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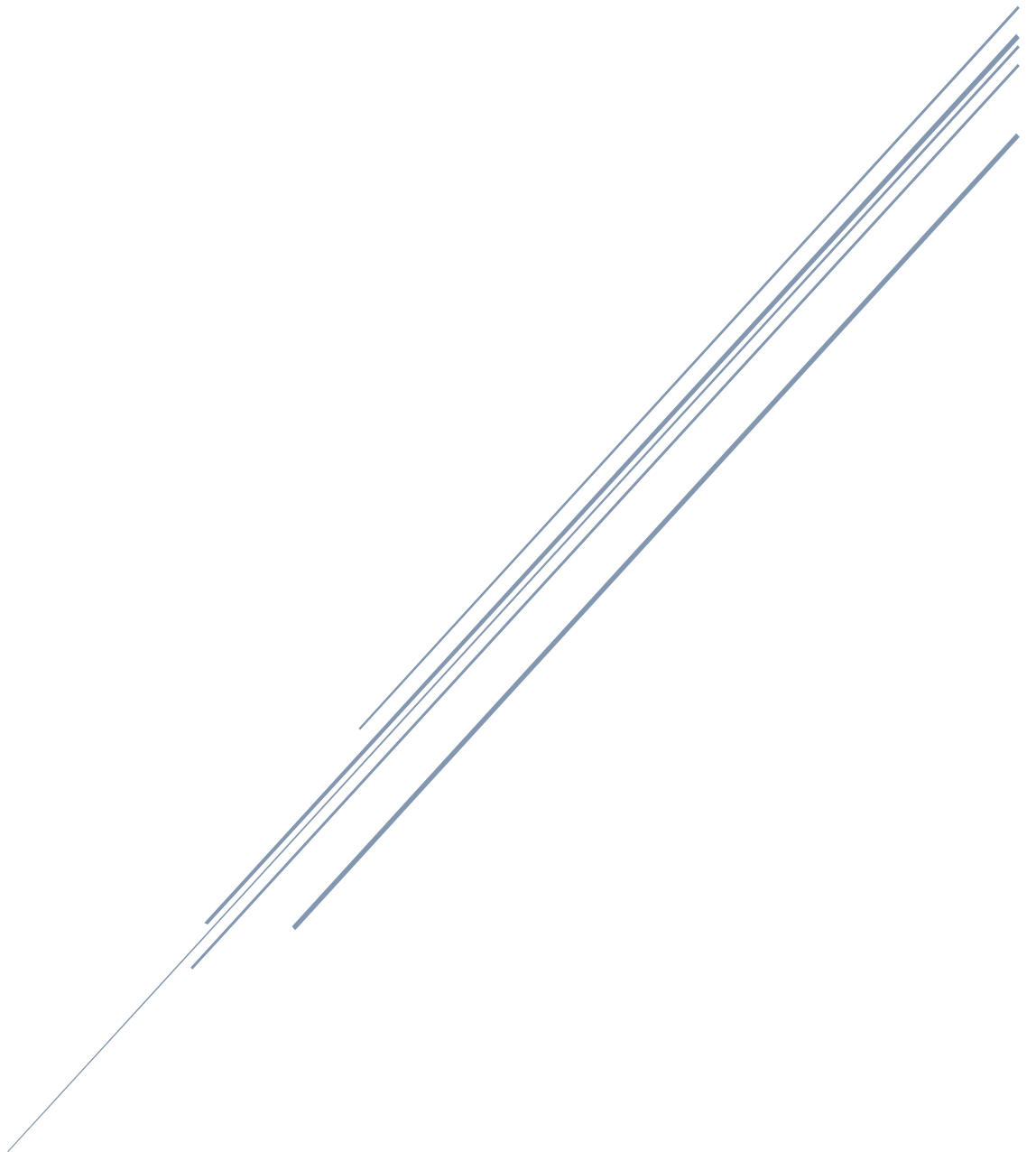
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**The professional status of educators requires them to be truly agents of change. What is the role that educators fulfill in the process of innovation in curriculum development, implementation and review?**

*Understand the role of educators in the process of curriculum development, implementation, and review from a socio-economic perception for the twenty-first-century students in Vocational Education Training.*



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## **Chapter: 1 Introduction**

This research study applied Evidenced-Based Research (EBR) for the collection of data that is to identify demands for the twenty-first-century education with a special focus on Vocational Education Training (VET). A systematic review has been used for a meta-analysis report. A summary of the results, generated from this research further provides recommendations from recent studies made by various VET and educational institutions.

The research study addresses the challenges of teaching and learning in a fast-changing world, where education is continuously evolving. The literature demonstrates that innovation in teaching and learning is a must, to cater for the future of the twenty-first-century students. The lecturers' role is key to equip the students with the appropriate skills demanded by future challenges and jobs.

This research study will provide recommendations addressing the following questions:

What is the educator's role to fulfill the requirements for the twenty-first-century VET teaching and learning?

What changes are being recommended to a VET curriculum programme to fulfill the educational needs of twenty-first-century students?

## 1.1 Background and context of this study

The purpose of this research study is to explore the future of the twenty-first-century VET students and the role of educators' requirements to fulfil the demands for twenty-first-century VET teaching and learning. Furthermore, the research study will aim to understand what changes are being recommended to a VET curriculum programme, to fulfil the needs of the Twenty-first-century students and educators from a socio-economic perception.

To sustain the current socio-economic and social inclusion situation, the way of teaching and learning need to be changed. Jack Ma founder of Alibaba Group, China's e-commerce giant during a conference stated that *"If we do not change the way we teach, 30years from now, we're going to be in trouble"*. (Ma, 2018)

Jack Ma argues that education needs something unique to keep up with a fast-changing World, otherwise we will end up competing with machines.

*"VET teachers acquired their pedagogical and vocational skills at the beginning of their careers. Today this is no longer possible. National VET systems are in continuous change. Educational theory suggests innovative teaching methods, some involving the use of technology."* (Cort, et al., 2004, p. 10)

Cort, et al., (2004) supported Jack Ma's argument by highlighting the continuous changes in education and the importance of innovative teaching.

Piaget (2009) cited in (Alismail & McGuire, 2015, p. 151) argued that *"adopting a 21st-century curriculum should blend knowledge, thinking, innovation skills, media, Information and Communication Technology (ICT) literacy, and real-life experience in the context of core academic subjects."*

According to the World Economic Forum's cited in: (Xuereb & Calleja, 2021) *"The Future of Jobs Report, 50 per cent of all employees will need reskilling by 2025 as the pace of adoption*

*of technology increases. Critical thinking and problem-solving top the list of skills employers believe will grow in prominence in the next five years.”*

This research study will use an EBR approach to gather the appropriate data with the scope to analyse what changes are being recommended to fulfil the needs of the twenty-first-century students and educators’ requirements for a VET curriculum programme.

