

## **Entrepreneurship Education: Is it a Response to Envisaged Engineering Graduates in the South African TVET Sector?**

### **Abstract**

Entrepreneurship education is becoming a necessity in countries around the world, including South Africa. Its necessity is increasing globally as a response to improving economic distress, innovativeness and youth unemployment. This conceptual paper seeks to explore the feasibility of the inclusion of entrepreneurial skills as some of the graduate attributes of engineering departments students in Technical and Vocational Education and Training (TVET) colleges in South Africa. Therefore, the paper strives to comprehend if the students exit the TVET colleges with relevant entrepreneurial skills to improve employment rate and their social status and contribute to the growth of the economy. Since the white paper for TVET colleges envisages the graduates to acquire skills, values and knowledge that are labour market (industrial) related in respond to economic demands of the country. It is also a general knowledge that high number of graduates are unemployed, and therefore skilled self-employment would be a necessary strategy to be incorporated in the TVET curriculum.

Moreover, graduates should also be equipped with skills that would enable them to embark on entrepreneurial ventures to become employers, mentors and trainers of upcoming artisans. This paper is exploring the extent to which the TVET curriculum is developing and embracing entrepreneurship abilities among its engineering students. And therefore, respond to the question of; How could TVET engineering studies curriculum embrace the development of entrepreneurial skills among the students? Furthermore, the paper will investigate best practices in terms of effective pedagogy for delivering entrepreneurship education for engineering students at TVET colleges as a reply to; How best could entrepreneurial skills be taught to engineering students at TVET colleges?

This paper further reviews the existing literature on the current response of entrepreneurship education to the global economies. Since the study is qualitative in nature, content analysis also known as document analysis would be used to draw conclusions and recommendations to improve on the current state entrepreneurial expertise.

**Key words: Technical and Vocational Education and Training, Engineering studies, entrepreneurship education, unemployment, economic contribution**

### **Introduction**

TVET Colleges were previously known as Technical Colleges which were more like silos in one city due to racial segregation, with ones in the city centre having well equipped workshops for skills development – while the ones in black townships were offering only theory without necessary technical skills due to absence of equipped workshops. And then later as FET Colleges, which was the amalgamation of several Technical Colleges into one FET College with various campuses as a strategy to

redress the imbalances of the apartheid era (Wedekind, 2010). During the apartheid regime in South Africa, Technical education was emphasised to play a role in responding to the requirements of the developing industrialised (industry driven) economy as well as improving social status of most citizens (Alexander & Masoabi, 2017). TVET could be defined as educational sector designed to promote skilled workforce needed in the industry. Moreover, these skills, including software ones should be aspired by content knowledge and values dictated by continually developing and technologically advancing industry for economic development (UNESCO, 2006). The ministerial report on the Old Technical College curriculum known as NATED that began from National Technical Certificate (NTC1 to NTC6) currently referred to as Nation N Certificates (N1 - N6) (DHET, 2009a) argue that the curriculum was developed by industry owners and stakeholders to meet the needs of industry (DHET, 2012). Thus, the graduates' attributes were then defined by industry that is intending to employ these students. Admission to N1 required a successful completion of the then Standard 7, now equated to Grade 9. N1 to N3 Engineering curriculum consisted of theory and practice in most colleges depending on the state of practical workshops in terms of resources (Wedekind, 2010) especially in black communities. After N3, work-based training for about 83 weeks was recommended before a student could apply to do a trade test (HRDC, 2014b) to qualify as an artisan – and this route is said to be unaligned to the NQF levels.

Hence in this manuscript the researchers strive to explore, to what extent are the current attributes responding to prevailing industrial prerequisites.

This assumption could be based on the high unemployment percentages of young South Africans up to 38% as stipulated by the Director-General of the Department of Higher Education and Training at the National Artisan Development Consultative Conference (DHET, 2016; Isaacs, et al. 2007). Furthermore, Statistics SA (2017) added that 31.2% of TVET graduates are unemployed, with the majority being black graduates, and perhaps among them are artisans and technicians with engineering qualifications. However, this issue of youth unemployment tends to be affecting Iran in the Middle-East (Karimi, Chizari, Biemans & Mulder, 2010) and European countries also, including Austria (OECD, 2010) which had vigorous GDP about ten (10) years ago and low youth unemployment rate.

According to the report of HRDC (2014a), shows that the South African government have been trying to build relationships and collaborations with the private sector as the employer. However, these efforts have been at face value other than improving the quality of TVET curriculum and graduates' attributes responding to current economic needs and societal development.

