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THE DEUTSCHE GESELLSCHAFT FÜR INTERNATIONALE ZUSAMMENARBEIT - GIZ

SELF-ASSESSMENT OF DIGITAL TRANSFORMATION READINESS OF PUBLIC TVET COLLEGES IN SOUTH AFRICA

EXECUTIVE SUMMARY

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Bureau of Market Research (Pty) Ltd (BMR)
University of South Africa (Unisa)

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Study background

The Bureau of Market Research (Pty) Ltd at the University of South Africa (Unisa) was commissioned by the Deutsche Gesellschaft Für Internationale Zusammenarbeit (GIZ) to assess the Digital Transformation Readiness of Technical and Vocational Education and Training (TVET) colleges in South Africa.

The self-assessment focuses on the Digital Transformation Readiness of Technical and Vocational Education and Training (TVET) colleges.

The study was endorsed by the Department of Higher Education and Training (DHET) and entails a self-reflection and self-assessment by TVET colleges as they progressively deepen their engagement with digital learning and pedagogies.

The study is of strategic importance to enable policy makers to design, implement and evaluate policy interventions for the integration and effective use of digital learning technologies at TVET colleges.

The study comes at an appropriate time when COVID-19 and the Fourth Industrial Revolution (4IR) have accelerated digital transformation as well as the advancement and development of digital skills within the technical and vocational education and training sector.

These realities serve as key motivators for undertaking an assessment on the digital transformation readiness of TVET colleges in an attempt to support TVET colleges as they prepare to become digitally mature at all levels.

Research methodology and participation rate

This study consists of a baseline study conducted among TVET colleges to assess the digital readiness of public vocational education and training institutions. The study is a self-assessment by data subjects defined as TVET college executive management, senior management and senior academic staff. A quantitative research approach was adopted to include all 50 TVET colleges located across all nine provinces of South Africa. A self-administered web-based survey method was used to collect data based on pre-determined research questions. An assessment instrument was developed applying a Theory of Change (ToC) methodology to measure the digital transformation readiness of TVET colleges. These self-assessments took approximately three weeks to administer, whereafter data cleaning, editing, coding and capturing were concluded prior to writing a very detailed project report. The collective research efforts resulted in all 50 TVET colleges being included in the study, with a total of 280 data subjects (assessors) participating in the self-assessment study.

Self-assessment instrument

The assessment instrument was designed to include three distinct sections.
Section 1: Focuses on generic information from the assessors regarding the name and location of the TVET college.
Section 2: Includes 92 statements related to the measurement of the Digital Transformation Readiness of TVET colleges. The section focuses on the level of digital transformation achieved by TVET colleges to date, as well as the level of digital skills attained by teachers/trainers and students.
Section 3 Focus on views regarding current and future priority course/programme offerings by TVET College.

Digital transformation

is the process of using digital technologies to create new, or modify existing, business processes, culture, and customer experiences to meet changing business and market requirements. This re-imagining of business in the digital age is digital transformation." (Gartner.Inc: 2022)

Digital Transformation Readiness

in the TVET context referred to the increasing use of digital technologies for teaching and learning processes while making less use of non-digital teaching and learning technologies.

Theory of change (ToC) framework model

A **Theory of Change (ToC)** framework model was adopted to construct the assessment instrument according to inputs, activities, outputs and outcomes stages, which also signified the key conditions for digital transformation, implementation and readiness. The ToC model was adopted as it *explains how activities are understood to produce a series of results that contribute to achieving the final intended impacts (*Rogers, P., (2014), *Theory of Change,* United Nations Children's Fund - UNICEF).
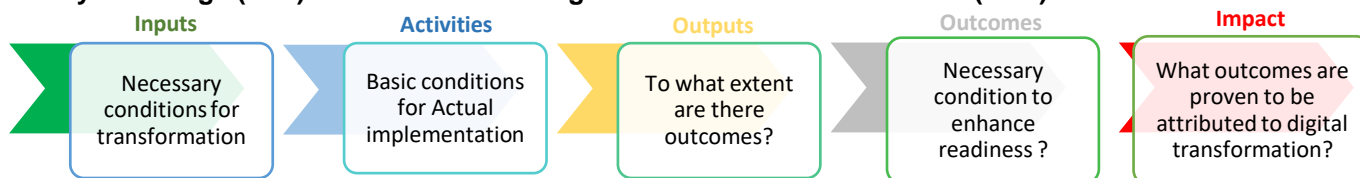
The ToC logframe or pipeline model disaggregates varied stages of digital transformation readiness, defined by 16 key constructs and 92 variables (statements) used to measure the maturity of digital transformation readiness.

