Competence Based Curriculum for Skills Development through Dual Training: Evidence from Eastlands College of Technology

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Abstract
This research paper will address the issue of "Education for What" in the context of vocational and technical training by presenting the evidence from the Dual Training System (DTS) adopted by Eastlands College of Technology & St Kizito VTI in conjunction with Simba Colt Motors and other players of the motor vehicle industry. The Dual Training System is the educational model followed by Germany and some other Central European Countries that combines the classroom and on job training. The Vocational Training Institution and the Workshop in the Industry are two places of learning.
DTS motivates the youth to take up vocational education enthusiastically, gives the resources to the students and the colleges to finance the training and what is more important provides the industry with trained manpower that fits its needs. Data collected from interviews and questionnaires administered to the stakeholders (college, industry, student, parents and policy making bodies) will be analyzed. The results of the data will help benchmark the local adaptation of DTS with the traditional implementation in Europe.
The paper recommends to adopt the Dual Training System as one of the methods to teach Competency Based vocational training to prepare manpower for the industrial growth of the country. It also provides the resources needed to finance the training by involving all the stakeholders of the vocational education.

Keywords: Dual Training/Kenya, TVET

1.0 Introduction

Aristotle analyses in the Nichomachean ethics has mentioned five ways in which the soul arrives at truth *"...virtue of which the soul possess the truth by way of affirmation or denial are five in number, ie. Art, scientific knowledge, practical wisdom, philosophical wisdom, intuitive reason....."*(NE, 1139b-1141a). The five ways in which the soul arrives at the truth are; pure science (episteme), art or applied science (techne/ technique, skill, art, applied science), prudence or practical wisdom (phronesis/intelligence pertaining to action), intelligence or intuition (nous/understanding) and wisdom (Sophia - theoretical wisdom). Similarly in the Metaphysics Aristotle says that theoretical kinds of knowledge are more of the nature of wisdom than the productive or practical kinds of knowledge because they deal with the first causes and the principles of things. Aristotle further says in his metaphysics that theoretical knowledge is more of the nature of wisdom that the productive or practical kind of knowledge (Metaphysics 993b). One of the earliest known description of technical (vocational) education is the training of the hand (Magnus, 1881).

Huxley in 1885 lamented that "*....it passes the wit of man to give a legal definition of technical education..."* The Webster dictionary (1993) defines Vocational education as a training for a specific vocation in industry or agriculture or trade. Vocational education has been conceived of being unworthy of the elite and more suited to the oppressed or unprivileged classes (Lewis, 1991).This view of vocational education is prevalent in Kenya due to a colonial mindset inherited from the colonial times that white color jobs were for whites and technical education for Africans. It is unfortunate that this view dominates the Kenyan view on Vocational Education.

The dualistic view and dichotomized divide between theory and practice has been criticized by many researchers among them Goodson (1996), Allan (2007), Berglund (2009) and Bengtsson (1995) as quoted by Nina (n.d). At the same time there have been different suggestions on methods to be used to bridge the gap between theory and practice (Tempelman & Pilot, 2010). Technical education is practical in comparison to university education which is more theoretical/academic (Williams, 1963). UNESCO (1997) distinguishes between general education which it says leads participants to a deeper understanding of a subject and vocational educational or technical education which mainly is meant to lead participants to acquire practical skills necessary for employment in a particular trade or occupations. In Politics Aristotle contrasted the training suitable for artisans, slaves and women and education appropriate for free men (Politics, 1260a12-14).

1.1 Vocational education and work

Aristotle says in Nichomachean Ethics that *".....all knowledge and every pursuit aims at some good..... it is true that a certain variety is to be observed among the ends....."*(NE, 1094a1-3).
According to Silver and Brennan (1988), education and training, theory and practice, the liberal and vocational have been polarities for centuries of turbulent history, they date

back to ideas about knowledge and education originally expressed by Plato and Aristotle. Recent formulation is based on the development of compulsory schooling when societies were in industrial revolution stage and the conceptions of work, labour and production were shaped by popular consciousness (Hyland, 1999). The distinctions between work and labour have played role in the determining the value surrounding different notions of vocational learning (Hyland, 1999). There is no genuine work that is lesser than another, "……*all professional work demands previous training and constant effort to improve one's formation and adapt it to the new circumstances that may arise*….." (Josemaria Escriva, Conversations, 90).