The latest qualification introduced in the South African TVET sector named the NCV (DHET, 2009b) also aims at equipping TVET students with necessary knowledge, practical skills and values within their designated specialisations. While the ultimate intention is to provide academic progression into main stream universities and universities of technology after students have obtained their NCV (Level 4) qualification.

Moreover, the paper seeks to further inspect the inclusion of entrepreneurship education into TVET engineering studies to respond to unemployment of young artisans' and their participation in the country's economic development and transformation. Wedekind, 2010) further argued that the Summit on Further Education and Training was intended to explore curriculum that is responsive to the country's demands.

### **The conceptual framework**

This paper draws from the responsive curriculum approach within the curriculum transformation framework, as a concept that guides the arguments thereof. Central to this paper is the responsiveness of the TVET curriculum in engineering sector towards, economic development, innovativeness and graduates' unemployment. Thus, TVET curriculum in the engineering departments needs to transform according to changing societal, industrial and economic requirements and therefore respond accurately to these spheres within the country and globally. Drawing from (Maringe & Osman, 2016), the researchers believe that transformation could be explained as transfiguration from a societal slavery (do as the boss says) mindset to inventive (innovative), free-spirited thought patterns promoting corporate and individual growth. University of Pretoria (2016) defined transformation broadly as "*moving from one configuration to another, characterised by on-going rethinking and renewal in the pursuit of social and environmental justice*". Lally (n.d.) and Ogude, Nel and Oosthuizen (2005), further add that responsive curriculum should be planned carefully to accommodate its dynamic nature to adapt to evolving societal, industrial and economic demands in a specific environment. Therefore, a transforming curriculum aligns to parochial and international contexts, and germane to social, industrial and economic needs of who it serves (University of Pretoria, 2016). Moreover, transformative curriculum responding to the societal, industrial and economic expectations (Maringe & Osman, 2016; council on Higher Education, 2015) would require appropriate funding to produce good quality TVET engineering graduates. Production of good quality TVET engineering graduates could also be achieved through embracing soft skills needed by technicians and artisans.

DHET (2017) in the TVET Teaching and Learning Plan policy, indicates that TVET curriculum should be responsive and relevant. Thus, the department needs to further elaborate the basis of the responsiveness and relevance of the curriculum – as it is not stipulated. Even though HDRC (2014b) states that the vision of DHET is to make TVET colleges as first choice for skills development.

### **The role of TVET education**

In most European countries, TVET education is generally purposed to meet the needs of industrial requirements and societal needs, (Field, Musset & Alvarez-Galvan, 2014; Hoeckel, 2010) hence the private sector other stakeholders and the government formed part of curriculum developing structure. Due to evolving industrial needs

influenced computerised workplace (Karmel & Maclean, 2007) graduates' attributes as soft skills are among the TVET education required outcomes at the end of studies. Asian countries as well are said to have involved and encouraged private sector to participate in developing curriculum that is relevant to the needs of industry (Ibrahim et al. 2015).

Powell (2012) and Akoojee (2008) stipulates the primary role of TVET colleges in South Africa as the provision of intermediate skills needed for the economy and moreover developing attitudes and values necessary for employability. Lately, TVET colleges in South Africa are offering dual curricula, the NATED (old curriculum) and the National Certificate Vocational (NCV) which was introduced in 2007. The latter is twofold, it was introduced to equip students with practical skills and knowledge as it was the case with the N programme – and provide a route for those the left secondary education after Grade 9 to end up at the institutions of higher learning. Thus, NCV4 is equated to the National Senior Certificate (NCS) that is obtained at the completion of secondary education. However, it seems to be missing its target (HRDC, 2014b) by not producing graduates with technical skills aligned to those needed by industry. Secondly, admission of TVET graduates to higher education institutions is still sceptical as they do not possess the NCS as preferred qualification required by these institutions.

After her independence, Singapore placed focus on TVET institutions to provide world class skills and knowledge. Which in turn attracted investors for manufacturing and exporting of finished products back to countries that rely on exporting raw materials and mineral resources (Law, 2010). As the economic landscape evolves, so was the TVET approach in aligning its curriculum to meet the needs of changing industrial demands, that was led by the autonomous Industrial Training Board later named Vocational and Industrial Training Board and the latest Institute of Technical Education, and the Economic Development Board which went into partnership with dominant foreign companies and investors. When the economy became diversified, globalised and driven by entrepreneurship – the TVET curriculum adapted the change of being more innovation focused (Tucker, 2012).