DXToC Conceptual Framework
For the Digital Transformation (DX) Readiness of TVET colleges, several framework models have been explored during and finally integrated to design a local conceptual framework suitable to measure the maturity of digital readiness of public TVET colleges in South Africa.
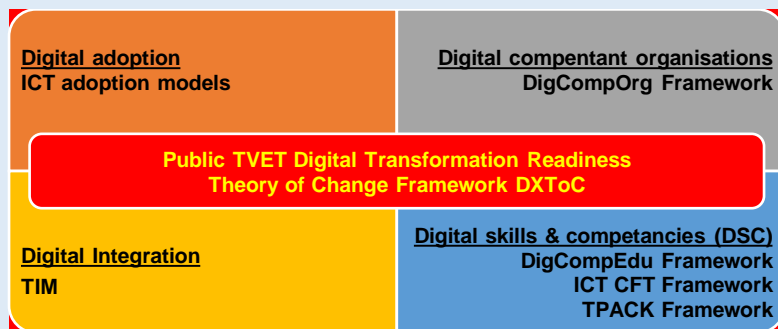
Theory of Change (ToC) Results Chain for Digital Transformation Readiness (DXR)

Inputs	Activities	Outputs	Outcomes	Impact
Necessary conditions for transformation	Basic conditions for Actual implementation	To what extent are there outcomes?	Necessary condition to enhance readiness ?	What outcomes are proven to be attributed to digital transformation?

In terms of the ToC model used for the purposes of this study any transformation process (i.e. digital transformation) is a multi-stage process starting by putting in place the necessary conditions making transformation possible (input phase) followed by activities commencing the actual transformation (activities phase). During the next phase (outputs phase) of the ToC the extent to which the transformation process already gave rise to certain transformation outputs being realized is being focused upon. The outputs phase is followed by the outcomes phase which focuses on the level to which transformation already permeated the institution and the level to which there are conditions in place to ensure that the transformed institution remain transformed and continue the transformation path. Finally, in the impact phase the impact of the transformation on the institution is being assessed with a specific focus on the level to which the new outcomes of the institution can be attributed to successful transformation

Key ToC Constructs

Analysis methodology and model reliability

The analytical methodology used in this study applied basic frequency distribution analyses on the 16 digital transformation readiness levels and 92 dimensions. This analysis approach was mixed with cluster analyses to identify leading or lagging levels and dimensions of digital transformation readiness. The voluminous data are finally consolidated into a digital transformation readiness index rating and ranking analyses to identify the maturity levels of digital transformation across different levels and dimensions. The analyses conclude with an assessment of the digital skills levels of TVET college teachers/trainers and students, as evaluated by the 280 accessors. Whereas high levels of consistency, reliability and construct validity in the data were detected, the overall TVET college assessment is being regarded as most reliable.

Research synopsis

The bulk of the analyses focuses on an overall assessment of the public TVET college sector in South Africa, which in general revealed low levels of digital transformation and maturity and low digital skills levels which currently seem not to ensure sustainable digital transformation of technical and vocational education and training in South Africa.

The neutral stance of TVET college assessors show

☐ There exist high levels of skepticism regarding the actual value that digital transformation and digital teaching products and services add to vocational and technical teaching and training.

☐ Many TVET colleges staff are still captured or trapped in the traditional off-line mode of teaching and training.

☐ The importance and low awareness levels of digital communication strategies, as well as the perceived lack of digital strategies and implementation plans, policies and procedures, are being viewed as critical digital governance regulations which must be in place to harness digital transformation to its fullest.