The concept of productive work linked to vocationalizing through applied knowledge may have contributed to the subordinate status of the Vocational Education and Training (white, 1997). There is a hierarchical curriculum differences linked to social stratification in which disinterested knowledge came to be associated with leisure elite and applied knowledge with the mass of people who had to work for a living (Shoefield, 1972). Dewey attempted to break down the antithesis of vocational and cultural education based on the false opposition of labour and leisure, theory and practice, body and mind (Dewey, 1916). Professional work, whatever it is, becomes a lamp to enlighten your colleagues and friends (Josemaria Escriva, Friends of God, 61). Further he says that any honest human work whether it is intellectual or manual if done with the greatest perfection possible (professional competence) no matter how insignificant it may seem to be helps to shape the world (Josemaria Escriva, Conversations, 10).

2.0 Skills development

Statistics from the World Economic forum (2016) show that on an overall basis, the world has developed 62% of its human capital in terms of skills development. Countries on average are wasting 38% of their human capital. Only 25% of the countries have topped 70% of their people's human capacity, 50% of the countries score between 60% and 70%, 41 countries score 50% and 60%, 14% of the countries remain below 50%. A successful entrepreneur in the informal sector may have no formal education, but a set of skills to perform various tasks. Therefore skills development is very important for any economy especially for people in the informal sector.

Improving Human Capital in Africa has become a major concern for researchers and policy makers (Shuaibu and Oladayo, 2016). Africa's population is bound to double in a generation, 60% of Africa's population comprise of the youth, Africa has the youngest population in the world; they comprise 60% of the unemployed. To be competitive, Africa has to make right long-term investments in education and health (World Bank, 2017). Having an increasing young population in Africa should not be seen as a weakness but as a strength in terms of human capital if the population is well trained in skills.

Africa will reap the demographic dividends if proper polices are implemented to increase the human capital index of the youth. For Africa to develop, there is need to cater for the huge youth population (200 million) and the enormous skills deficit. What Africa needs more is not more university graduates but graduates with the right skills for the changing

market. To meet the needs of the youth, the education system need to focus more on developing skills that are needed in the job market and on a storing public-private partnerships (World Bank, 2017)

To meet the needs of the youth, the education system need to focus more on developing skills that are needed in the job market and on a storing public-private partnerships (World Bank, 2017). Walther (2013) observes that studies on existing formal training systems in developing countries have clearly demonstrated that the training policy and provisions is mostly failing to meet the needs of the young people in informal employment. Skills are applied to tasks to produce output; skills on their own do not directly produce output.

Skills development is a major contributor to social cohesion and inclusion. Efficient policies are important not only from a social point of view but also from an economic point of view. Inadequate education and training, poor skills, low productivity jobs and low wages can trap and exclude the poorest and most vulnerable groups of the working population (UNESCO, ITC and ILO, 2011). Skills are malleable; they can be developed through practice and reinforced through daily experiences it is possible to change diverging trajectories over the course of a lifetime (OECD, 2015). It is possible to change to other skills or acquire others over the course of a lifetime.

3.0 Skill development policy in Kenya

In Kenya the percentage of TVET enrolment as a share of total enrolment has declined consistently (Nicolai et al, 2014). The presidential committee on unemployment; the Wanjigi Report (1982) and The Presidential Working Party on Education and Manpower Training for the Next Decade and beyond (1988) envisaged technical and vocational education with specific emphasis on a foundation on vocational and entrepreneurial skills. Three factors are identified in the 1979-83-development plan of school leaver unemployment; the rate of school leavers output, unrealistic ambitions among school leavers for higher job placements and inappropriate skills among school leavers for medium range jobs (Republic of Kenya, 1979). Youth Polytechnics and Vocational Training Centres are the main institutions where the youth in Kenya get vocational skills training (Momanyi, 2014).

Skills development in Kenya is important for economic development; poverty alleviation and social inclusion in order to achieve Education for All (EFA) and the targets of Millennium Development Goals (MDGs). Session paper 10 of 1956 envisaged Growth in numbers of skilled, trained and experienced manpower, the paper envisioned provision of quality education and training at all levels. At the same time the Kenyan Government committed itself to eradicate ignorance, poverty and disease. Thus, education system has increasingly turned out large number of school leavers over the years at all levels who are not able to obtain gainful employment in the formal sector and thus end up in the informal sector (Momanyi, 2008).