### **Current Engineering sector curriculum expectations**

The Pathways report (HRDC, 2014b) indicates that the white paper envisioned TVET colleges as providers of practical skills for studies such as engineering, however, TVET colleges seem to be under resourced pertaining infrastructure and workshop equipment. Moreover, there is a view from the LMIP Report 22 that TVET sector is detached from industry who is the employer, and this creates misalignment between what the curriculum offers and the expectations of the employer (Wedekind & Mutereko, 2016). And therefore, suggests that the private sector (employer), government (curriculum policy maker) and the TVET colleges (curriculum implementer & labour force producer) should collaborate in developing curriculum that would respond to the industry demands.

Furthermore, TVET colleges ought to develop formal relationship with industry in terms of developing and implementing a more structured and assessable work-integrated learning. Moreover, HRDC (2014a) also suggests close ties between the TVET college sector and SETAs for funding skills development programmes such as work integrated learning (WIL) offered by private sector. Another issue raised by HRDC is the TVET provision of programmes tailor-made to respond to employers' needs in the area and nearby communities. Taking from the UK's prototype, HRDC (2014b) shows that the local and countrywide employer play a supportive role in terms of direction TVET education curriculum.

Hindrances for TVET colleges to develop functional associations with the industry for their engineering students arise from the environment in which the engineering studies are offered (HRDC, 2014b) where there is no relevant industry. Secondly, TVET colleges opt for the NATED programmes which allow large enrolment numbers offering theory only with each level taking about ten weeks to complete – thereby saving college running costs irrespective of low pass rate. Thirdly, low entry requirements by TVET colleges further jeopardise the engineering students' chances of being absorbed by industry – which on the other hand expects high achieving candidates.

The researchers opinionated that engineering departments at TVET colleges should be accredited by Engineering Council of South Africa (ECSA) to improve institutional accountability (Fisher, 2011) towards teaching and learning and crucial levels of the qualifications including the infrastructure needed. Thus, for South Africa to improve the standards of TVET colleges regarding the quality of skills development among students and teaching and learning (Asian Development Bank, 2009) suggests injecting enough finances to keep up with evolving demands of the industry. As well-developed technical and soft skills contribute positively to the country's economy and productivity. Furthermore, researchers believe that engineering studies encompassed with entrepreneurial skills would be a platform for graduates to obtain dual-profession and promote innovation for the enhancement of the economy. According to UNESCO, (2014), the Centre for Educational Research and Development (CERD) also finds the inclusion of entrepreneurship education into the curriculum as essential for global economy and enhancement of youth employment.

### **Background of entrepreneurship education**

Entrepreneurship is mostly associated with alleviation of unemployment and contribution towards socio-economic development of the country through self-employment and increased productivity, emerged about three decades ago. Entrepreneurship further became an influential force for economic development through innovation, development and execution of new ideas for the future global economic needs (Kuratko, 2005). Therefore, engineering studies as thriving force behind innovation would be a suitable base for inculcating entrepreneurship education in South African TVET college sector. According to Sanchez (2011), earlier studies focused on personalities and traits as common variables that influenced the intent of a person to embark on entrepreneurial ventures – and did not investigate if these attributes could be somehow developed based on the theory of planned behaviour.

We therefore believe entrepreneurship education emanated as a strategy for developing specific personality traits through purposive training (Kuratko, 2005) to improve the intention, knowledge and skills of students to explore entrepreneurial venture.

### **The necessity of entrepreneurship education in TVET engineering sector**

Entrepreneurship education is regarded as cultural evolution constructed and spawned ideologically by government through educational practices and policies (Rae, 2010) to respond to prevailing economic challenges. Hynes (1996) alluded that it is of utmost important to provide entrepreneurship education for engineering students to widen their scope of operation in the companies they serve. Moreover, Bokova (2017) in UNESCO agenda for 2030 suggests that TVET sector should be equipped to offer youth entrepreneurial skills through entrepreneurship education as one of the Sustainable Development Goals.