## **Chapter 2: Literature Review**

Various dynamic factors are influencing the demands and changes in VET; such as Industries, communities, and socioeconomic status. The latter also include the poverty class. The future of VET and education, is not only about the knowledge and skills of new technologies and teaching innovative methods, but also the importance of teaching basic life skills. Xuereb & Calleja (2021) argued that *“Newly emerging skills this year are skills in self-management such as active learning, resilience, stress tolerance and flexibility.”* One of the main reasons for an increase in poverty is the lack of basic skills. A report issued by (Kilpatrick & Allen, 2001) emphasised that training needs, are increasingly looking for ‘life skills’ learning for life requirements in literacy, numeracy, and personal skills. A more recent paper (Montebello, 2019) posits that *“It is regularly observed that these people have a low academic background, may not have basic financial literacy knowledge, and it is very difficult to try to improve their difficult situation.”*

With a distance of almost 20 years between the outcome of Kilpatrick & Allen (2001) and Montebello (2019), life skills are still one of the main factors that induce poverty. This demonstrates that basic skills are to be seriously considered as part of the educational changes for the twenty-first-century students together with technology and innovative pedagogical demands. Xuereb & Calleja (2021) highlighted that *“The jobs on the increase will be those*

*requiring creativity and innovation, digital skills – such as data analytics, programming and AI – and those requiring social/emotional intelligence.”*

In this digital era, students can find information from various sources. Education today is not the only source of knowledge. Shdaifat & Huson (2020, p. 324) underlined that *“They should deliver vocational education through letting students adopt investigative and exploratory approaches and practice handworks.”*

The role of a VET teacher for twenty-first-century students, not only requires industrial experience but also mentorship to validate information. VET teachers need to be abreast with the industry’s changes to deliver real-life experience teaching with the aim to provide problem-solving training.

A report issued by CEDEFOP, (2015, p. 51) posited that *“teachers themselves have concerns over how little experience teachers have in the industry. Apprentices, in particular, see teachers who do not have experience in the industry as less helpful, and supportive.”*

It is a fact that the role of the VET teacher must change to satisfy the twenty-first-century students’ requirements and social and industrial demands, however, this breakthrough for the transformation needs to be supported. Kari B. Taylor and Marcia B. Baxter Magolda argue that problem-solving through collaboration is the first step to support VET teachers in their development transformation, and the second step is to find others with whom to collaborate. The main stakeholders that need to collaborate with teachers in this developmental transformation are the educational institution and industry. A study carried out by UNESCO-UNEVOC, (2020) identified ten trends characterizing the TVET system and support TVET teachers to deliver skills and knowledge for twenty-first-century students. The outcome of the study addresses the need for new technologies, transversals skills, applied skills, practical skills, to possess future-oriented skills, and inclusive methods. Communication channels between VET teachers and stakeholders are vital. UNESCO-UNEVOC, (2020, p. 45) posited

that “Regular consultation with TVET teaching staff is key to building a resilient, responsive and future-ready TVET system.” VET teachers need to be involved in consultation especially consultations that will impact on educational changes.

*“This leads to effective policies and thereby improves the responsiveness of TVET systems to evolving skills requirements.”* (UNESCO-UNEVOC, 2020, p. 45)

The VET teachers’ role in the twenty-first-century, is not just about delivering lessons but supplying knowledge, skills, values, and positive attitudes which learners need to success in a continuous dynamic world.

A report provided by Wheelahan & Curtin, (2010) showed that a VET curriculum compared to other sectors needs to be more experiential, applied, and student-focused. For such a curriculum the importance of teachers’ experience and industry currency is crucial.

The importance of producing a curriculum that is grounded on experimental learning, applied and student-focused gives the teacher the necessary flexibility to go in deep learning without restrictions and be able to go beyond specific training occupations (Wheelahan & Curtin, 2010, p. 29).

According to an information session presented by Wakamiya, et al., (2021) there are three essential aspects to model and design a curriculum;

**A substantive perspective:** involves the development and design of the classroom resources according to the subject matter and materials for teaching and learning.

**Technical professional perspective:** analysis, re-design, and development of the curriculum in order to shape the curriculum content in an optimal and relevant resource.



**Socio-political perspective:** This refers to the influences by various stakeholders (pupils, parents, teachers, school leaders, policymakers, administrators, etc.). At this stage of the curriculum design stakeholders' concerns must be anticipated.

The first two essential aspects confirm how important is the role of a teacher in curriculum design and development. The substantive perspective information comes directly from the teachers' experience, skills, and knowledge. The technical professional aspect is founded on the teachers' expertise and industry currency.

The Socio-political perspective supports (Taylor & Magolda, 2015, p. 1) argument, that main stakeholders need to collaborate with teachers.

One of the short-term deliverables for 2021-2025 proposed in the Osnabrück declaration report is to *“Develop national and regional skills intelligence systems including skills anticipation and graduate tracking; enable social partners, decision-makers, stakeholders and providers to adapt and update VET programmes, curricula and guidelines in a timely and effective manner”* (EU & EEA, 2020, p. 6).

This statement once again highlighted the importance of collaboration including skills anticipation. Approaching a skills anticipation strategy is not necessarily linked to the future but to stimulate teachers and stakeholders to forecast innovative ideas.

Facer (2017: 1) cited in (Bayne & Gallagher, 2021, p. 611) *“describe anticipation studies as being ‘less concerned with the future as an object of study than [with] the emergence of new forms of time-consciousness and anticipatory practices which enable people to engage with ideas of the future as a resource to interrogate the...present’.”*

## **2.1 Conclusion:**

Literature review demonstrates that teachers must be able to teach in a variety of modalities and circumstances, and this must be based on a knowledge of how learners learn and what they must learn. The importance of assessment, as well as the necessity for a more comprehensive and in-depth understanding. Literature review also reveals that the role of a teacher and the curriculum development, implementation, and review are not to be treated as a separate matter but as a whole strategy in a collaborative context to be equipped for the twenty-first-century educational challenges.

This research study will take a qualitative approach using EBR that involves applying a systematic review method to gather data. Through meta-analysis the research is expected to provide sustainable recommendations to fulfil the needs of the twenty-first-century students and educators' demands for a VET curriculum programme.

## **Chapter 3: Methodology**

### **3.1 Introduction:**

The objective of this research study is to understand the role of educators in the process of curriculum development, implementation, and review from a socio-economic perception for the twenty-first-century students in VET. This research study aims to identify the Educators' role and demands for the twenty-first-century students, explore changes that are being recommended to a VET curriculum for the twenty-first century and provide recommendations based on EBR addressing the following questions:

What is the educator's role to fulfill the requirements for the twenty-first-century VET teaching and learning?

What changes are being recommended to a VET curriculum programme to fulfill the educational needs of twenty-first-century students?

