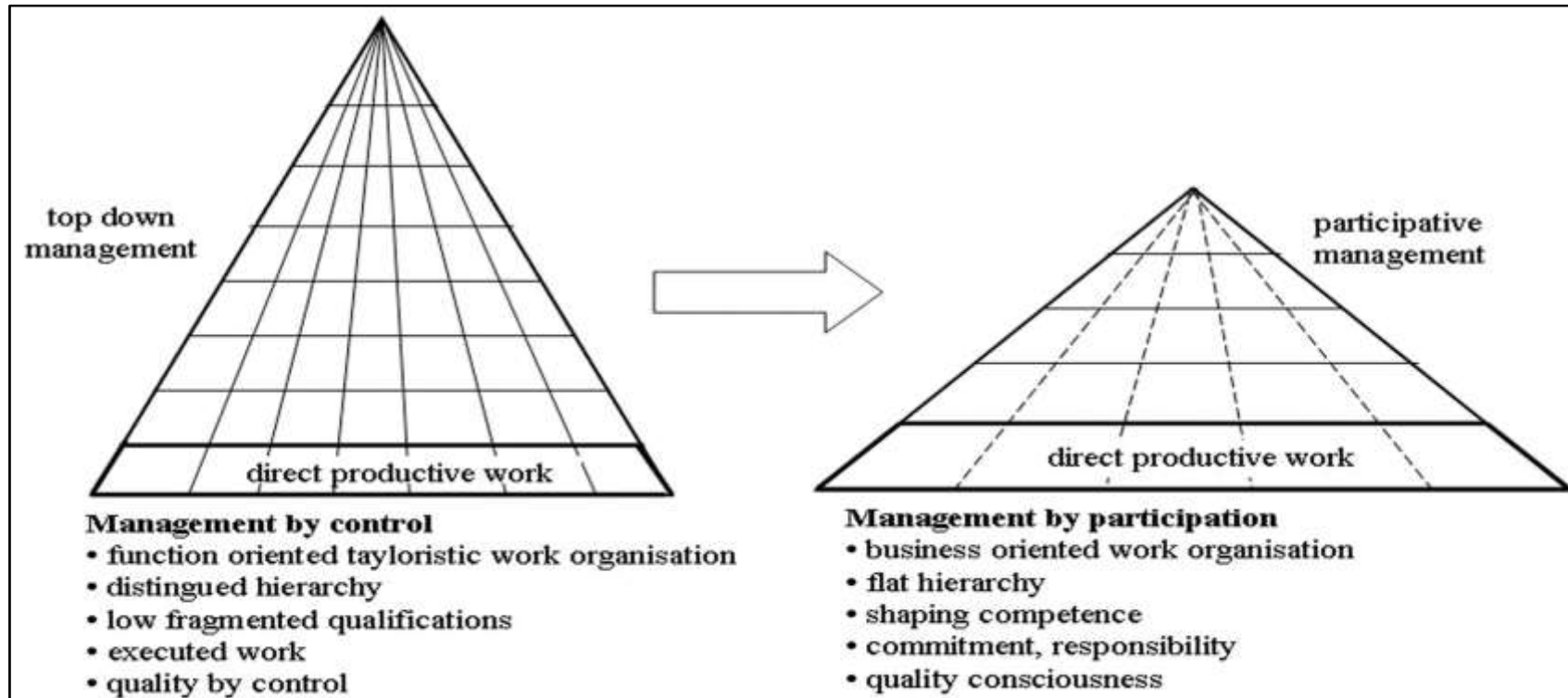
Reflective thinking: why doing it this way and not in another way?

(inAP, 2012, p. 4; Rauner, 2011, pp. 19-26).

WORK PROCESS KNOWLEDGE - WPK



WORK PROCESS KNOWLEDGE



(Rauner, 2013; Rauner et al., 2013, p. 32)).