A report by UNDP and the Ministry of Youth and Sports (2012) found out that both employers, graduates and trainees agree on the most significant skill gaps among the youth, however most graduates from Vocational Training Centres and Youth Polytechnics and out of school youth are unable to use modern machines, trade knowledge and practical industrial exposure in that order. Therefore there is need to adopt a competence based curriculum to address this issue. The UND/Ministry of Youth and sports research notes that Prior to 2007/08, the Youth Programame sector was not properly linked with the rest of the education and training system in Kenya as envisaged in the Sessional Paper No. 1 of 2005.

According to UNDP and ministry of sports and youth affairs (2012), in Kenya out of the 14 million youth only39% are absorbed into the job market and the remaining 61% remain jobless, a majority live in rural areas. Those who migrate to towns end up staying in slums due to limited opportunities. The Kenya vision 2030 sees the youth as the bedrock to transform the requisite human resource skills for technological and industrial transformation to increase wealth creation and social wellbeing (Republic of Kenya, 2009).

3.0 Competence based education

The use of the 'concept' first occurs in the work of Plato (Lysis 2I5 A., 380 BC), In the Plato's death of Socrates, Socrates answers Miletus by saying*".....you say I teach spiritual concepts and believe in strange divine beings...."* the concept also appears in the 'Code of Hammurabi' (1792–1750 BC) also mentions a comparable concept within the 'Epilogue' Competence appears in the Latin language in the form of 'Competens', which was conceived of as being able and allowed by law/regulation, and in the form of 'Competentia'; perceived as (cap)ability and permission (Mulder et al,2007). Competency is the individual's ability to use, apply and demonstrate a group of related awareness, knowledge, skills and attitudes in order to perform tasks and duties successfully as assessed against provided evidences at work location (Wahba, n.d). Spencer and Spencer (1993), define competency as internal characteristic of an individual that produces effective and superior performance.

Competence based education in vocational education and training system is a leading development for innovation on different levels of the school organization (Wesslsink et al, 2003). The popularity of a competence based curriculum is because of its positive side on education and learning, it makes individuals more competent instead of emphasizing their knowledge deficits (Wesselink et al, 2003) and the expected gap between the labour market and the school system (Klink and Hendriks, 2003). Some descriptions of a competency based education describe it in terms of behavior and others in more holistic character (Biemans, et al, 2003). I the behaviourist approach, is characterized by discrete behaviours associated with completion of atomized tasks (Gonczi, 1994). Competencies' described in behavioristic way cannot provide guidelines for an educational curriculum because of the detailed level of description, at this level competencies are reduced to mere human action (Barnet, 1994). The generic approach is a comparison between average workers and excellent workers, it is criticized as being unsuitable for education

since learners have to learn competencies in specific situations and develop the capability to apply them into other situations.

The holistic approach which is seen as a whole of knowledge, capabilities, skills and attitudes displayed in a context in with appropriate generality or holism by Hodkinson and Issit (1995), they say that this approach focuses on the development to f capabilities of students in relation to to professional practice. Competencies are seen as capabilities (Wesslink et al, 2003), according to Mulder (2000) a competence is the integrated performance-oriented capability of a person or an organization to reach specific achievements. Mulder further says that these capabilities can either be cognitive, interactive, affective, psychomotric, attitudes, and values which are conditional in carrying out a task. In a competence-based educational programme the aim is to contribute to the students' professional identity development. Students who finish their educational programmes should be better prepared to work in professional practice and participate in society as a whole (Jenewein et al. 2002).

3.1 Vocational education

So the main important objective of vocational training is to produce skilled workers with flexible qualifications (Manuel, nd). Skill systems and VET regimes have attracted increasing attention in comparative political economy of late (Culpepper et al, 2007). This is one of the main reasons why vocational training regimes are strongly linked to the development of national political economies and have historically developed in line with the development of other key labour-market institutions and organizations (Thelen and Busemeyer, 2008). Pring (2007) has pointed out the false dichotomy between general education (academic) and vocational (practical) education, and the low value attached to vocational education. One of the earliest descriptions of 'technical instruction' is as the training of the hand, which is contrasted with the education of the mind (Magnus, 1881).