### **3.2 Research Philosophy**

A research study can be described as a systematic structure to examine a specific theme that requires a solution. The techniques approached in this research study developed procedures by which data is examined and explored to identify appropriate recommendations that lead to solutions. This research study applies a qualitative EBR methodology. EBR literature identifies relevant data to analyse and describe recommendations.

In the case of this research study, EBR was applied to identify and analyse the demands of the educators' role and the changes that are being recommended to a VET curriculum for twenty-first-century education. The purpose of this research study is not to propose pedagogical changes but to describe recommendations based on recent and previous studies.

### 3.3 Sampling Strategy

The research applied a systematic review methodology that yielded 21 articles of which 12 articles were excluded and 9 articles included (45% of the total review)

A systematic review method based on the PRISMA model was used to collect data. A search string was constructed using a combination of keywords to include or exclude records addressing appropriate criteria. Articles, reports, and papers associated with keywords, *VET*, *Curriculum Review Future*, *Lectures'/Teachers' role*, *Future Skills*, *Demands and Challenges*, were cautiously screened for eligibility. Articles and records were researched for relevancy according to the criteria. The final inclusion criteria of selected literature were subjected to a thorough assessment by two researchers to discover any inconsistencies or consistency related to the research. The study selection strategy followed the PRISMA model statement guidelines as follows:

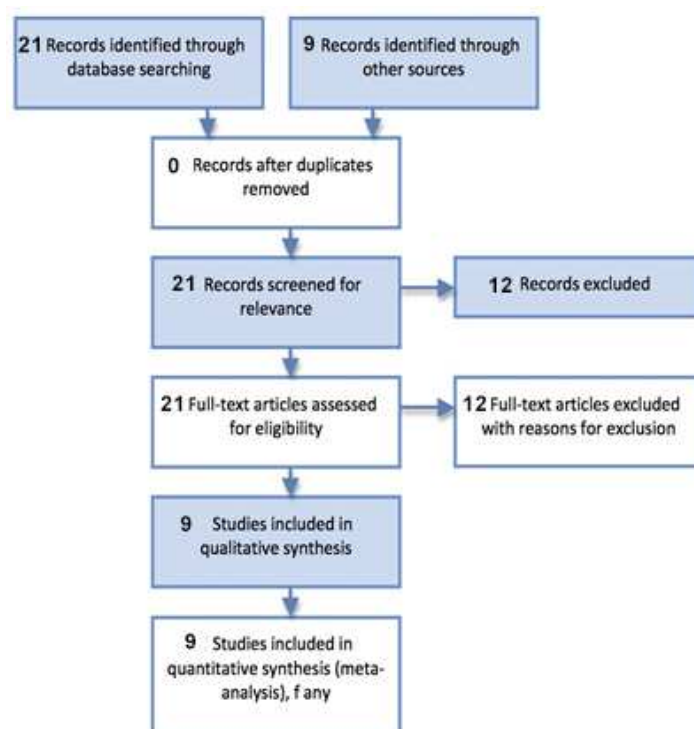


Figure 1 PRISMA MODEL

(EQUATOR, 2021)

- **Identification:** Twenty-one records identified through database research.
- **Screening:** Twelve records after duplicates removed and number of records excluded.
- **Eligibility:** Nine records of full-text articles assessed for eligibility.
- **Included:** Nine records studies included in the qualitative synthesis.

The databases SAGE, EBESCO, Research Gate and Academia.edu were searched using keywords: *VET, Curriculum Review Future, Lectures'/Teachers' role, Future Skills, Demands and Challenges*. The Prisma Model (Appendix1) provides details of the selected articles including reasons for inclusion and exclusion.

This research study included one participant. The participant took the role of a reviewer for the second interpretation of the screening process and coding. The participant was purposively selected due to his knowledge and understanding about pedagogy and instructional design.

### **3.4 Validity and Reliability**

Validity and reliability can never be completely solved in a research study. (Cohen, et al., 2007, p. 152) stated that *“Threats to validity and reliability can never be erased completely; rather the effects of these threats can be attenuated by attention to validity and reliability throughout a piece of research”*.

The EBR method was carried out by two researchers with VET educational knowledge as well as industry currency experience to improve validity and reliability for this research study. Records were reviewed separately by each researcher, then discussed and analysed to determine which records should be included and which should be excluded based on the research criteria.

The EBR method enhanced the validity and reliability of this research study. According to Fitz Gibbon (1997: 35-6) cited in (Cohen, et al., 2007, p. 309) *“evidence-based approaches are*

*necessary in order to challenge the imposition of unproven practices, solve problems and avoid harmful procedures, and create improvement that leads to more effective learning.”* The argument brought forward by Fitz Gibbon (1997: 35-6) supported the validity and reliability of the systematic review applied in education as well as the approach of this research study.

### **3.5 Ethical Procedures**

To protect participants’ privacy, no names or other personal information were requested. The participant was notified formally about the research study and purpose, in order to protect the privacy of information and personal details, no data was exposed and any data that was not utilised for the research was destroyed. There were no religious or cultural research linked to this study. The research study was solely related to the subject of this research study the “VET twenty-first-century-education.”

## **Chapter 4: Evidenced Based Review (Data Analysis)**

This reflective discussion explores the requirements for twenty-first-century VET learning, teachers' role, and curriculum changes. The objective of this reflective discussion is to analyse the demands being studied and discuss the future of VET education. The outcome results of this analysis are expected to provide recommendations about curriculum changes to fulfil the demands for the twenty-first-century-students and what should be the VET educator's role to fulfil the requirements for the twenty-first-century VET learning.

### **4.1 Curriculum Changes: What changes are being recommended to a VET curriculum programme to fulfill the educational needs of twenty-first century students?**

Literature review reveals that the curriculum for the twenty-first century must be founded on creativity, creative thinking, problem-solving, social skills, and technology, applying flexibility and resourcefulness methods, and not teaching to test students. The integration of cognitive learning and skills are to be part of the curriculum approaching the 4Cs characteristics (critical thinking, communication, collaboration, and creativity) including core academic content. Lombardi, (2007) cited in (Alismail & McGuire, 2015, p. 2) argues that a curriculum based on 4Cs integrating academic core content will prepare students with the necessary knowledge and life skills that will help them to be successful in their future careers. As a result, the curriculum in the twenty-first century should focus on knowledge construction and encourage students to produce information that is valuable or meaningful to them to gain new skills helping them to identify their talents.

To reach such results a VET curriculum needs to be connected with the real world to encourage students' participation and enhance their motivation to learn. The literature review also

revealed the importance of technology in a curriculum. Kanuka et al, (2007) cited in (Alismail & McGuire, 2015, p. 4) posited that *“Technological tools offer students the option of working in collaborative groups, which may increase student motivation and develop critical thinking.”* According to Kanuka, (2007), Multimedia tools promote a deeper understanding of active learning, and that student who used multimedia tools for teaching have higher-level of thinking skills when compared with traditional teaching methods.