Assessing the digital transformation readiness of TVET colleges

TVET colleges are **least in agreement** with the following levels of progress with respect to digital transformation readiness

	Variable
1	Little access to ICT in my institution prevents me from using it in teaching and learning.
2	Digital Competence is factored in performance appraisals of staff.
3	The ICT facilities in my institution are well-functioning and can be used for digital teaching and learning purposes.
4	There are sufficient resources (time, people, budget) available to implement the digital transformation strategy within our institution.
5	The institution's digital transformation implementation plan identifies opportunities, incentives and rewards for staff who actively engage in the process of building digital capacity and digital modernisation of learning environments.

TVET colleges are **most in agreement** with the following developments regarding the level of progress in digital transformation readiness

	Variable
1	Top management strongly supports the use of digital teaching technologies.
2	Continuous change is part of our institution's culture.
3	Our institution's executives support the implementation of the digital strategy.
4	The institution aims to establish a culture where staff (and including students as appropriate) are considered as partners in change and are encouraged and incentivised to take measured risks and to explore new approaches to teaching and learning.
5	There are computer labs in my institution to which I can bring students for digital teaching and learning purposes.

Institutional dimensions which evoked relatively **higher levels of uncertainty** regarding the level of digital transformation readiness of TVET colleges

	Variable
1	There is direct added value created by the progressive digitization of products and services of our institution (e.g., cost reductions, increased productivity, better customer experience, customer differentiation)
2	Digitization has a positive impact on the decision-making agility of our institution.
3	The institution has in place an explicit digital teaching communication strategy, which identifies and uses appropriate communication channels/systems for different purposes and target groups.
4	A process is in place to externally benchmark the institution's digital capacity, with respect to similar institutions, regionally, nationally or internationally.
5	The impetus of our digital strategy is leading to innovations in operations.

Cluster analyses

Dissatisfaction rankings

- Little access to ICT in my institution prevents me from using it in teaching and learning.
- Digital Competence is factored in performance appraisals of staff.
- The ICT facilities in my institution are well-functioning and can be used for digital teaching and learning purposes.
- There are sufficient resources (time, people, budget) available to implement the digital transformation strategy within our institution.
- The institution's digital transformation implementation plan identifies opportunities, incentives and rewards for staff who actively engage in the process of building digital capacity and digital modernisation of learning environments.

Satisfaction rankings

- Top management strongly supports the use of digital teaching technologies.
- Continuous change is part of our institution's culture.
- Our institution's executives support the implementation of the digital strategy.
- The institution aims at establishing a culture where staff and students (where appropriate) are considered as partners in change and are encouraged and incentivised to take measured risks and to explore new approaches to teaching and learning.
- There are computer labs in my institution to which I can bring students for digital teaching and learning purposes.

