Developing an ERP Skills Programme to Build ICT Capacity for Disadvantaged South African Youths

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1 Introduction

South Africa (SA) is a country located at the southern tip of the African continent. It borders the countries of Namibia, Botswana, Zimbabwe, Mozambique and eSwatini. Lesotho is an enclave entirely surrounded by South African territory. With a land area of 1,214,470 km, it boasts of numerous natural resources ranging from gold, platinum, diamond to human resource. It attained its independence from UK on the May 31, 1910. Pretoria is its executive capital, Bloemfontein, the judicial and Cape Town its legislative capitals, respectively (CIA.gov, 2020).

The research goals are to develop an experiential learning framework structure to capacitate SA Black youths to be employable or entrepreneurs. The methodology is a case study qualitative approach to tackle the problem of unemployment of Black SA youths using this learning framework.

2 Problem Definition

Historically, racial discrimination dis-empowered non-Whites (Africans, Coloureds, Indians) from participating in the formal economy in SA. Apartheid was a system of government in SA, abolished in 1994, which systematically separated groups on the basis of race classification (Naidu, 2011, p. 1). It was designed to keep non-

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Whites unskilled, subjected to abject poverty and total dependency on the State for welfare (Gama & Willemse, 2015, p. 721). It also created inequality among all racial groups, making SA one of the most unequal country in the world, having the highest GINI coefficient of 0.65, a measurement of income inequality (McKeever, 2017, p. 114). With a shrinking economy, adequate skill in SA is demanded so acquiring ICT skills is adequate in meeting these demands. But also in redressing the racial skills imbalance, there is a need to skill Blacks and bring them to the level of their White counterparts without reverse discrimination.

There is a growing interest by Black youths in ICT-related disciplines according to Kirlidog et al. (2018, p. 16). In their study at one SA university department, results showed that Black students have a strong tendency to study ICT and they comprised 82.1% of all ICT students for a particular academic year. The problem arises when these Black youth (students) complete studies and enter the labour market. Employers demand work-related experience alongside a formal qualification. This results in capacity inadequacy.

The problem of capacity is borne of the fact that there is inadequate supply of skilled Black professionals in the ICT sector, specifically enterprise resource planning (ERP) skills. Generally, ERP skills are technical and analytical in nature and require manipulating computer application(s). This is not to say that other ICT areas (such as programming and networking) do not experience similar skill shortages. In SA, lack of appropriate work skills inhibits youth employment. Employers have the resource(s) to help skill youths. Training a youth at an employer's premise is a way to skill a youth. But training may not be conducted in many cases because employers are not willing to allow learner youths to use their resource due to software costs, risks of system damage, time and training constraints. Thus, an ICT skills programme is proposed in this study to skill Black youths to be better prepared for work or entrepreneurial activities.

With government's demand for transformation and racial inclusiveness (Andrews, 2017), there is a strong focus on Blacks being trained and skilled. The SA department of higher education and training (DHET) further highlights government's resolve through the national skills development strategy to prioritise and confront racial inequalities, with a particular focus on giving more opportunities to previously (and currently) disadvantaged South Africans. Continuing, this requires focused attention on skills provision for Blacks in general and Africans in particular (Department of Higher Education and Training (DHET), n.d.). Kingdon and Knight (2004, p. 21) argued that the historical characteristics of blacks had unfortunately put them at the back of the queue for employment especially among Black women (English & Hay, 2015, p. 149), so improving their characteristics may improve their place in the queue. These characteristics according to the authors include human capital (education) and employment experience. These problems led to the formulation of research questions to guide this study.

2.1 Unemployment in South Africa and ICT skills

Information and Communication Technology (ICT) skills are emerging as essential ingredients for job acquisition among the youth globally. Key skills such as problem solving, teamwork, communication, planning, numerical and IT skills are increasing in significance in many occupations (Felstead, Gallie, Green, & Zhou, 2007). In a study by the DHET and gazetted, the ICT sector was identified to show signal for increased labour demand as well as recover relatively quickly from the impact of COVID-19 (Department of Higher Education and Training (DHET), 2020, p. 17). South Africa (SA) as a republic has a total population of 59.62 million according to Statistics South Africa (SSA) mid-year estimates with youths accounting for 16.1%, that is, 9.59 million (Statistics South Africa [SSA], 2018, p. 8).

Unemployment, according to Kingdon and Knight (2004, p. 21), is inequitably distributed in SA and certain racial groups are highly likely to be unemployed and remain in it than others. These groups are typically non-Whites and young Africans in particular who live in homelands and remote areas. Unemployment remains a problem especially for the youth due to little or no work experience. Youths in this study are between ages 18 and 30 years.

The unemployment problem is more pronounced among Black youths who we classify in this study as disadvantaged. Blacks comprise African, Coloured and Indian people would be referred as such in this study. At 27.1 million in the October to December 2018 survey, the total unemployment was very high especially among Black youths who account for most of this total unemployed population (Table 1). Of the 6.1 million unemployed in the October to December 2018 quarter, 1.7% are graduates (Statistics South Africa [SSA], 2018, p. 7). Post-COVID-19, we anticipate that unemployment will increase because of the many businesses currently closing down or being liquidated and Black youths will be severely affected.