Commerce, (2021, p.12) argued that *“A curriculum review would provide a holistic approach to subjects taught, new skills that need to be introduced and the potential elimination of content that is no longer relevant”*. In addition, literature review withstands a curriculum for the future that is a continuous investigation to provide innovative cognitive instructions, social capacities, and critical thinking skills as well as evaluating skills and knowledge across different methods of assessment.

Literature review reveals that a VET curriculum needs to integrate live industry projects and endorsement of industry practitioners as well as the contribution of the private sector. A VET curriculum needs to be designed in collaboration with VET teachers, industry, and interested parties. Such an approach balances the content of a curriculum between academic content and daily practice providing flexibility in teaching and promoting teachers’ own experience. Literature review shows that a VET curriculum has to be competence-based and not curriculum-oriented, focusing on learning by doing. According to Cort, et al., (2004, p.54) *“Teachers can develop their competences in a dual way of learning, coached by the coach from the institute for teacher training as well as by the coach in the workplace.”*

The latter is an innovative mindset for a dual VET route that involves VET educators in the curriculum design and delivery of appropriate competencies, giving VET educators’ the responsibility for change and acquire a feel of ownership.



## **4.2 Educator's role for the twenty-first-century VET learning: What is the educator's role to fulfill the requirements for the twenty-first-century VET teaching and learning?**

Literature review reveals that the role of teachers for twenty-first-century students is to identify students' skills, use methods to improve student's ability and introduce innovative strategies and modern learning technologies that help to integrate cognitive and social skills in order to promote future skills. The literature review demonstrates that the problem-based learning approach motivates students to discuss and analyse issues related to the topics that are being delivered as well as allows students to investigate problems. The literature demonstrates that problem-based learning stimulates students to generate ideas and provide explanations to find appropriate solutions. Another important fact that teachers need to include during their lessons is cooperative learning. During cooperative learning, the teacher's role changes into a coach and/or mentor role approaching an inclusive mindset. Cooperative learning encourages dividing students with different abilities and skills into groups. Cooperative learning encourages creativity. The curriculum for the twenty-first century promotes creativity. Knowlton, (2003) cited in (Alismail & McGuire, 2015, p. 3) argued that "*The diversity of students' skills and abilities can encourage creative work where every person brings something to the table*" Working in a cooperative environment among students with different abilities, skills and knowledge provides exchanging of ideas and consequently developing the concept of community of practice. According to the literature review teachers', trainers, and VET teachers' mindsets need to be set for future-oriented skills, be sensitive and inclusive, not only for learning differences but also for socio-cultural, gender, and other disadvantages and backgrounds.

UNESCO-UNEVOC, (2019, p. 8) argued that *“TVET teachers/ trainers also need grounding in inactive, learner-centered pedagogy to build learners’ cross-curricular skills and cross-occupational competencies.”* Cross-curricular and cross-occupational skills are the game-changer factor to prepare the teachers to face the twenty-first-century teaching and learning challenges. Cross-curricular promote innovative teaching strategies encouraging creativity and problem-solving skills. Barnes, (2015, p. 7) sustained that *“Creativity and cross-curricular are linked”* when linked, problems are more easily faced and learned. Mohammad, (2009) cited in (Shdaifat & Huson, 2020) mentions a *“convenient learning environment”*. Mohammad, (2009) cited in (Shdaifat & Huson, 2020, p. 2) stated that convenient learning set up, *“promotes respect for criticism in the classroom, acceptance for others’ opinions in the classroom and encourage learners to find creative solutions for solving their problems.”* In this case, a teacher’s role in a convenient learning environment shifts to that of a mediator, applying experiences and supervision for information validity while allowing students to explore, research, and approach hands-on practice works. Atteyeh, (2010) cited in (Shdaifat & Huson, 2020, p. 3) argued that students, *“ought to think and learn rather than the way of memorizing the information”* supporting the problem-based model. Literature reveals that a change in a VET teacher’s role also requires an alternative assessment method to assess students’ development. The assessment structure should encourage students to continue learning by applying a continuous assessment structure for an ongoing improvement. In this case, VET teachers should develop students’ critical thinking skills for a high-quality education using effective communication methods.

Another trend requested for VET and VET teachers is that VET teachers work in companies for at least three months (on-the-job learning scheme) to update vocational competencies. The

literature demonstrates that a VET teachers' role has become that of a coach or facilitator. These changes demand VET teachers to plan a different way of teaching focusing on different learning styles. A VET teacher for the twenty-first-century needs to apply various methods of teaching and evaluation such as; project working, workshops, case studies, and other methods that approach problem base models for continuous teaching and evaluation. Literature reveals that the public demands across Europe debating Globalisation, digitisation, migration, demographics and the greening economy will influence the future of VET development. The literature demonstrates that the twenty-first-century VET teacher needs to acquire new pedagogical skills with a learner-centred approach, on-the-job training to update skills competencies, be up to date with modern technologies, be aware of business and employers' needs, and have managerial, organisational, and communications skills.

### **4.3 Challenges**

Literature reveals the importance of teachers' wellbeing which is a critical issue. This is a challenge that needs to be seriously supported to avoid the lack of VET teachers in the coming future. Cort, et al., (2004, p. 12) argued that *"VET systems are struggling to recruit new VET teachers and keep their existing staff. The case studies identify several important issues for teacher welfare and provide concrete examples of strategies designed to improve teachers' satisfaction with their work."* Although VET expansion can be a benefit this may experience a loss of transparency putting a risk group of individuals not to benefit from VET if not appropriately developed in terms of curriculum design and VET teacher training.

CEDEFOP, (2017) report showed that *"Increasing the transparency and permeability of education and training systems, as supported for example by the EQF, is therefore crucial.* The growth of VET needs to be supported with new pedagogies, curricula, technologies, life skills, and appropriate training, developing future focus programmes.

UNESCO-UNEVOC, (2020) argued that TVET teachers and trainers should possess future-oriented competencies that they can pass on to students to improve VET responsiveness for future skills. The literature demonstrates that the main challenges are; VET teachers' wellbeing and keeping VET teachers as well as the method of transformation focusing on learners and modern curricular.

*“Challenges and transformations, both in the world of work and learning, are very real. Attracting, recruiting and keeping young teachers and trainers in the profession is crucial for enhancing the quality of TVET. In our experience, offering young vocational teachers adequate opportunities for professional training, equipping them with the 21st century teaching and/or facilitating skills and ensuring that they have easy access to continuous professional development not only improves the teaching learning outcomes, but also improves people’s social and economic lives.”*

Carolin Bansbach, Head of Section, Social, Health & Education, GIZ cited in (UNESCO-UNEVOC, 2020, p. 26)

## **Chapter 5 Recommendations**

This research study demonstrates that changes in the VET curriculum and VET teachers' roles are certain and require new competencies. The impact of these changes is subject to reforms in various sectors including social and political demands. The role of VET teachers requires new competencies to deal with more diverse learners than before. Changes are not only associated with young students but also with adults (Lifelong Learning). Taking into consideration their previous career and life experiences, as well as their varied talents and attitudes, which may differ significantly from those of younger Learners. Educational paradigms are shifting and the teachers' role is becoming that of a coach, facilitator and mediator. This requires optimal teaching focusing on learning but also transmitting techniques and proper competencies. New changes in curriculum entail VET teachers to apply various methods of teaching such as problem solving and inquiry-based learning models including methods of assessment that involve project works, workshops, and case studies and other methods. The model below by (Buck Institute, 2020) provides a clear illustration model of teaching practice based of problem solving and inquiry-based learning.