Neutral rankings

- There is a direct added value created by the progressive digitization of products and services of our institution (e.g. cost reductions, increased productivity, better customer experience, customer differentiation)
- Digitization has a positive impact on the decision-making agility of our institution.
- The institution has in place an explicit digital teaching communication strategy, which identifies and uses appropriate communication channels/systems for different purposes and target groups.
- A process is in place to externally benchmark the institution's digital capacity, with respect to similar institutions, regionally, nationally or internationally.
- The impetus of our digital strategy is leading to innovations in operations.
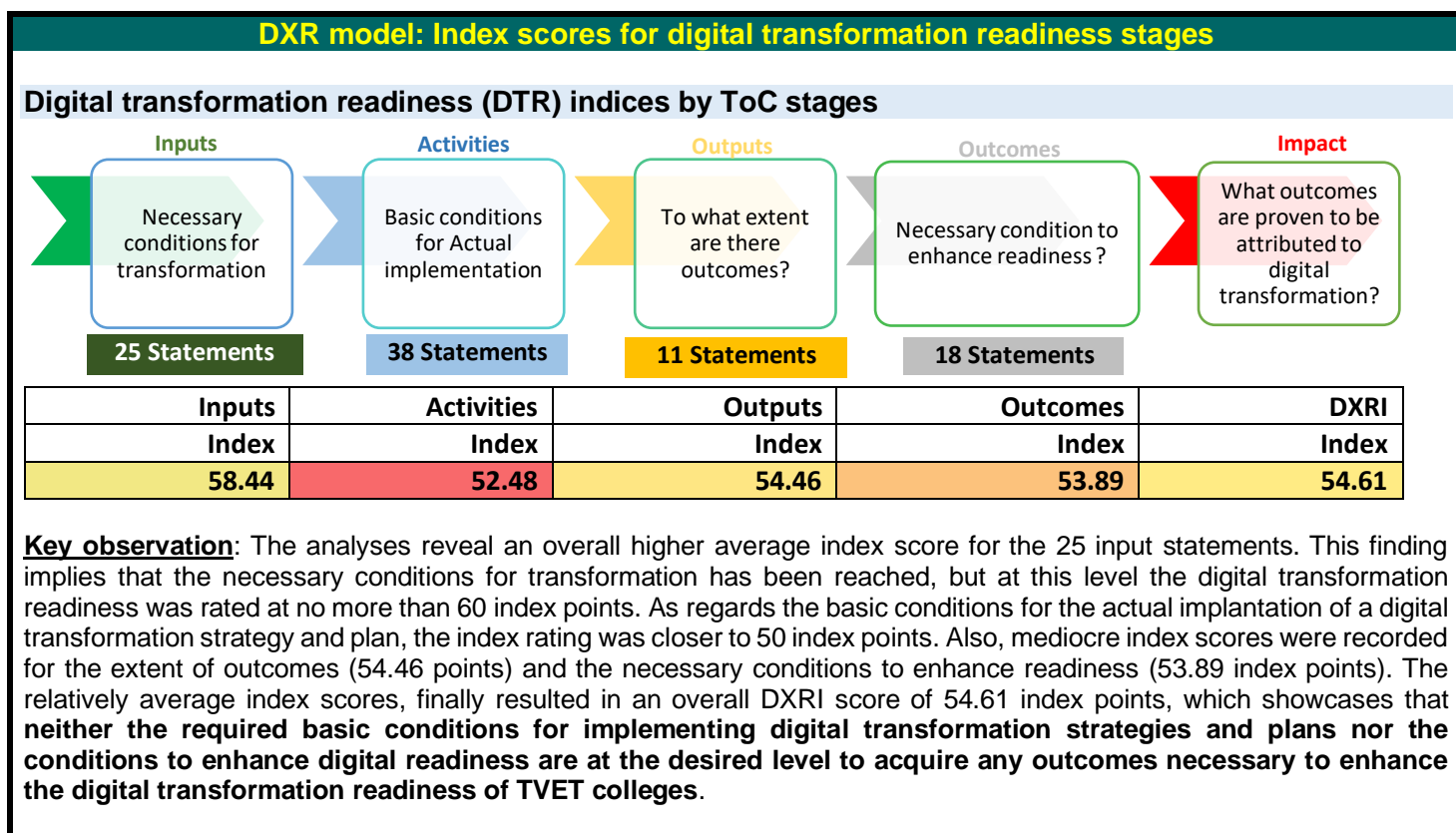
Descriptive analyses

Key observation

The digital transformation readiness (DXR) rankings by key level show high levels of willingness and commitment towards digital transformation, but clearly the digital competence of staff and students, the digital teaching experience, teaching and learning spaces to promote digital readiness and the formulation and implementation of digital strategies and implementation plans, processes, procedures and policies to advance digital readiness, are key DX aspects lacking at TVET colleges.