Table 1 shows that between the months of April to December 2018, unemployment slightly declined across all the various population groups (African is 0.1%, Coloured is 1.7% and White is 0.4%) except for Indians which recorded an increase of 2%. For 2020, statistics are not readily available but speculations are high that unemployment has increased exponentially, which is attributed to the national lockdown leading to some small and medium companies closing down permanently and employees losing jobs.

Within the South African ICT sector, the only available comprehensive IT race representation data to date is outdated (older than 10 years); it revealed that Blacks in general are under-represented (Fourie, van Rensburg, & Serfontein, 2005, p. 49).

Table 1 Unemployment rate by population group

	Black/African (%)	Coloured (%)	Indian (%)	White (%)
Apr–Jun 2018	30.5	23.3	10.4	8.0
Jul–Sep 2018	31.1	21.8	10.1	7.1
Oct–Dec 2018	30.4	21.6	12.4	7.6

Table 2 Total population estimates and IT race representation

Population groups	Technical area	%	Non-technical area	%	Total	Total population estimates 2005
African	40,394	30.5	20,701	29.8	61,094	37,205,700
Indian	13,907	10.5	8,641	12.5	22,548	1,153,900
Coloured	21,560	16.3	11,414	16.4	32,974	4,148,800
White	56,520	42.7	28,712	41.3	85,232	4,379,800
Total	13,2381	100	69,468	100	201,849	46,888,200

This under-representation is in-line with 2005 estimated population data (Ratele, 2008, p. 26) and IT race data comparison. This prompted the study report here which attempts to address this imbalance by proposing a skills programme (Tokosi, 2008). Table 2 by Fourie et al. (2005) indicated a gap in the racial disparity in IT skills as of 2005. A study by Schofield and Dwolatzky (2019, p. 11) on IT skills survey in SA within the MICT (Media and ICT) SETA indicated that 34% are white employees, 43% Black and the remainder almost equally split between Asians and coloured people. The need for a comprehensive new research study on IT race representation similar to Fourie et al. (2005) is imperative post-COVID-19 to assess the current situation as population and skill proportions have changed.

Table 2 is indicative of the proportion of each racial group in comparison to their representation within the ICT sector according to technical and non-technical areas in 2005. For example, Africans (Blacks) constitute 29.8% (61,094) of the total IT representation while they make-up 79.35% (37,205,700 million) of SA total population. Conversely, Whites constitute 41.3% (85,232) of total IT representation but make-up 9.34% (4,379,800 million) of SA total population. Skills and qualification standard is presented in the next section to highlight learners' competency requirement levels.

2.2 Skills and Qualification Standards in South Africa

While there is slow growth and improvement of participation by Black youths in the ICT sector, the SA government wants to accelerate the increase in the participation rate; however, financial resources to train these youths are limited. The Sector Education Training Authority (SETA) was established to address these problems where each SETA is tasked with undertaking training of all unskilled South Africans within its industry irrespective of race.

Since training is relevant to tackle challenges of growth, competitiveness and employment, there must be commitment from all stakeholders. These stakeholders partake in a tripartite agreement involving the learner, training provider and employer (public or private firms). The government is the facilitator of this agreement to ensure that all parties to this agreement abide by it. The involvement of social partners such as the SA government and SETA acts as a guarantee to the

Table 3 South African national qualification framework (NQF)

NQF level	NQF band	Qualification type		Learning routes to qualification
10	Higher education and training	Doctorate		Universities: Universities of Technology (formerly Technikons)
9		Master's degree		Universities: Universities of Technology
8		Post-graduate diploma Honours degree		Universities: Universities of Technology
7		Bachelor's degree Professional qualification		Universities: Universities of Technology
6		Diploma advanced certificate		Universities: Universities of Technology
5		Higher certificate		Universities: Public FET colleges: NGOs
4	Further education and training	Senior certificate Adult national senior Certificate Senior certificate (vocational)		Secondary schools
3		Occupationally directed qualifications		Secondary schools
2		Occupationally directed qualifications		Secondary schools
1	General education and training	Grades 7–9	ABET level 4	Primary and secondary schools
		Grades 4–6	ABET levels 2–3	Primary schools
		Grades 1–3	ABET level 1	Primary schools

maintenance and investment ploughed into ensuring that this training is successful. This training go beyond addressing short-term needs of participants but also tackling skills shortages of qualified Black ICT professionals especially in the ERP domain. An ERP system is an enterprise information system tool designed to integrate and optimise business processes and transactions in a corporation (Leon, 2014, p. 18).

SETA incentivises learners to partake in learning programme through the provision of stipends. Learners' participation increases the skills base for companies to choose from. Table 3 highlights the 10 levels in the South African National Qualification Framework (NQF). All qualifications in South Africa need to adhere to this framework.