WORK PROCESS KNOWLEDGE

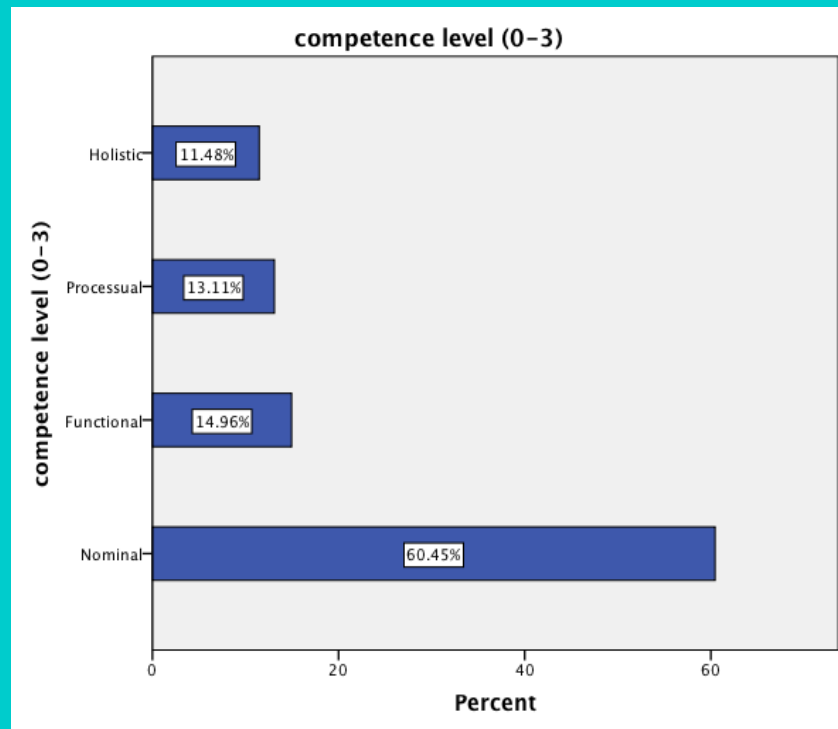
Fundamental directives of TVET:

- Knowledge incorporated in actual performance of work;
- Knowledge as a guide for practical action in novice situations;
- Knowledge that can be abstracted from the given situation to exceed assumed reality and involve the notion of a different design of the world of work
- Interrelated, holistic approach

(Fischer & Boreham, 2008, pp. 466-475).



COMBINED OCCUPATIONAL COMPETENCE LEVELS



- K1-Clarity/Presentation
- K2-Functionality
- K3-Use value
- K4-Cost Effectiveness
- K5-Business /Work Process
- K6-Social Responsibility
- K7-Environmental Responsibility
- K8-Creativity

N = 488

Total Median Score = 16.25

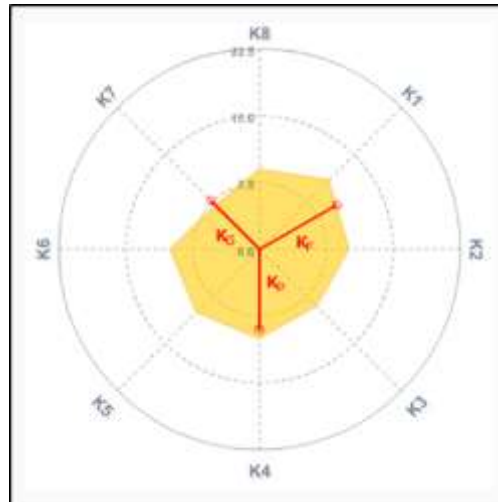
The **poorest performance** shown for the COMET criteria - **K7 on Environmental sustainability** holds serious implications for the establishing sustainable solutions for environmental challenges.

Most students operating at the **know that level of work process knowledge risk of being prepared for the lowest level of their occupations**

SUMMARY OF MAJOR FINDINGS

- Poor holistic problem solving competence (11.4%) pose a threat to the high expectations of TVET.
- **Welder occupation-25.2% for Holistic shaping competence; progression to the *Know-how* level of work process knowledge is showing evidence of the impact of **workplace-based learning(DSAP)** on the development of occupational competence in students and most **probably lecturer competence.****
- The drop in performance **from K1 (median – 7) to K2 (median – 5)** is proof of the emphasis on the theoretical part of their current curriculum.

Occupational competence levels -
stigmatization of TVET as second-class education.