Major digital transformation readiness construct	Index
Digital competence among staff and students in place	49.84
Digital teaching and learning spaces available to contribute to digital readiness	50.54
Digital transformation implementation plan formulated	51.21
Availability of digital teaching expertise in the institution contribute to digital readiness	51.54
Processes, procedures and policies are in place to contribute to digital readiness	51.98
Digital strategy and digital implementation plans implemented	52.57
Digital strategy	53.80
Planning	54.70
Availability of a digital communication strategy in the institution contribute to digital readiness	55.15
Digital teaching and learning products, tools and technologies contribute to digital readiness	55.35
Value to be added and the positive impact of digital teaching contribute to digital readiness	55.63
Digital teaching and learning content is in place to contribute to digital readiness	55.76
Knowledge exchange and partnerships with respect to digital modes of teaching and learning contributing to digital readiness	56.25
Digital pedagogy is in place to contribute to digital readiness	56.90
ICT infrastructure	57.77
Organizational culture and management commitment	64.42

DX dimensions least contributing to the digital readiness of TVET colleges	Key recommendations

DX dimensions least contributing to the digital readiness of TVET colleges

☐ Clear knowledge gaps exist in using digital technology.
☐ Digital experts are perceived as insufficient.
☐ Lack of digital workplace conceptual and digital tools to model business processes.
☐ Limited access to ICTs.
☐ Insufficient range of digital technologies and tools.
☐ Deficient virtual learning spaces.
☐ Lack of training and professional development of lecturers to make use of digital technologies in teaching.
☐ Digital transformation implementation plans do not support the autonomy of internal stakeholders to implement digital learning technologies.
☐ Lack of periodic review of the curricula to integrate and effectively utilize digital learning technologies.
☐ Students' digital competence are not routinely encouraged, developed and assessed in diverse learning settings and across the curriculum.

Key recommendations

➢ The study provides support for the use of **digital business engineers** to support TVET colleges in their digital transformation journey. Digital business engineering (DBE) is a useful methodology for <u>sustainable</u> digital business transformation

➢ DBE could serve as a sound methodology to advance digital transformation systems of TVET colleges with a key focus on ICT and HR tools alongside securing cybersecurity measures to make vocational and technical education more efficient, secure, and productive.

➢ The importance of imbedding digital transformation at a human resource development level where digital competence, proficiencies, capacity building and the ability to inculcate digital transformation into the learning environments should be factored in as part of performance appraisals and rewards.

The proposed re-engineering is most likely to impact positively on sustainable digital transformation aspirations of TVET colleges. This process will be complemented by the positive view notable from the assessment that TVET managements are indeed very supportive of the use of digital teaching technologies and the implementation of digital strategies. This commitment demonstrates a good level of willingness to strengthen the allegedly mediocre progress with the actual implementation of digital transformation strategies, plans, processes, and procedures within the TVET business ecosystem.

DXR model: Index scores for digital transformation readiness stages

Digital transformation readiness (DTR) indices by ToC stages

Inputs	Activities	Outputs	Outcomes	Impact
Necessary conditions for transformation	Basic conditions for Actual implementation	To what extent are there outcomes?	Necessary condition to enhance readiness ?	What outcomes are proven to be attributed to digital transformation?
25 Statements	**38 Statements**	**11 Statements**	**18 Statements**	

Inputs	Activities	Outputs	Outcomes	DXRI
Index	**Index**	**Index**	**Index**	**Index**
58.44	**52.48**	**54.46**	**53.89**	**54.61**

Key observation: The analyses reveal an overall higher average index score for the 25 input statements. This finding implies that the necessary conditions for transformation has been reached, but at this level the digital transformation readiness was rated at no more than 60 index points. As regards the basic conditions for the actual implantation of a digital transformation strategy and plan, the index rating was closer to 50 index points. Also, mediocre index scores were recorded for the extent of outcomes (54.46 points) and the necessary conditions to enhance readiness (53.89 index points). The relatively average index scores, finally resulted in an overall DXRI score of 54.61 index points, which showcases that **neither the required basic conditions for implementing digital transformation strategies and plans nor the conditions to enhance digital readiness are at the desired level to acquire any outcomes necessary to enhance the digital transformation readiness of TVET colleges**.

TVET colleges readiness for digital transformation

Digitally Transformed — 45.89
My institution is already digitally transformed as evidenced by the full use of digital teaching and learning.

Implemented Plan — 51.70
My institution already implemented digital transformation.

Formulated Plan — 52.95
My institution already formulated digital transformation implementation plan.