## Gold Standard PBL

### Seven Project Based Teaching Practices

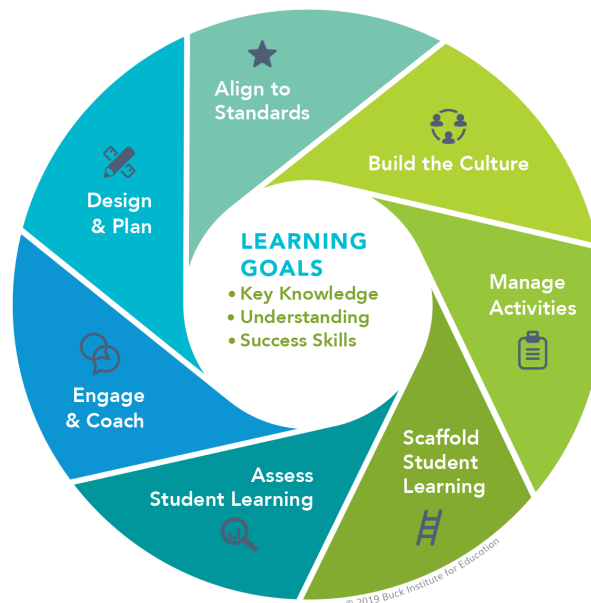


Figure 2: Project based teaching practice

(Buck Institute, 2020)

A key factor that had an impact on changes in almost every sector, including education, is ICT. The rapid development of ICT affected every field of business and now has a significant impact on education. ICT skills are part of the educational system and all VET teachers are required to have general skills in ICT because VET teachers are expected to use ICT teaching tools, (Educational Technology). VET teachers must come up with new methods to use digital devices in their classrooms and become familiar with e-learning as well as blended models. The aim of VET is to assist the business community, and therefore the industry expects that young learner (after leaving a vocational training course) should have acquired the appropriate knowledge and skills. If a VET curriculum is not properly planned and designed together with stakeholders, including VET teachers, the teaching will fail to keep up with new technologies and new work practices and learners will not have the required skills according to the modern industry's demands.

Another change and challenge for VET teachers concerns internationalization. Market development suggests that the VET system needs to approach an international dimension promoting also internationalization in the classrooms. This requires new skills and knowledge such as; cultural knowledge, knowledge of trades and markets in other countries, and intercultural communicative skills include language skills. It is a fact that the most important resources for a VET as a learning organization, are teachers' knowledge and experience. As a result, building teacher competencies and sharing knowledge have become and recognised as critical challenge for school administration as well as the development of organizational and training techniques. This led to the introduction of new teaching practices such as interdisciplinary teaching encouraging students to develop, knowledge, problem-solving skills, and passion for learning. This demonstrates that the role of a VET teacher is not independent but has to be cooperative with other VET teachers to plan and coordinate teaching sessions together as a team. Nonetheless, it must be acknowledged that the influence of VET reform on teachers' professional well-being is not always beneficial and it is vital to find ways for VET teachers' needs, providing teachers with formal qualifications to improve their competencies and acknowledge non-formal competencies that teachers have acquired through practical experience.

The twenty-first-century curriculum demands a student-centered approach strategy to help students master multi-dimensional knowledge and skills integrating core academic content and the 4Cs (Critical thinking, Communication, Collaboration, and Creativity) framework. The curriculum design needs to engage students to solve complex problems preferably in the real world that is why it is important to include cognitive learning into the curriculum design.

The curriculum for the twenty-first-century students should allow students to discuss, explore, investigate and come up with solutions and creative ideas. Students must be able to analyze their work, provide explanations and generate new ideas.

Cooperative learning is another method that helps students develop twenty-first-century skills. This strategy encourages students to share ideas and exploit each other's skills. The cooperative approach stimulates class activities encourages inquiry-based learning and therefore applies the knowledge in real-time. This method encourages students to gain new knowledge and abilities and instead of memorizing to prepare for a test, they listen, discuss and evaluate while being assessed.

Technology is a vital part of twenty-first-century curriculum design. Technology is a powerful tool but needs to be properly used. Students can access lots of information, however, this information needs to be validated and filtered by experienced people. In this case, the role of a teacher is to coach students and prepare them to learn how to learn in order to get the proper information from the internet and apply it accordingly. Multimedia tools foster creativity and encourage critical thinking (Kanuka, 2007). Multimedia tools allow students to provide different types of literacies and practices. Multimedia tools can increase students' motivation and performance as well as encouraging discussions, a collaboration by promoting cognitive processes and construction knowledge.

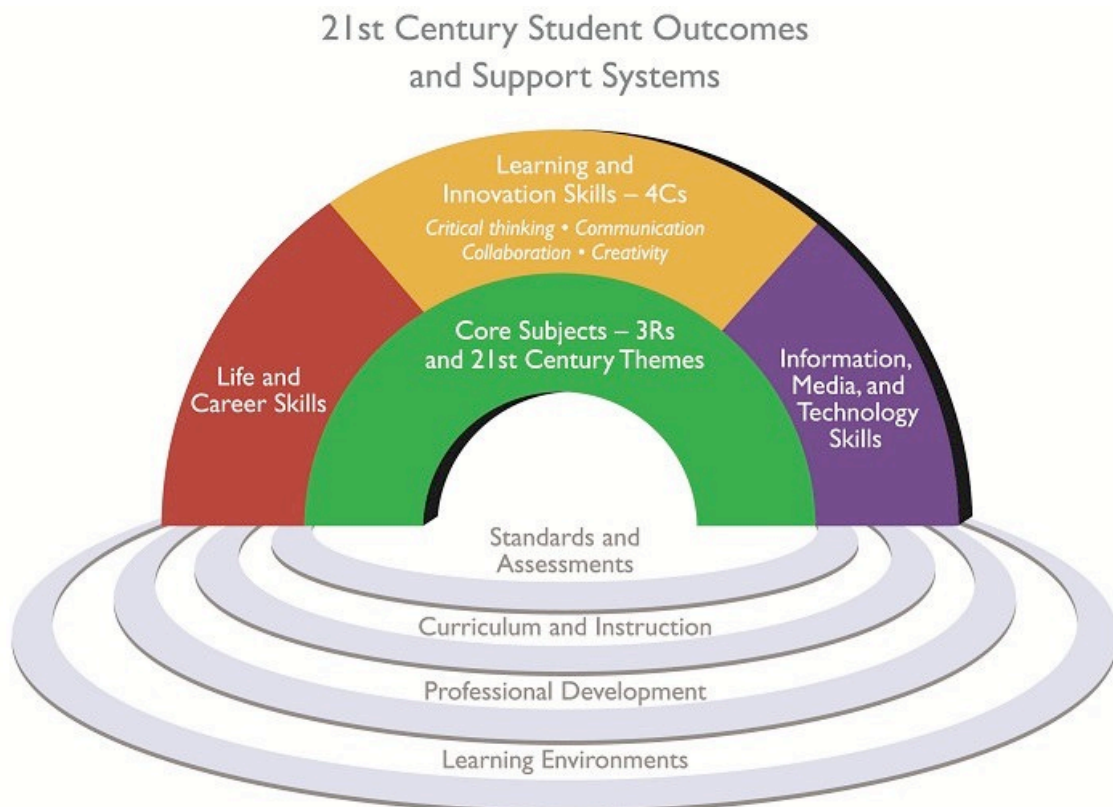
Embedding life skills into a VET curriculum enhances multi-dimensional learning and encourages inclusion. It is a fact that students who lack life skills find it difficult to communicate, socialize and integrate with the world of employment (Montebello, 2019) (Kilpatrick & Allen, 2001). Key competencies are not exclusively related to technical skills but also life skills competencies which must be part of a VET curriculum for holistic education and learning.