(Van Aardt et al. 2014; Nicolaidis, 2011; European Commission, 2009) elaborated the concept of entrepreneurship as “*process of conceptualising, organising, launching and through innovation, nurturing a business opportunity into a potentially high growth venture*”. Unpacking this definition in the context of this paper, TVET engineering studies students need to learn how to develop a competitive business vision, which is the purpose and anticipated growth potential of the envisaged enterprise. And draw a mission statement as a pointers or pathway guidelines that would lead to the achievement of the envisaged apex of his or her creativity driven business venture (Nicolaidis, 2011). The imbedded vision serves as a drive to pursue this endeavour even if there are some foreseeable calculated risks. Thus, our students should be taught the how of starting from lowest point to growing a business in a hostile economic environment. However, in a more broader perspective, engineering students’ creativity abilities also need to be triggered and enhanced to bring about self-reliance towards taking initiatives to bring about new developments in their areas of specialisation (Lackéus, 2015), for the betterment and satisfaction of the society baring-in-mind the environmental impact.

Thus, entrepreneurship education refers to the curriculum content used to develop entrepreneurship awareness, creativity and innovative skills of TVET engineering students to become entrepreneurs (Lekoko, Rankhumise & Ras, 2012; Isaacs, et al. 2007) and have efficacious entrepreneurial mindset with good planning and management skills (Karimi, et al. 2010). This content and methods of delivery of entrepreneurship education in TVET engineering sector should be aimed at moulding entrepreneurial skills tailormade for these students’ needs such as the start-up competencies, value creation and innovation and identification of opportunities for business – where they could use the acquired occupational skills to improve and transform companies they serve and societal economic status (Lackéus, 2015; Kozlinska, 2011). Although (European Commission, 2009) argues that entrepreneurship education should not be mistaken for economic or business studies since its purpose is to encourage innovation, creativity and self-employment – we believe an entrepreneur with clear vision would in the long run acquire business knowledge towards growing his or her enterprise (Raposo & do Paço, 2011). Perhaps,

the context in which entrepreneurship education is employed contributes to claims that its impact is untraceable pertaining to amelioration of entrepreneurial skills and self-efficacy (O'Connor, 2012). Rasmussen and Sørheim (2006) argue that several reports indicated entrepreneurship education as successful adventure in improving students' intentions to start new enterprises in various parts of Europe. Furthermore, a more context specific entrepreneurship education would be best vehicle in enhancing entrepreneurship intentions among TVET engineering students (Rasmussen & Sørheim, 2006).

Therefore, the focus of TVET engineering studies should not only be on producing artisans for seeking employment only (Radipere, 2012) but also put emphasis on acquiring skills that encourage graduates to opt for skilled self-employment. On the same notion, some of the students and probably minority may be born risk-takers to venture in entrepreneurship, and majority need to be made, through educational empowerment – even though Echtner (1995) argues that certain traits, including risk-taking and innovation are close to impossible to be changed or enhanced. In support of the above assertion, Australian education for sustainability report (Murphy, Fein & Kent, 2007) contended that TVET education should not only prioritise industrial needs but those of individual students also. The preliminary results pilot study on final year students in commercial departments regarding South African youth intentions to explore entrepreneurship by (Musengi-Ajulu, 2009) indicated that most of these students showed to have the intentions of venturing into entrepreneurship, however, only 22% of them stated to be informed regarding the practicalities of starting a business. Moreover, cultural perspective has also proven that few (24%) of the students' immediate families regarded entrepreneurship to be a valuable initiative. Which build to this paper's argument that educational empowerment is necessary and could therefore enable the graduates to overrule views of the society based on the skills they have acquired. Furthermore, there should be a way of teaching students these skills in a more practical and authentic manner not just as content knowledge – to develop self-efficacy, proactiveness and other personal traits, values, attitudes and beliefs (Raposo & Paço, 2011; Sanchez, 2011) to employ after their studies when embarking on entrepreneurial enterprises as first preference – not because they could not be employed and fall back to entrepreneurship. Haertel, Terkowsky and May (2016) believe fostering creativity for engineering students to generate ideas that solve current problems, and innovative to be transferred into business start-ups. Nieman and Niewenhuizen (2009) have indicated 14 entrepreneurial attributes that students should be skilled in to help them gauge the economic opportunities and environment in their areas, as well as building self-confidence in initiating and advancing their businesses.

It would therefore, be necessary for TVET lecturers in the engineering sector to be trained and equipped with entrepreneurial education and skills to be able to cultivate skills more relevant and applicable to engineering students. If the lecturers have developed entrepreneurial conviction and behaviours, they would be able to make students aware opting for entrepreneurial ventures in completion of their studies (Haolader, 2015). Moreover, these kinds of lecturers would also have the ability to design practical activities, teaching students how to start or run a small business –

thereby improving possibilities of more graduates choosing to collaborate and begin own small companies. Echnner (1995) contended that setback in implementing entrepreneurship education in most developing countries is lack of qualified and experienced lecturing manpower – which may lead to countries such as South Africa outsourcing skilled labour from 1<sup>st</sup> world countries, which does not come cheap.