3.2 Competence in the development of vocational education

Competence-based education has become a dominant trend in vocational education and training (VET) in several countries due to the expected decrease of problems in the transition from school to work Misbah, (2012) quoting Biemans et. al., 2004; Wesselink et. al, 2007; Biemans et. al 2009).

The concept of competence becomes the basis of the redesign of TEV (Misbah, 2012).The notion of competence entered the public domain in the 1970s with the debate around the recognition of the competencies of unskilled and semi-skilled workers (Dupray et al 2003). In the competence based vocational education, learning takes place in real life work place and business processes, the skills imparted are the skills required in the labour market. The learning outcomes describe what somebody knows, understands, and is capable of doing upon completion of a learning process based on the competence to be acquired (Weber et al, 2015). Provision of competence-based education is founded on a strong connectivity between what occurs in educational institutions and the work place setting (Wesselink et al., 2007)

3.3The European concept of VET

All over Europe and in the world Vocational Education and Training (VET) is in transition as led by the labour market; circumstances, conditions and measures affecting VET are varied according to continent and countries (Modláné, 2015**)**. In the recent decades the concept of competence has been used for the development of vocational education and training majorly due to its popularity within, and also outside, the European Union (Mulder et al, 2007). Europe, the European Union member countries all represent different VET (Vocational and Technical Education) and labour market traditions, they have different meanings to the principles and concepts underpinning VET. This is the case, even where countries adopt seemingly similar systems, such as those based on competences (Mulder et al, 2007). Competence based VET system usually denotes functional employability (Brockmann et al 2008). In Europe, school-based VET route does not prepare students for formal employment, it all does not contain workplace element (Pring, 2007).

Within the literature on institutional change in collectivist training systems, one finding is that According to Thelen 2007, collectivist training regimes exhibit a high degree of stability as vocational education and training. Collectivist training show three kinds of rules; procedures and practices that sustain them as an institution: first, employers and their associations are heavily involved in the administration and financing of training; second, the systems provide portable, certified occupational skills (Thelen & Busemeyer 2008); and third, historically, employers' interest in skills may lead to training regimes that evolve as 'dual' schemes. Dual schemes combine school-based learning with company-based training. In particular, the coordination between employers and the provision of occupational skills whose content and quality are monitored and standardized by coordination greatly distinguish collectivist skill systems from segment list skill systems, which are associated with the provision of firm-specific skills and less coordination across companies (Thelen & Busemeyer 2008).

3.4 Dual Training System (DTS)

Dual vocational education and training takes place in at least two places of learning i.e. on the job, in particular at the workplace in a company and off the job, in particular at a VET school and in VET centers (Manuel, n.d). The Dual training is a system in VET where the responsibilities and costs are shared by the state and the economy, by acknowledging joint interests (Modláné, 2015). DTS is a training methodology which combines theoretical and practical training. It is called "dual" because the training takes place in two venues – the vocational school and in the workshop of the company. Vocational education and training within the school system besides the provisions of the vocational and examination requirements is based on the vocational training framework syllabus issued for the given school type and qualification (Modláné, 2015). The student spends over 70% of the training time in the industry working in real life working environment and producing for the company (ECT, 2017). The dual vocational training has two pillars**:** education in schools and practical training organized by enterprises and

other organizations. The goal of dual training system is to strengthen class learning and the world of bussiness by promoting high quality practical training based on apprenticeship contracts (Modláné, 2015).

3.4.1 The characteristics of the system in countries operating dual vocational education and training systems?

1. Vocational education and training functions as a service, the aim of which is to fulfil the labour market needs of a successful economy, and to provide career opportunities for a young, skilled workforce.
2. The aim of training skilled workers is not the acquisition of lexical knowledge, but to train successful and efficient employees.
3. As for enterprises the main motivating force is not short-time profit making, but high level training of the future employee, which is considered an investment with a long-term return.
4. As the vocation is being learnt in the course of work, the chances of an employee to find a job increase significantly, while the employer can minimize the costs of training and wrong employment.
5. Training in the school workshop prepares for practice at the firm, however everybody has to take part in external practice in a life-like situation.