Welder Occupation



COMBINED OCCUPATIONAL COMPETENCE LEVELS

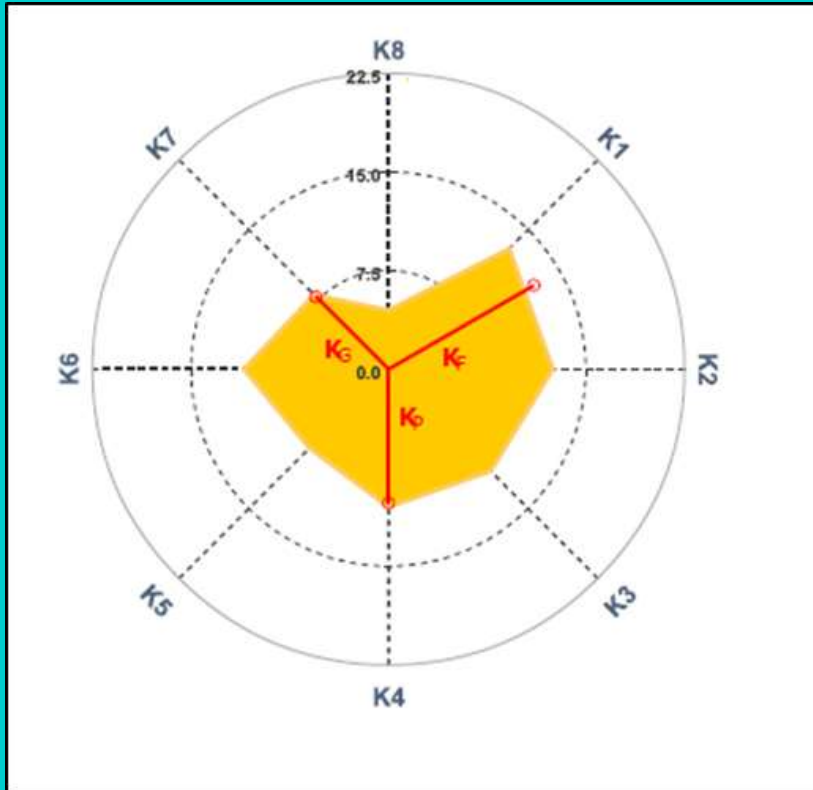
COMET PRACTICAL TASK

Students had to design and build a Hydraulic system that will clamp and bend a steel plate at a 90-degree angle.

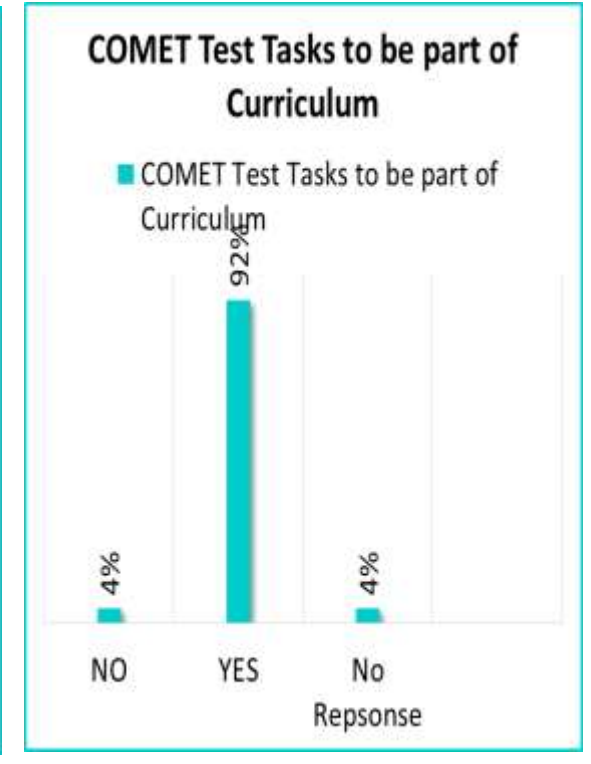
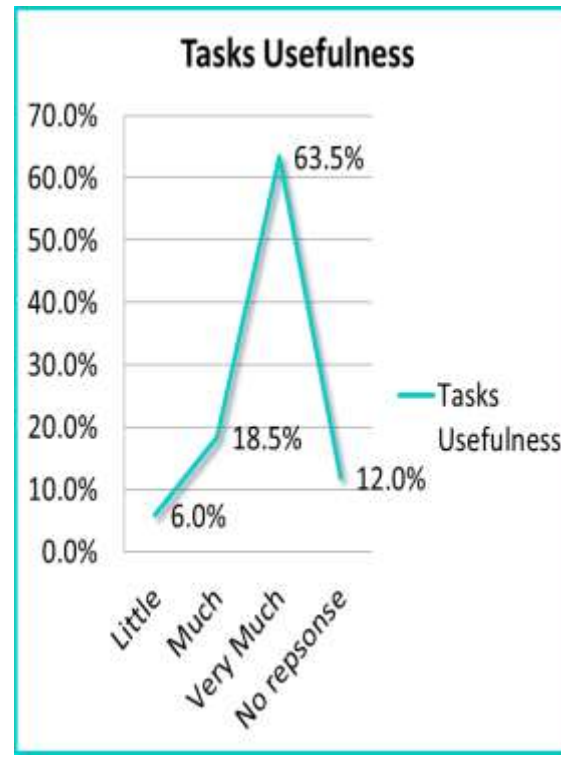
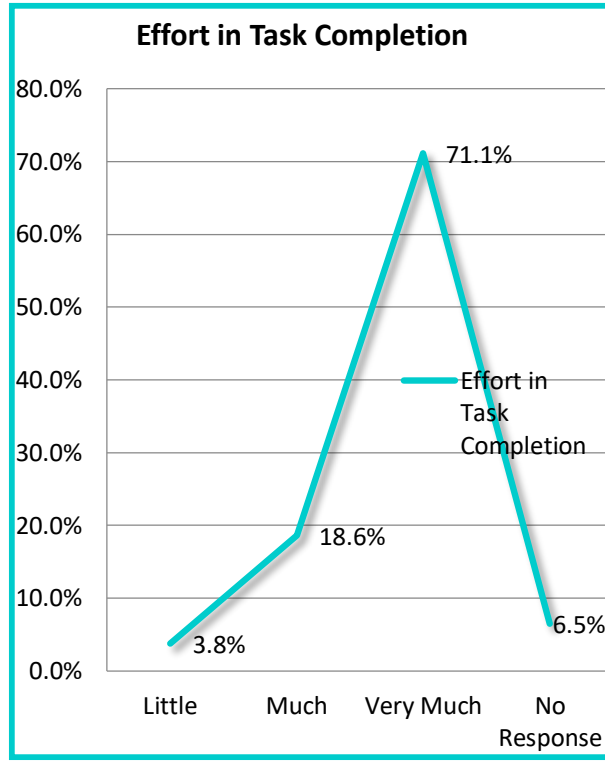
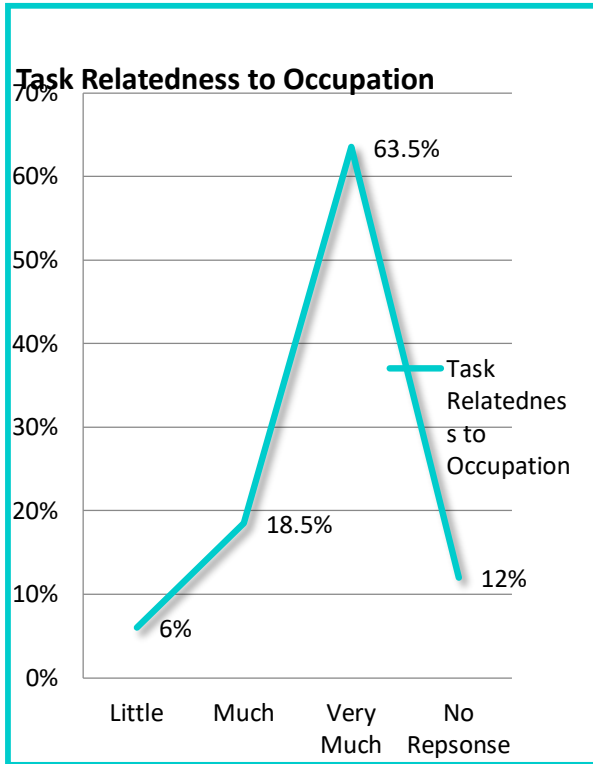
K1	K2	K3	K4	K5	K6	K7	K8	Kf	Kp	kg
13	12.5	11.5	10.5	8	11	8	4.5	12.8	10	7.8