This research study brought up a series of significant recommendations represented in the list below:

- a) VET teachers need to adopt a dual approach alternating theoretical training and on-the-job training to keep up-to-date with the latest technical requirements.
- b) Close contact between VET teachers and the industry. Constant communication with the industry builds up a relationship between the educator and the industry which can support research studies embarked by students and/or the college.
- c) VET teachers should also train for managerial, organizational, counselling and communication skills. VET teachers not only transfer technical skills to students but also communicate with students on different routes and it is vital that teachers have the necessary skills to communicate with students to engage them and placed them in the right direction.
- d) VET Curriculum reform has to be designed with the participation of teachers and students together with the main stakeholders. A curriculum reform needs the collaboration of practitioners and students as customers to be flexible, dynamic, and balanced.
- e) VET curriculum has to be flexible and dynamic allowing VET educators to support students with different learning styles and adjust according to the current and future demands.

The following figure provided by the Framework Partnership for 21st Century Skills (Alismail & McGuire, 2015, p. 2)



Partnership for 21st Century Skills: Framework for 21st Century Learning

*Figure 3: A Visual Framework for the twenty-first century curriculum*

*(Alismail & McGuire, 2015, p. 2)*

The figure above presents a visual framework for the twenty-first century curriculum focusing on:

- Content knowledge, and expertise,
- Apply interdisciplinary themes,
- Deep understanding and knowledge,
- Engage students with real world data,
- Allow for multiple evaluation methods.

According to Paige (2009) cited in (Alismail & McGuire, 2015, p. 2) *“adopting a 21st century curriculum should blend knowledge, thinking, innovation skills, media, Information and Communication Technology (ICT) literacy, and real- life experience in the context of core academic subjects. In order to achieve authentic learning that is demanded in the 21st century, students.”*

According to the outcomes of this research study, Malta College of Arts & Technology (MCAST) must adopt a curriculum that encourages a problem-solving-learning and inquiry-based-learning models that allow students to investigate, solve issues, generate new ideas and engage with real world experience. It is also curial to integrate the 4Cs framework (Critical thinking, Communication, Collaboration, and Creativity) to enhance life skills value and core competencies to practice interdisciplinary themes.

MCAST must balance industry and students’ requirements by applying a student-centred approach and providing meaningful education for students. This requires the participation of teachers and students during the design of a curriculum that has to be flexible, and dynamic, allowing teachers to customize lessons according to different learning styles and apply multiple assessment methods.

Literature review reveals that the role of a VET teacher is becoming that of a coach, facilitator and mediator. Teachers must be in constant contact with the industry and combine pedagogy with practice, this requires on-job training to update the content knowledge, according to their expertise. This transition requires support by the management for the well-being of the educators and students.

## Chapter 6: Conclusion

We must remember that students are our customers as well as are representing the next generation, hence we must not just focus on labour market demands, but also on the needs and interests of the students. Students must participate in curriculum reform and design since the curriculum is for them to practice, and who better than students can tell us how to develop a curriculum that is appropriate for them to learn? By focusing mainly on the industry's demands, we risk putting up barriers and kill creative learning, impeding students to generate new ideas during their studies. Pedagogy has to be a priority because it guides us to understand how to teach as well as how to learn. In this age of information, having the support of a teacher who is to act as a coach, facilitator and mediator with prior experience is critical. Students have access to a wealth of information, but not all of it is accurate since there is a lot of fake information on the internet.

The role of a teacher is to establish values and a sense of belonging in students while also training them to be reasonable, critical thinkers, and problem solvers.

Unfortunately, the literature review also provides phrases like, “*vocational schools will produce candidates*”, “*the labor market requires*”. This is a production mindset that focuses only on the economic demands with a lack of humanization towards learners. These are statements that should make us reflect. VET does not produce candidates but educates and teaches learners to become knowledgeable and skilled according to their requirements. It is critical that VET and industry collaborate to improve the economy and prepare for future demands, but this must be done in a balanced manner considering industry’s demands as well as student needs, that includes flexibility and customized plans.

VET needs to approach a learner-centred strategy providing customized pedagogical methods, materials, appropriate curriculum design, and assessment methods, to individual needs, focusing on the learners' capabilities, with the aim to give the students meaningful choices and learning