Adopted from Hungarian Chamber of Commerce and Industry (Modláné, 2015),

The main objective of vocational training is to produce skilled workers with flexible qualifications, therefore vocational training within the dual system is oriented to this aim (Manuel, n.d). The DTS program embodies a strong cooperation between training institutions and the company and aims to benefit both parties and the student. Training institutions send the student-trainees to the company for *in-plant* training and exposure. The company makes good use of their skills and potentials by assigning the jobs where they learn and be productive at the same time (ECT, 2017).

Dual Vocational Education and Training is a success story, the system contributes to the national economy and society with strong SME competitiveness on international markets, low youth unemployment rates and a high employment security for skilled workers in comparison to unskilled workers (Manuel, n.d).

The company, as a DTS partner, pays stipends to the trainees since they are as a matter of fact like an employee. The in-plant-training duration takes most of the training time. Throughout this period, the student-trainees will acquire relevant knowledge and skills as their training progresses and as they become more productive. Thus, they contribute productively to the company's competent workforce. The learning progress of the trainee is tracked using a logbook. This is a document that outlines all learning outcomes, roles of the student, workshop manager and the Industrial coordinator from the training institution. The logbook ensures that the student covers the syllabus while delivering on the tasks at the workshop simultaneously. It acts as a feedback mechanism between the

industry and the training institution (ECT, 2017). The dual vocational training system was first implemented in Germany and Austria. These countries have the lowest youth unemployment rate today in Europe (Manuel, n.d).

3.4.2 Pilot DTS Programme in Kenya

In 2016, the Eastlands College of Technology and St. Kizito Vocational Training Institute in partnership with Simba Corporation Limited (Simba Corp) and Handwerkskammer Frankfurt-Rhein-Main (Chamber of Skilled Crafts) rolled out a unique Automotive Training Programme aimed at equipping qualifying students with the necessary skills to meet the growing need in the automotive industry. The programme was precipitated by the technological advancements experienced in the recent past that has greatly impacted the global motor vehicle industry and has in its wake, resulted in development of motor vehicle models that are more dependent on technology than was the case a few years ago. Having identified this need, the parties developed an industry driven syllabus that will in the end meet the rising demand for technicians possessing the skills required to meet the growing needs and emerging industry trends.

In addition to this, the parties initiated and rolled out a Dual Training aspect in the programme. Being the first of its kind in the motor industry, it gives the continuing students the opportunity to gain industry experience and on-the-job training through periodic apprenticeships. Currently, the programme is structured such that the industrial attachment is undertaken in between each of the three semesters over the 1.5-year course duration. There are two courses on offer: Automotive Technology and Automobile Body Works Technology, presented in three levels (Grade III, II and I) and examined by National Industrial Training Authority (NITA) at the end of each level. The program targets both girls and boys and education financing options are available to those from marginalized backgrounds through in-house arrangements with HELB. The students in this pilot programme have already done grade III examinations offered by NITA. Other than DTS in Automotive, the training partners have plans to roll out the training model to other courses i.e. Construction sector (Welding, Fabrication, Electrical Wireman, Plumbing), Hospitality (Catering, hair dressing and beauty etc.) among others.

4.0 Eastlands College of Technology

Eastlands College of Technology is sponsored by Strathmore Educational Trust as a Charitable Public Trust that holds property and is responsible for the administration of several educational institutions. Strathmore Educational Trust sponsors Strathmore College (1961)/Strathmore University (2002), Strathmore School and Eastlands College of Technology (ECT) (2013). The college implements an educational model that meets the real needs of Kenya's formal and informal sectors. It caters for the formal sector by creating permanent linkages with the corporations through the implementation of the Dual Training System (DTS) in Motor Vehicle Engineering, Electrical and Electronics Installation Systems, Industrial Maintenance, Electro-Mechanics and Specialized Welding Course. The college also caters for the Informal Sector by up skilling the already practicing apprentices to be able to run businesses better. The philosophy of the

college is in line with Government Strategies to attain poverty alleviation and economic growth under the Vision 2030. The need for improved technical skills training and better accordance of the training provided with the needs of the private sector.