### **Global perspectives on entrepreneurship education in TVET colleges**

Global view is that TVET colleges are most appropriate to respond to the development of entrepreneurship skills and improve employability of graduate artisans and technicians as a measure of addressing issues of youth unemployment and exclusion in socio-economic development. Moreover, developing countries could not curb high unemployment rate of young people by enrolling as many as possible of school leaving students in TVET colleges and equipping them with only theoretical and technical skills (Haolader, 2015) – entrepreneurial capabilities could be a better instrument for opening doors of self-employment.

According to Haolader (2015), Bangladesh has incorporated entrepreneurship education in all TVET colleges departments valuing 2 credits for over twenty years and the Bangladesh National Skills Development Policy put more emphasis on employability and self-employment. Moreover, challenges experienced by the TVET community is staffing – where most lecturers have no background of entrepreneurship education or enterprise experience and therefore affecting entrepreneurship self-efficacy of lecturers. Which then impact negatively on TVET graduates in exploring entrepreneurship as future career and unemployment solution.

Malaysian government after realising high unemployment of graduates, decided to inject funds into the implementation of entrepreneurial education begins from primary school through to tertiary institutions and succeeded in the renewal of graduates' mindset to opt for entrepreneurial ventures after their studies (Mansor and Othman, 2011). Moreover, the Malaysian government, took upon itself to source the best practices that would yield the intended outcomes. Specific for TVET sector, Malaysian government made entrepreneurial education compulsory irrespective of direction of study including engineering studies (Ibrahim et al. 2015). The reason being TVET colleges offer variety of skills that students could use to start new businesses after completion of studies, and thus acquiring of entrepreneurial enhance graduates' self-efficacy to begin new enterprises. In their study, Ibrahim and countenance show that majority of TVET graduates have high intentions of venturing into enterprise and positive attitudes towards entrepreneurship, also students portrayed high levels of self-efficacy and entrepreneurial knowledge and are mostly supported by the society and cultural norms.

The Oosterbeek, van Praag and Ijsselstein (2010) and European Commission (2009) reports that in majority of European countries, 90% to 100% of TVET college students take part in entrepreneurship curriculum at a certain level during their study career. In most European countries such as Austria, Cyprus, Denmark, Estonia and Germany, Czech Republic Hungary, Poland and Norway, Romania, Slovenia, Spain,

Netherlands and Slovakia, entrepreneurship education is included in their curriculum policies as a strategy of encouraging and increase self-employment for the betterment of the regional and individual country's economy. In other countries like Sweden, Italy, France and the UK, entrepreneurship education is not yet compulsory but rather optional for those students who may be interested in gaining entrepreneurial skills. Student mini-company programme is leading and producing observable impact among students.

The Iranian unemployment rate for college women and girls went up to 54% in 2002, because of her historical background of government as the main employer (Karimi, et al. 2010) – the higher education focused on developing future employees for their government. However, this has evolved through government's injection of finances in research, promoting and encouraging entrepreneurship and innovation – and developing education policies for inclusion of entrepreneurship education. Iran further introduced Science and Technology Park and Business Incubator as breeding environment for entrepreneurs with various educational specialisations. Furthermore, the concern raised by (Karimi, et al. 2010) is minimal impact of entrepreneurship education that is offered as standalone rather than being embedded in various course contents.

### **African state of entrepreneurship education in TVET sector**

Nigeria as one of popular African countries has not yet ventured into developing TVET college curriculum to include entrepreneurship skills as some of their graduate characteristics (Maigida, Saba & Namkere, 2013) to respond to high unemployment of young people in that country. The report of the National Steering Committee (2011) assigned to develop the National Qualification Framework (NQF) for Nigeria listed various aspects hindering skills development in the country – namely; TVET sector is neglected and not prioritised, and the tuition and assessment was mainly theoretical. Like in many other African countries, TVET education was also perceived as pathway for unintelligent individuals who could not obtain access to the traditional universities (Dike, 2013). Therefore, not responding to industrial needs of Nigeria, with dropping number of accredited technical colleges is an indication of diminishing quality of training. The formal TVET institutions range from technical colleges, mono-technics and polytechnics under the National Board for Technical Education (NBTE). The report further states that entrepreneurial education for TVET sector is incubated in the policy awaiting due implementation. Thus, Nigeria is pending focus and prioritising TVET sector for the betterment of the country's socio-economic status (Dike, 2013). Akpoyibo (2015) asserts that high unemployment rate of TVET graduates in Nigeria results from inadequate skills provided by these institutions in the country; and further postulates that entrepreneurship education should be included in TVET colleges to transform skills into merchandises and services for the betterment of TVET graduates' participation in the economy. Since the epoch of certification that guaranteed employment has past, Onweh, Akpan and Emmanuel (2013) further attest that, inclusion of entrepreneurship education in TVET sector would be profitable to the country's economic development.