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## Appendices

Systematic Review VET for the 21st Century				
Title	Author /s Publishers	Included	Excluded	Reason
Investigating the image deficit of vocational education and training: Occupational prestige ranking depending on the educational requirements and the skill content of occupations	Aurélien Abrassart - Stefan C Wolter Journal of European Social Policy 2020, Vol. 30(2) 221–236 © The Author(s) 2019		<b>EXCLUDED</b>	The journal is more oriented towards the functionality of VET in relation to desired occupation rather than the future of VET
Stability and change in vocational interest profiles and interest congruence over the course of vocational education and training	Julian M Etzel and Gabriel Nagy European Journal of Personality 2021, Vol. 35(4) 534–556 © The Author(s) 2021		<b>EXCLUDED</b>	This study focuses on the stability of VET and work related issues and few almost none research study with regards the 21st century VET.
Apprenticeship review MALTA In pursuit of quality and relevance: revitalising apprenticeship	cedefop (2015). Apprenticeship review: Malta. In pursuit of quality and relevance: revitalising apprenticeship. Luxembourg: Publications office.		<b>EXCLUDED</b>	This CEDEFOP report studies the quality of apprenticeship in Malta even though is related with VET future it focuses mostly on the unemployment issues.
21st Century Standards and Curriculum: Current Research and Practice	Halah Ahmed Alismail Dr. Patrick McGuire Journal of Education and Practice www.iiste.org ISSN 2222-1735 (Paper) ISSN 2222-288X (Online) Vol.6, No.6, 2015	<b>INCLUDED</b>		This Journal discusses the 21st century Standards and Curriculum. Even though the research doesn't d focus directly on VET curriculum the argument about Common Core State and Standards (CCSS) are much related
Future of TVET Teaching	2020 by the UNESCO-UNEVOC International Centre for Technical and Vocational Education and Training	<b>INCLUDED</b>		This Report provides clear recommendations about the TVET teacher for future guidance.
The Future Role of Vocational Education Teachers in the Professional Learning Communities in Public Schools from the Perspective of Principals and Academic Supervisors in Jordan	1Al- Balqa' Applied University (BAU) 2Head of the vocational education department Assistant professor Correspondence: Sameer Aowad Kassab Shdaifat, Al-Balqa' Applied University (BAU), Jordan. August 13, 2020	<b>INCLUDED</b>		This research study focuses on the future of vocational education teachers which relates to this study. This paper provides recommendations and guidelines on how VET and the role of teachers need to be prepared for the future of VET.
Building Educators' Capacities to Meet Twenty-First Century Demands	By Kari B. Taylor and Marcia B. Baxter Magolda Published online in Wiley Online Library (wileyonlinelibrary.com) © 2015 by American College Personnel Association and Wiley Periodicals, Inc. DOI: 10.1002/abc.21202		<b>EXCLUDED</b>	Even though the title of this Journal brings one of the keywords of this study "Twenty-First Century Demands" Twenty-First Century Demands" The journal study focuses on adaptivity to partnership with industry and other development capacities
Shaping the futures of (vocational) education and work: Commitment of VET and VET research	Edited by Gabriele Molzberger and Manfred Wahle. 2015. Berne, Peter Lang, 2015, 260 pp. Studies in Vocational and Continuing Education series,		<b>EXCLUDED</b>	The objective of this research is to present the future of VET in a globalization era. Starting from the history of VET and future. The information does not relate to this research study.



Vocational Education and Training in Sub-Saharan Africa	W. J. Akala, E. Alemayehu, C. Bohne, A. Ciraso-Cali, D. D. da Costa, F. Dehing, B. D'Oliveira Singo, C. van Dorp, J. Downing, R. Dreher, K. Duncan, F. Eicker, B. N. Ezekoye, M. Gessler, M. D. Hartmann, G. Haseloff, L. P. Hauuanga, A. B.		<b>EXCLUDED</b>	This report provides information about the current VET situation in Africa and recommendations for improving the system. This does not relate with this study.
Revisiting Susan Isaacs – a modern educator for the twenty-first century	Jenny Willan* International Journal of Early Years Education Vol. 17, No. 2, June 2009, 151–165		<b>EXCLUDED</b>	The research addresses childhood rather than VET. Is not relevant for this research study.
Mechanism of vocational education promoting precision poverty alleviation	Chunqiu Xu <sup>1</sup> and Yang Sun <sup>2</sup> International Journal of Electrical Engineering & Education 0(0) 1–17 ! The Author(s) 2021		<b>EXCLUDED</b>	This research focuses on the mechanism of VET in China and plans for the future but not on future of VET and how to apply changes in pedagogy or innovative teaching methods. Does not relate to this research
Research on innovation and entrepreneurship competency evaluation of teachers in industry-oriented higher vocational colleges	Xingfeng Liu and Hongmei International Journal of Electrical Engineering & Education 0(0) 1–14 ! The Author(s) 2021		<b>EXCLUDED</b>	This research is more oriented on the future of VET and entrepreneurship competencies of teachers rather than form a holistic changes in VET for future students and jobs. Is not relevant for this research study.
The vocational route to higher education in Finland: Students' backgrounds, choices and study experiences	Nina Haltia Ulpuukka Isopahkala-Bouret Annukka Jauhiainen European Educational Research Journal 1–18 © The Author(s) 2021		<b>EXCLUDED</b>	This study addresses a strategic plan of how students in Finland make their study choices based on their background. Not relevant to this research.
Vocational Teacher Students and 21st Century Skills	Marianne Teräs (presenting / submitting) Eva Eliasson (presenting) Shu-Nu Chang Rundgren Ylva Ståhle European Educational Research Association 2019	<b>INCLUDED</b>		This paper focuses on the Curriculum changes and teachers' role for the 21st century VET. Reaktes to this research study
Education for the future	The Malta Chamber of Commerce, Enterprise & Industry Education Committee	<b>INCLUDED</b>		This report provides recommendations related to the future education in Malta refelecting a global economy. This report relates to the current study

## Literature Coding

Curriculum Review	Teachers' Role	Skills Future/Teacher role	Challenges /Demands
<p>it is important to allow students the creativity and use the power of technology to support necessary skills and learn in unique ways. By allowing creative thinking and gauging understanding of content standards through a portfolio-based system, students can display their concept retention while producing tangible and valuable outcomes (P1)</p> <p>The future of our students depends on flexibility and resourcefulness not teaching to the test (P1)</p> <p>The Partnership for 21st Century Skills (P21). P21 (2006) advocated integrating core academic knowledge, critical thinking, and social skills in teaching and learning to help students master the multi-dimensional abilities that are required in the 21st century.</p> <p>These skills can help students succeed in their future careers by supporting 21st century learning systems to improve outcomes. (P1)</p> <p>can help to complement the 3Rs (core academic content mastery) and 4Cs (critical thinking, communication, collaboration, and creativity) (Partnership for 21st Century Skills, 2006). (P3)</p> <p>By integrating cognitive learning and skills into curriculum, students can obtain deeper understanding of the subject and try to solve complex problems in the real world(P3)</p> <p>In order to achieve authentic learning that is demanded in the 21st century, students</p>	<p>Teachers play a significant role in helping students develop 21st century skills by applying methods that increase students' abilities. They should use innovative strategies and modern learning technologies that help integrate cognitive and social skills with content knowledge as well as increase student participation in the learning environment in order to promote these future skills. (P3)</p> <p>One such approach is problem-based learning. In this model, students can discuss and analyze different issues and topics that are related to the real world. Also, this approach allows students to investigate problems, provide explanations, generate ideas, analyze data, and make judgments in order to find the appropriate solution.</p> <p>Another pedagogy that enhances 21st century skills is cooperative learning. This strategy divides students into different groups with diverse abilities and interests, and has a powerful effect on learning that gives distinctive results. The group's work is more creative because of the deep thought and integration of students' strengths and</p>	<p>The case studies pointed to some of the skills and knowledge teachers need to acquire and teacher training to provide. These include:</p> <ul style="list-style-type: none"> <li>• new pedagogical skills in line with the learner centred approach of modern pedagogical theory ('pedagogical update') and on-the-job learning techniques now being offered to trainees;</li> <li>• up-to-date 'vocational' skills related to modern technologies and work practices ('vocational update');</li> <li>• awareness of the needs of business and employers;</li> <li>• skills for team working and networking;</li> <li>• managerial, organisational and communications skills.</li> </ul> <p>Another trend is that teachers work in companies for two to three months in so-called on-the-job learning schemes to update their vocational competences.</p> <p>Another critical issue addressed by the project is</p>	<p>Public debate on the future of work and of education and training has been raging across Europe. Globalisation, digitisation, migration, demographics and the greening economy are the challenges fuelling discussions.</p> <p><b>FUTURE Challenges</b></p> <p>future VET development may require solutions spanning several subsectors and involving institutions and providers currently operating individually. While the expansion of vocationally oriented education and training seems unstoppable, fragmentation and loss of transparency may also be experienced, making it more difficult for groups at risk to benefit from VET. Increasing the transparency and permeability of education and training systems, as supported for example by the EQF, is therefore crucial.</p>