It is challenging to assess all the COMET criteria in practical tests tasks in a **simulated workshop scenario**.

COMET competence diagnostic model can be applied in a **practical setting in a real workplace** environment.



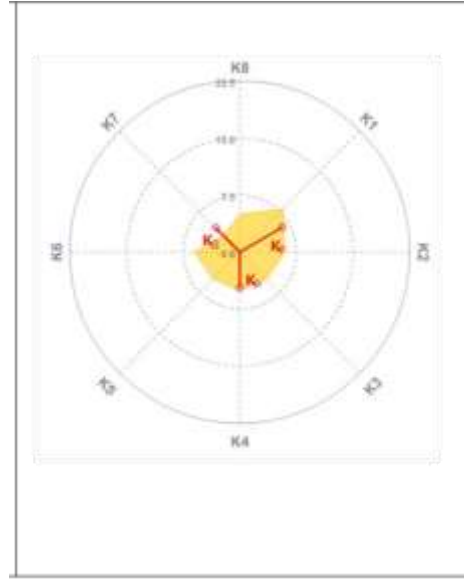
STUDENT MOTIVATION AND COMMITMENT



Low Occupational competence levels achieved versus very high levels of motivation, vocational identity and occupational commitment. (Possible indication of a misconception among students of the 21st century workplace professional demands; underutilization of student innate motivation and commitment).

World Economic Forum Top 10 skills for 2020

1. Complex Problem Solving
2. Critical Thinking
3. Creativity
4. People Management
5. Coordinating others
6. Emotional Intelligence
7. Judgment and Decision Making
8. Service Orientation
9. Negotiation
10. Cognitive Flexibility



WEF: Unlearning is as vital as learning in 4IR

THANK YOU



Isaacson describes Steve Jobs as the greatest business executive of our era, a genius whose imaginative leaps were instinctive, unexpected and at times magical. Jobs's passion has been to create a great company where **people were motivated** to build great, **quality products** supported by a deep current of **humanity in their innovation** (Isaacson, 2011, pp. 560- 571).

Dr. Patricia Jacobs
UWC IPSS
021 959 9596
pajacobs@uwc.ac.za