Botswana is one of the African countries that has introduced entrepreneurship education in its TVET college sector on all the qualifications. In the study that was done in Selebi-Phikwe, Setibi and Mapfaria (2014) indicate that the region is still experiencing high youth unemployment with TVET qualifications. The study stipulated various factors that push graduates to seek employment that would give them monthly wages or income, they include bursary contracts that need repayment on regular basis after completion of studies, lack of capital to start-up and entrepreneurial skills are offered at lower level that does not build confidence and competence among graduates to take risks of venturing into small enterprise sector. Moreover, students are only given theory and not exposed to real-world practices such as acquiring mentorship relationship with existing and advancing entrepreneurs. Moreover, according to Jotia and Sithole (2016) recent studies in Botswana indicated that about 49% of TVET graduates are hunting for jobs due to misalignment of skills provided by TVET sector as opposed to industrial requirements.

Furthermore, Ethiopia as one of the African countries that despised entrepreneurship in the past – regarded as anti-social also associated with lower class citizens. But, currently entrepreneurship is prioritised as one of the eminent economic drivers in the country (Edem, 2008). Above all, Ethiopia has included entrepreneurship education within its TVET college sector in all the departments for over a decade. The study done in two of the Addis Ababa TVET colleges (Edem, 2008) reflects that teaching methods varied from authentic project based, group discussions, field visits, lecture to simulations presuming most of necessary skills, values and attributes have been properly addressed in the colleges. Students as research participants indicated that entrepreneurship education has played positive role in improving their self-efficacy to start-up new enterprises and majority indicated to opt for self-employment as their first choice after completing their studies. However, in another study by (Tegegne, 2014) in some colleges around Addis Ababa, revealed that the quality of entrepreneurial training offered at the colleges tend to be inadequate to help the graduates start-up their own small enterprises because time allocation was not enough. Another challenge was creating an environment that supports graduates' collaborations to venture into starting their own businesses from the government and private sectors. It could however, be inferred that Ethiopia may be regarded as exemplary to South Africa that entrepreneurship education – when efficiently and effectively implemented in TVET colleges could be a major economic development model.

Like many other developing countries, Kenya also initiated to put more emphasis on academic education which resulted in high unemployment of young people – as TVET education was neglected. About three decades ago, Kenya began to focus its emphasis on technical and vocational education and introduced it as, the Technical, Industrial, Vocational and Entrepreneurship Training (TIVET) sector (Nyerere, 2009), that already included the entrepreneurship training in the naming and categorising of the TVET sector. Thus, it is therefore evident that entrepreneurship education is one of the main purposes of vocational education in this country. Moreover, the educational framework allows academic progression within the technical education from Technical Secondary Schools, to TIVET College Diploma, to TIVET under-grad and to the highest post-graduate levels and even crossing to the traditional universities.

Furthermore, the Republic of Kenya (2012), states that the country's vision 2030 directed focus on TVET as driving force behind economic growth aimed at producing varied levels of technical expertise. Kenya education system further invested in TVET teacher training to produce expected skills and competencies and, also mobilising resources and private business sector as benefactors to increase revenue for running TVET institutions. According to Simiyu (2009), alignment of TVET skills training to the industry requirements and the introduction of entrepreneurship education was the best strategy ever. Which has encouraged majority of Kenya TVET graduates to embark on entrepreneurial ventures. Moreover, the TVET sector is working closely with private sector where students get authentic entrepreneurial training. Simiyu (2009) further indicates that, even those trainees who opted for salary paying jobs – in the long run they start their own enterprises. The researchers are of the opinion that South African Department of Higher Education and Training needs to invest on sending researchers and TVET lecturers to countries like Kenya to harness good TVET entrepreneurial skills development strategies.