Formulated Strategy — 53.57
My institution already formulated digital transformation strategy.

Commitment — 60.27
My institution is fully committed to digital transformation.
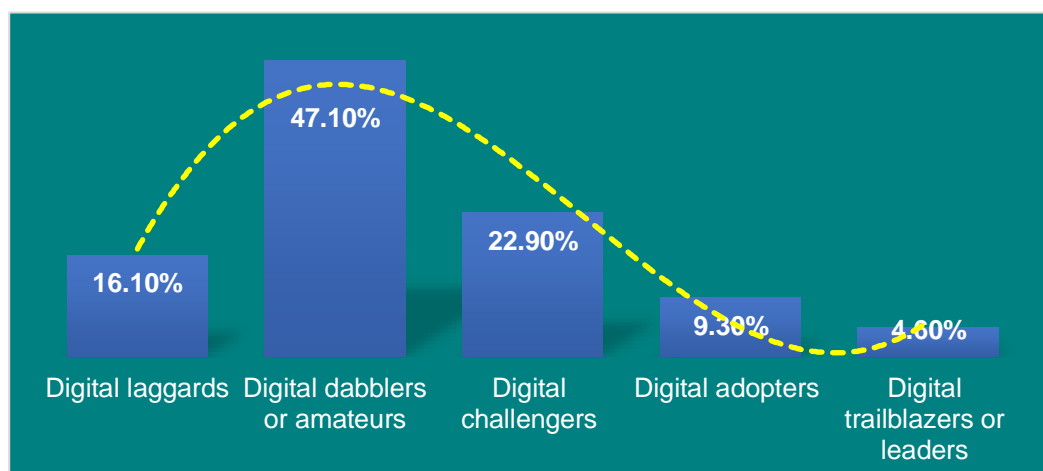
Index: 0.00 — 35.00 — 70.00

Scale anchor: 0 = strongly disagree; 100 = strongly agree

Key observation

From the analyses the commitmen of TVET Colleges to towards digital transformation is notable. However, the readiness levels drop when reflecting on the availability of a digital transformation strategy and plan and the implementation of such strategy or plans. Furthermore, the index score drops well below 50 index points when considering whether the TVET colleges have digitally transformed as evidenced by the full use of digital teaching and learning.

Level of digital performance achieved by TVET college - Five digital transformation maturity levels

- Digital laggards — 16.10%
- Digital dabblers or amateurs — 47.10%
- Digital challengers — 22.90%
- Digital adopters — 9.30%
- Digital trailblazers or leaders — 4.60%

Key observation

In 47.1% of the cases, institutions were classified as digital **dabblers or amateurs,** which showcases some awareness/adoption, leadership support and investment in digital transformation with poor ICT capacity for full digital teaching implementation.