4.1 Partners in ECT's Dual Training System

(i) Simba Corporation

Simba Corporation is a leading regional corporation with diversified interests in automotive and power distribution, services and solutions, as well as in real estate and hospitality. Founded in 1948 by the late Mr. Abdul Karim Popat as a modest used-car selling enterprise, the company is headquartered in Nairobi, Kenya and has grown to a large integrated multi-sector business group representing international brands and franchises such as Mitsubishi, Fuso, BMW, Mahindra, Renault, AVIS, SAME tractors, AKSA and GE generators. The company's Corporate Social Investment mission is "*To provide a platform to underprivileged youth by equipping them with technical and business skills"*.

(ii) Handwerkskammer Frankfurt-Rhein-Main (Chamber of Skilled Crafts)

The Handwerkskammer Frankfurt-Rhein-Main is one of the German Chambers of Skilled Crafts in Germany with the mandate of providing practical training within the German dual vocational education and training system as well as giving consultation and expertise to small and medium enterprises in the crafts sector. Together with the Chamber of Industry & Commerce Giessen-Friedberg implements a partnership project with the following partner organizations in Kenya: Kenya Private Sector Alliance (KEPSA), Kenya Association of Technical Training Institutions (KATTI) and Kenya Federation of Master Builders (KFMB) and Strathmore Educational Trust. The project aims at introducing a more demand and practice-oriented vocational training to improve the employability of young people in Kenya.

Table 4.1 Total number of students undertaking the dual training programme at ECT

Course	Jan 17	May 17	Sep 17
NITA III	36	22	26
NITA II	29	0	27
NITA I	0	0	17
DIPLOMA	0	0	17
TOTAL	65	22	90

Table 4.2 ECT intakes in Motor Vehicle Engineering

		Admission	No. of students attached
1	August 2016	**30**	**30**
3	January 2017	**33**	**27**
4	May 2017	**22**	**18**
5	September 2017	**28**	

Table 4.3 Companies that participated in the DTS and number of students who have completed industrial attachment

		No. of students	No. of months spent at firm
1	Oriel	**8**	**6**
3	Auto Xpress	**21**	**3**
4	Simba Corp	**17**	**6**
5	Daivine	**9**	**6**
6	Super touch	**4**	**3**
7	Autofine	**12**	**6**
8	Jacaranda Motors	**2**	**3**
9	Express Connections	**6**	**6**

Table 4.2 ECT Students on industrial attachment

		No. of students	No. of months into the attachment
1	Oriel	**2**	**2**
3	Auto Xpress	**8**	**2**
4	Simba Corp	**0**	**2**
5	Subaru kenya	**1**	**2**
6	Daivine	**2**	**2**
7	Super touch	**2**	**2**
8	Autofine	**3**	**2**
9	Jacaranda Motors	**0**	
10	Express Connections	**0**	

The ages of the students

Range	Number	
15-20	7	
21-25	16	
26-30	1	
31-35	0	

Student responses	Yes	%	No	%
Got Orientation before starting placement	23	29.11	1	1.27
Received some stipend during placement	20	25.32	4	5.06
Visited by instructors for assessment	24	30.38	0	0.00
Filled in logbook on a daily basis	19	24.05	5	6.33
given placement assessment result	13	16.46	10	12.66
Competencies improved during placement	22	27.85	2	2.53
Learnt how to operate various machines	23	29.11	1	1.27
Placement experience helped to network	22	27.85	2	2.53
gotten offers for employment	11	13.92	`13	16.46

Student responses	Yes	%
wheel alignment machine	5	6.31
spring compressing machine	3	3.78
Diagnostic machine	7	8.86
arc welding machine	1	1.27
spot welding machine	2	2.53
Mapping	1	1.27
Tyre changer	1	1.27
None	5	6.31

Companies in discussions to join ECT's Dual Training System include:

i. GM (Isuzu EA),
ii. DT Dobie,
iii. Stantech Motors,
iv. Toyota EA.

Recommendation

In Kenya there are many challenges in vocational training. More challenges continue to arise in the vocational skills training, more challenges may arise in implementing a dual training system; there is ignorance of this system of training besides the ignorance of training centers of the reality of the Kenyan productive market and its needs of specialization. There may be a rigidity in adapting to this system and lack of uniformity in the various models of dual vocational training cycles which may be implemented. There is a general lack of recognition of apprenticeships, some firms may initially refuse

to take in interns. There has to be a curriculum to guide the time that an intern should be in the company and school for various vocational courses. There should not exist different dual formats in the framework of the same training involving the private sector, government and all stakeholders in the skills training programme.

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