### **The prevailing state of entrepreneurship education in South African TVET colleges**

In South African context, the government regards entrepreneurship as any form of small enterprise without any creativity or innovation – whether selling fruits at street corner for survival or having political relations to access government tenders “*Tenderpreneur*” from state owned parastatals (Van Aardt et al. 2014). According to Kuratko, (2005), entrepreneurship could not be limited to a mere formation of small enterprises as it is a process driven by creativity, innovation and implementation of new ideas and seizing opportunities with calculated risks.

According to HRDC (2014b), entrepreneurship training is done by independent providers outsourced by SETAs and not necessarily instilling the skills for entrepreneurs but giving theories on how to start a small business. However, on TVET campuses, entrepreneurship modules are only found in management courses. Therefore, engineering students in South African TVET colleges are disadvantaged regarding the acquiring of entrepreneurial skills. Strategic Framework and Programme of Action for TVE in the SADC Region (2011) indicates that it is necessary to include entrepreneurship education within the curriculum to counter lacking economic and skills development in the region.

However, it seems it would take time for South Africa to raise the bar by including entrepreneurship education at basic education level and TVET sector level (Nicolaidis, 2011), to achieve the vision of Accelerated and Shared Growth Initiative of South Africa (ASGISA). We are of the opinion this delay is as a result of narrow definition of entrepreneurship in South African context, only regarding entrepreneurial activity as small business sector or start-up ventures (Museng-Ajulu) excluding creativity and innovation as major aspects of entrepreneurial skills and training. Innovation has been defined as inclusive of developing new products, improving quality of products and coming up with new way and processes of production that respond to current social and environmental needs (Gürol & Atsan, 2006) – and further argue that innovativeness is an integral competency of entrepreneurship education as

new opportunities that bring profitable change and business growth (Mitchelmore & Rowley, 2010). UNESCO (2014) have identified ten key areas of TVET reform as; enhancing responsiveness of TVET provision, changing perceptions of TVET, restructuring qualifications frameworks and building new learning pathways, increasing work-based learning, skills development for TVET lecturer and trainers, improving ICT usage at TVET, cultivating good quality governance and partnerships and establishing sustainable financing models for TVET sector.

### **Entrepreneurship education teaching methods**

Since entrepreneurship education in South African engineering departments at TVET colleges would be a new phenomenon – researchers need to search for more efficient pedagogical approaches and theories of learning that would guide its teaching and learning (Karimi, et al. 2010).

Lackéus (2015) categorised entrepreneurship education delivery methods as “teaching about”, “teaching for” and “teaching through” entrepreneurship. While the first entails content-based which normally gives general knowledge and understanding of the environment. The second method of teaching is giving basic knowledge and skills for start-ups – and he recommends these methods for high school students since they are still young. Thus, “teaching through” entrepreneurship is proposed as more relevant for inclusion in core subjects such as engineering division – where students would be given experiential learning to go through the entrepreneurial process (Lackéus, 2015; Rae, 2010). Moreover, Arasti, Falavarjani and Imanipour (2012) listed other recommended methods of teaching entrepreneurship education include case study, group discussion, individual presentation, individual report writing, group project, formal lectures, guest speakers, action learning, web-based learning, simulation and recorded video.

It could be argued that teaching students how to look after an existing business and obtaining managerial position as good and loyal servants, is not instilling entrepreneurial motives and skills (Aronsson, 2004) – and therefore suggests active participation of students through apprenticeship as one the best ways to teach entrepreneurship skills to provide authentic experiences (Rae, 2010).

Therefore, to obtain these characteristics among the Engineering Sector TVET students, relevant methods of teaching should be directed to each of the attributes. It is evident that the world’s and South African economies are private sector driven (Maigida, Saba & Namkere, 2013) – and thus practical and authentic ways of teaching artisans’ entrepreneurial skills to stimulate (Mwasalwiba, 2010) correct attitudes, values and culture is a necessity.

Mansor and Othman (2011) listed some the world’s best delivery methods for entrepreneurial education as: facilitating and coaching; experiential learning; problem-based learning; students as leaders; people in the community; variety of methods and lifelong learning model. And among these PBL and experiential learning are highly recommended. Experiential learning by John Dewey, is highly recommended (Malindi, 2014) as one of active learning pedagogies where experiences are reconstructed into tacit knowledge and could be regarded as the underpinning theory behind the other

fore mentioned recommended entrepreneurship education delivery methods to obtain the envisaged engineering graduates' attributes (Kozlinska, 2011). Honig (2004) further suggests that incorporation of both content knowledge and soft skills such as values, daily experiences and attitudes learnt through experiential learning could be an effective way of teaching entrepreneurship education.