<p>engage in the learning environment effectively and develop 21st century skills such as critical thinking, problem solving, and collaboration. In this way, students will be prepared with the necessary knowledge and life skills that will help them be successful in their future careers (Lombardi, 2007). Therefore, curriculum in the 21st century should focus on the construction of knowledge and encourage students to produce the information that has value or meaning to them in order to develop new skills. (P3) curriculum to be connected with the real world can support student participation, their motivation and understanding for the academic subjects, as well as preparing them for adult life (Lombardi, 2007). (P3) Developers of curriculum and instruction have claimed the essential part of learning in this century is integrating multimedia tools in teaching.(P4) Technological tools offer students the option of working in collaborative groups, which may increase student motivation and develop critical thinking. Multimedia tools promote deeper understanding to complete class activities. Some studies found students who used multimedia tools in teaching have higher-level thinking skills than in comparison with traditional teaching methods (Kanuka et al., 2007). Future research should consider the implications this has for preparing teachers in the proper ways to embed 21st century skills in their lessons and integrate multimedia tools. In addition, future research must continue to investigate the effects of using 21st century curriculum and instruction on students' cognitive, academic, and social capacities, as well as</p>	<p>talents in order to achieve a product. The diversity of students' skills and abilities can encourage creative work where "every person brings something to the table" (Knowlton, 2003). (P3) (Alismail &amp; McGuire, 2015) Teacher and trainers are now expected to possess future-oriented skills, be self-directed learners, and be sensitive and inclusive with regards to gender, cultural and learning differences and social disadvantage. To fulfil these high expectations, TVET teaching staff need strong training and support. (P8) TVET teachers/trainers also need grounding in active, learner-centred pedagogy to build learners' cross-curricular skills and cross-occupational competencies. (P8) (UNESCO-UNEVOC, 2019) For instance, teachers can create a convenient learning environment in the classroom. They can promote respect for criticism in the classroom. They can promote acceptance for others' opinions in the classroom. They can encourage learners to find creative solutions for solving their problems (Mohammad, 2009). (P2) They should deliver vocational education through letting students</p>	<p>teachers' professional wellbeing, an unjustly neglected important topic, in a period when national VET systems are struggling to recruit new VET teachers and keep their existing staff. The case studies identify several important issues for teacher welfare and provide concrete examples of strategies designed to improve teachers' satisfaction with their work. The study identified a key need for a 'collegial approach' which can contribute significantly to reducing teachers' workloads.(P12) The teacher's role becomes that of a 'coach' or 'facilitator'. This calls upon teachers to plan and differentiate their teaching to take account of students' different learning styles. Optimal teaching requires teachers to apply a broad range of teaching methods, including project work, workshops, case studies, etc. The challenge for VET is how to integrate these methods into national VET systems and to equip teachers to use the new methods in their day-to-day classroom practice.(P19) Moreover, employers frequently set the curriculum of VET programs to align training content to their skill needs. Our findings suggest that effective mitigation of future skill obsolescence begins in the classroom, where students can acquire strong foundational development in the general skills that promote</p>	
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<p>measuring these effects across different grade levels and subject areas.</p> <p>A curriculum review would provide a holistic approach to subjects taught, new skills that need to be introduced and the potential elimination of content that is no longer relevant. (Commerce, 2021)</p> <p>TVET teaching staff training must be aligned with the private sector's own interests.</p> <p>Examples of delivery models that could bring about such an integration includes use of live industry projects and secondment of industry practitioners to training institutes as part of their career growth.</p> <p><i>TVET institutions must build mechanisms for industrial attachments for TVET staff within their in-service and CPD curriculum. (P36)</i></p> <p>the private sector has to be involved in both the delivery of vocational training and skilling/ upskilling/reskilling of TVET staff. (P36)</p> <p>several programmes favour a 'bottom-up approach' which encourages teachers to reflect on their teaching practices, express their skill needs and take part in designing and assessing training to meet those needs. This avoids the risk that a more academic approach or an approach not based on daily practice and on teachers' own experience might provoke resistance to change. In programmes based on this strategy, teacher training no longer follows a fixed lecture-based curriculum but adapts from day to day, in</p>	<p>adopt investigative and exploratory approaches and practice handworks. They should deliver vocational education through letting students work in the VE workshop, shops, factories, and the school yard. They must teach students the way they ought to think and learn rather than the way of memorizing the information included in the curriculum without understanding it (Atteyeh, 2010). (P3)</p> <p>According to Hussein et al. (2018), VE teachers should use conventional and alternative assessment strategies for assessing students' development in all areas. They should encourage students to learn in an ongoing manner. They should use effective communication methods to communicate effectively with students. They should implement the continuous improvement strategy. That shall contribute to delivering education of high quality. VE teachers should develop students' critical thinking skills (Hussein et al., 2018). (P2)</p> <p>Invalid source specified.</p>	<p>on-the-job learning over their careers. In doing so, our study delivers policy relevant insights that inform how to improve the institutional design of VET to prepare workers for ever-changing labor market demands, and not just immediately after graduation.</p>	
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<p>line with participants' daily practices;</p> <p>Where management adopts this approach, the 'curriculum' is not set by training providers but is drawn up continuously with teachers. In this way, teachers take responsibility for change and acquire a feeling of 'ownership' which contributes greatly to the effectiveness of the programme.</p> <p>"Demand-oriented curriculum, new target groups in VET"</p> <p>The ideology underlying the programme, its content and methodology are innovative. It is a dual route for educational staff with emphasis on learning at the workplace, i.e. integrating working and learning. It is competence-based instead of curriculum-orientated and it emphasises learning-by-doing. Teachers can develop their competences in a dual way of learning, coached by the coach from the institute for teacher training as well as by the coach in the workplace (p60)</p>			
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