Digital laggards show no awareness/adoption, leadership commitment and investment in digital transformation initiatives with an underdeveloped ICT capacity.
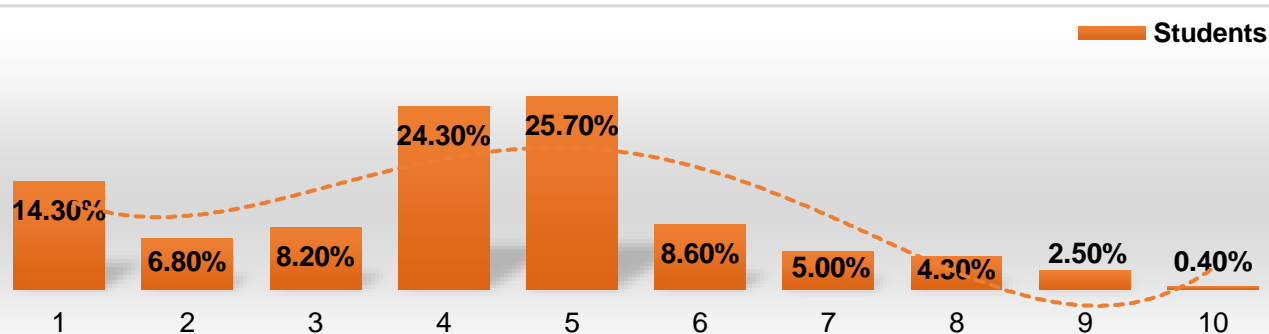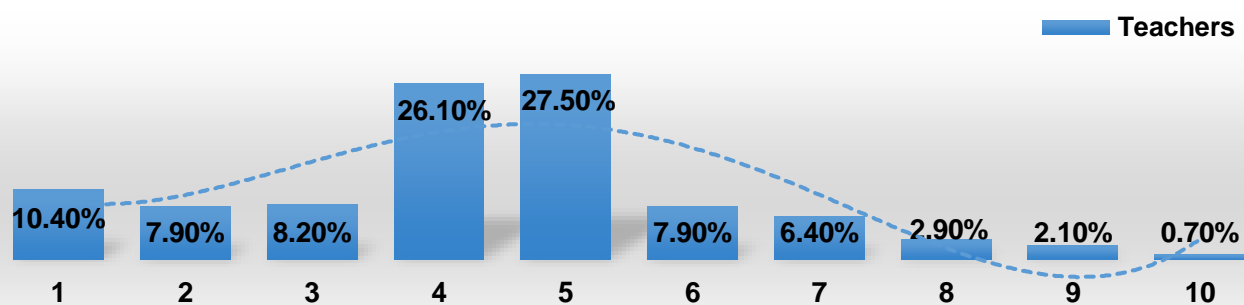**Digital dabblers or amateurs** show some awareness/adoption, leadership support and investment in digital transformation with poor ICT capacity.
Digital challengers show high awareness/adoption, leadership support and investment in digital transformation initiatives with moderate ICT capacity.
Digital adopters show very high awareness/adoption, leadership support and investment in digital transformation initiatives with high ICT capacity exists.
Digital trailblazers or leaders show a mature digital transformation plan where digital processes and mindsets are ingrained in the DNA of the institution with an advanced ICT capacity.

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Rating of level of digital skills attained by most teachers/trainers and students

Teachers: 1: 10.40%, 2: 7.90%, 3: 8.20%, 4: 26.10%, 5: 27.50%, 6: 7.90%, 7: 6.40%, 8: 2.90%, 9: 2.10%, 10: 0.70%

Students: 1: 14.30%, 2: 6.80%, 3: 8.20%, 4: 24.30%, 5: 25.70%, 6: 8.60%, 7: 5.00%, 8: 4.30%, 9: 2.50%, 10: 0.40%

Scale anchor: 1 = only basic skills and 10 = advanced digital skills

Key observation

☐ The analysis shows that approximately 80% of the TVET college teachers/trainers and students received rating scores below 6 on the digital skills rating scale.

☐ This finding reveals that most teachers/trainers and students were assessed as having only basic digital skills.