## **Methodology**

Secondary sources such as research articles, curriculum policies and research reports, news publications and books will be used to draw data for this conceptual paper (Owen,2013). The researchers strive for using credible and authentic sources to determine trends of entrepreneurship education globally, within the African continent and in South Africa. The paper further, seeks to comprehend the impact of entrepreneurship education on economic development and youth employment in places where it is part of artisan training curriculum. The study employs hermeneutics approach using thematic goals for content analysis procedures to extract the richness of assertions from various sources (Mayring, 2014). The researchers opted for document analysis as research method due to readily available information on public sphere to hasten the identification of research gaps in the TVET division. Research papers from various parts of the world, European, Middle-East, Asian and African perspectives focusing TVET sector and entrepreneurship education for engineering studies were consulted. As well as policy documents by the South African Department of Higher Education since the TVET sector is under the aforementioned department.

## **Conclusions and recommendations**

South African TVET sector seems to be continually misplaced, poorly structured and governed, under resourced and therefore providing poor quality qualifications and inappropriate and outdated skills to those required by the post-industry economy due to inadequately qualified teaching personnel and lecturer understaffing in these institutions (Maringe & Osman, 2016; Akoojee, 2008). This unpleasant phenomenon within the TVET seems to be prevailing in other regions of the world as well. For example, in countries such as Pakistan, Bangladesh, Afghanistan, India and China – TVET sector is mostly offered at high school level therefore not meeting the current economic expectations of knowledge and information era that is booming (Agrawal, 2013; Akoojee, 2008). It could also be deduced from the history of TVET sector in most of these countries that it has not been the priority of governments to develop this sector to global levels but regarded as second-class type of education. In South Africa, innovation and creativity for entrepreneurship could be achieved by increasing the NQF level at N4 to N6 to that of the engineering diplomas offered at universities of technology to produce high skilled labour (technicians). Thus, instead of doing N4 to N6 in almost 30 weeks, each of these levels should be offered in 10 months period. Then universities of technology should then focus on four-year degree programmes. The above recommendations would curb the issue of TVET colleges as rebound options for schooling but preferred option by matric students as admission requirements would be that of diploma pass at matric level. Moreover, educational continuity or progression would be aligned as TVET graduates would now qualify for

one or two-year programme to complete engineering degrees at universities of technology. At the current state, N6 qualification is not even equated to first-year level at universities of technology. Therefore, provision low to medium skilled labour (artisans) in the engineering sector should now be a responsibility of Technical High and Comprehensive High schools.

Moreover, in countries such as Indonesia, Malaysia, Philippines and Thailand, TVET division has been fairly developed to enhance the countries' industrial skills and curb unemployment (Agrawal, 2013). Furthermore, Korea, Japan and Singapore are classified as countries providing best TVET qualification with world-class institutions evolving with new demands of economy (Agrawal, 2013) to keep their economy and employment rate flourishing.

Since the TVET sector in South Africa has been placed under DHET, this calls for TVET colleges to offer higher education standards and world-class engineering studies – we believe they could not continue to provide educational knowledge and skills at Further Education and Training (FET) level which is high school standard. At higher education level – graduates should be qualified to be absorbed anywhere in the world not only locally by small factories. Hence, we are of the opinion that inclusion of entrepreneurship education and training among engineering students would increase global competitiveness in terms of economic development and innovation. In this way, the improved curriculum that is globally recognised and provides skills, values and attitudes that are world-class would be responsive to the changing economic demands of the country to alleviate high unemployment rate of TVET engineering graduates and increase chances of being absorbed in the world's economy. According to Dlamini (2014) in his study done in one of the South African TVET colleges mentioned that responses from student support officers, students and local industry (employer) stated that the current TVET system is not responding to the skills need of industry hence the high unemployment of TVET college graduates. Moreover, the involvement of bodies such as Engineering Council of South Africa and industry in the development of a responsive engineering curriculum in TVET colleges would bring a positive change and improvement towards attaining the afore mentioned variables (Wedekind & Mutereko, 2016). They further highlighted that a close and structured relationship between industry and TVET colleges have a high impact on absorbing trainees into fulltime employees after completing their well-planned and monitored work-integrated learning programme. We also agree that a responsive engineering curriculum should appeal to the employer and thus address the expectations of the industry in the region not overlooking national and international requirements.

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