Critical outcomes	Recommendations
➢ Low levels of awareness and a lack of true understanding of what DX entails and what institutional digitization demands. ➢ Slow uptake of digital technologies in some areas of digital competence, without, however, following a comprehensive or consistent approach. ➢ Digital experiments are attempted but they are conducted in disparate silos with disconnected goals, resources, and vision. ➢ Low trust in DX dividends. ➢ Pedestrian DX readiness. ➢ Low skills and competency levels. The underlying idea is that teachers who lack the necessary competencies to use ICT in their professional practice will not be able to deliver quality education and ultimately not be able to effectively guide the development of students' ICT competencies. ➢ Low levels of digital teaching experience. ➢ Knowledge gaps in using digital technology. ➢ Inadequate digital experts. ➢ DX disconnect between different staff job levels regarding the maturity levels of DX. ➢ Imbalance between leadership and governance (for vision and top-down strategies) and staff and stakeholders capable of taking personal responsibility for self-initiated actions and bottom-up efforts and initiatives related to digitalization. ➢ Lack of a tie-down human resource performance, rewards and recruitment strategies to enhance commitment towards DX. ➢ Lack of policies, processes and procedures to effectively govern and manage DX. ➢ Low awareness levels of digital communication strategies. ➢ Insufficient teaching and learning spaces to promote digital readiness. ➢ Inadequate implementation of digital strategies and implementation plans, processes, procedures and policies to advance digital readiness.	➢ Have to change the mindset of TVET staff to transform from traditional to digital teaching and learning behavior. ➢ Expose TVET staff to international best practice and exemplar of successful DX strategies and plans. ➢ At a corporate governance level, assist TVET colleges to develop and implement DX strategies and plans. Information sessions on DX strategies and plans and aligning these with the performance agreements, rewards and recruitment of staff will be critical. ➢ As an executive management level, leverage from the noted willingness of top management in support of DX. ➢ Institute DX engineers or agents to guide TVET colleges during their DX journey in response to institutional digitalization and digital skills demanded by the 4IR and the digital economy. ➢ Given the extent of the TVET ecosystem, a phased-in approach is recommended when prioritizing resources to assist TVET colleges with their planning, implementation and monitoring of their digital transformation strategies and plans. ➢ Inculcate Digital Business Engineering (DBE) in support of <u>sustainable</u> digital business transformation and to advance digital transformation systems of TVET colleges with a key focus on ICT and HR tools alongside securing cybersecurity measures to make vocational and technical education more efficient, secure, and productive. ➢ At an operational level, showcase the seriousness of DX at an HR level by imbedding DX into the performance assessment and rewards systems of TVET institutions. This will entice the desired buy-in and trust in DX at operational level. ➢ Use the DXRI score as baseline study to measure the impact of digital transformation over two to three-years from now. ➢ Conduct a digital skills audit among staff and students using existing EU frameworks for the Digital Competence of Educators (DigCompEdu). ➢ Undertake a study among industry to determine current and future technical and vocational and digital skills demands. ➢ Share the outcome of the 2022 baseline DX readiness study with DHET and GIZ implementation agents to engage with TVET colleges regarding the outcome of the assessment and to facilitate DX policies, processes and procedures in support of sustained DX. ➢ Concurrently, TVET colleges should be informed regarding the future digital skills requirements pronounced by this study (3D models designing and printing, Robotics, Cybersecurity, Cloud computing, Coding, Computer system analysis and design, Computer Program Communication Networks, Computer system analysis and design, Digital Marketing, Office Data Processing, Information Technology programming, Data analysis and processing, digital money transacting, virtual arts, digital industrial design, digital platform navigation, digital (remote) office skills, office data processing, digital ocean economy, drone pilot, Internet of Things – IoT, Information Security, Artificial Intelligence - AI and Machine Learning, Networking, Hardware Interfacing, Business Intelligence) and be encouraged to proactively respond to industry demands to secure that the notable digital skills levels and gaps are addressed by the development of innovative technological, pedagogical and content knowledge (TPACK) learning which will advancing digital skills and promote sustainable DX. ➢ Conduct a full-fledged digital transformation impact assessment as a follow-up step of the 2022 base-line assessment.

CONCLUDING REMARKS

The study under discussion comprised of a baseline study based on the self-assessment of TVET college staff members across different job levels who willingly agreed to act as assessors of the 50 public TVET colleges who were included in the study. Based on the findings of this study it is being recommended that the TVET colleges be supported to develop and implement the necessary DX strategies and plans and to cultivate a culture of digital teaching and learning in support of sustainable DX, improved digital skills and growth of the digital economy. It will be essential for public TVET colleges to embrace digitisation for the benefit of all citizens and to invest in human capital in support of a stronger technical and vocational education and training (TVET) system which will remain challenged to ramp up the development of technical skills required for the future world of work.

The full report on the ***self-assessment of digital transformation readiness of public TVET colleges*** is available from the the Deutsche Gesellschaft Für Internationale Zusammenarbeit (GIZ) who commissioned the Bureau of Market Research (Pty) Ltd at the University of South Africa (Unisa) to undertake this strategically important study to aid TVET colleges as they prepare to become digitally mature at all levels.

Teachers need to integrate technology seamlessly into the curriculum instead of viewing it as an add-on, an afterthought, or an event.

Bill Gates