The skills programme requires learners to have a minimum NQF level 4 qualification standard as presented in Table 3 above as each learner must have acquired the minimum competency of end-user computing, mathematical and communication skills. A review of the literature is undertaken in the next section to describe the model underpinning the study.

3 Theoretical Framing for Experiential Learning

A review of the literature is a synopsis of research undertaken on capacity building, empowerment, and different learning models. Capacity building builds independence especially for trained disadvantaged youth groups as they will be equipped with the necessary or relevant skills and experience. The drive for independence from government in areas like job provision is why a skills programme is important. While this explanation is satisfactory, it is not complete. Capacity building goes beyond skills development (Senge, 2014). Senge (2014) explains capacity building as, '*a means to improve efficiency of performance and productivity of either an individual or group*'. The individual or group in question will be brought up to a level of competence through skills development and knowledge acquisition to make informed decisions.

Capacity building should be targeted at the people or a group that have been disadvantaged, under-served or 'left behind' (Airhihenbuwa et al., 2011, p. 28); in this study they are Black South African youths. After building capacity, youths should be equipped with skills to work or create job. Although efficiency and productivity in SA are equated with creating opportunities, these are the primary objectives of a skills programme which is to create job opportunity for learners who undertake it.

The success of a skills programme should be conditional upon improving knowledge and changing people's behaviour and ways of thinking (Gackowski, 2003, p. 363) so that they can make informed decisions and choices. Behavioural change is not only a change in mind-set but adapting to new challenges as it occurs. It is also changing learner's way of thinking from total dependence on government to interdependence on networks and associations, thus quality education is important.

In-line with the United Nations Sustainable Development Goals (SDG) 4 (quality education) and 8 (decent work and economic growth), experiential learning through a skills programme has the potential to skill Black youths as education builds human capital which in turn promotes economic growth (Sachs et al., 2019, p. 806). Through the leave-no-one-behind principle, the SDG can be implemented with the aim at overcoming inequalities and discrimination by gender, race, social status or other qualifiers, which according to Sachs et al. (2019, p. 808) result from a range of factors including power dynamics, discrimination, poor system design and insufficient financing.

3.1 Experiential Learning (EL)

Experiential Learning (EL) is an action learning process and comes in various forms such as skills programmes, learnerships, apprenticeships, service learning, internships, job shadowing (Bindal & Goodyear, 2014, p. 528), work-based learning (WBL) (Cunningham & Dawes, 2016) and externships (Kuckes, 2014). Many of

these forms of EL show overlap as they exhibit similar characteristics, this is to say that some of these forms are the same because they show the same characteristics, but are sometimes referred to by different names and implemented differently in different countries.

Rudman and Terblanche's (2012, p. 70) findings demonstrate that EL work experience (through vacation work) addresses skills and competencies of learners by enabling them to reflect on and apply their theoretical knowledge when applying this knowledge in a business scenario and vice versa. In addition, such skills and competencies are currently neither addressed in theoretical lectures, nor through other teaching aids. Sanahuja Vélez and Ribes Giner (2015, p. 128) in their study of internships in the travel and tourism industry concluded that well trained and supervised interns, especially those whose job performance skills match the needs of the agency are likely to stay employed at their respective agency or employer. Pool et al. (2016, p. 27) highlighted a research project that confirmed most workers' learning occurs at the workplace itself with formal learning contributing the most when it is both relevant and well-timed. Hannaway et al. (2018, p. 50) recommended a transition from theory to practice using a mentoring system. In addition, this system is better enhanced and optimised as the value of a mentor (or supervisor-teacher) focuses not only on developing appropriate competencies but should be implemented in accordance with the methods that are used by supervisors in their classroom practice.

Other examples of EL include job shadowing which is a work experience option where learners learn about a job by walking through the workday as a shadow to a competent worker. It is temporary unpaid work exposure to the workplace in an occupational area of interest to the learner (Bindal & Goodyear, 2014, p. 528). WBL is more focused on learning in the workplace, derived from work undertaken for or by an employer (i.e. in paid or unpaid work). It involves the attainment of competencies and knowledge in the workplace. An internship on the other hand is an opportunity to integrate career related experience into an undergraduate educational curriculum to enable learners to participate in planned, supervised work lasting 3–6 months. Learners learn the relevant skills and aptitudes that someone will need to progress during the early stages of their career (Sweitzer & King, 2013).

It is noteworthy that EL is not only learning in business practice and connecting to theory but include cognitive and practical learning (Ilonen & Heinonen, 2018, p. 399). In addition, it involves affective learning and learning for life where learners can transform their practical experience into business opportunity such as entrepreneurship. Affective learning relates to learner's interests, beliefs, motivations and attitudes and with the current job "blood-bath" in SA due to the coronavirus pandemic, affective learning can contribute to reducing unemployment through entrepreneurship (St-Jean & Audet, 2012, p. 133).

3.2 Transition in Experiential Learning

Skills and knowledge were acquired through apprenticeships in the old days of industrialisation. A learner or student was apprenticed to a tutor or teacher. There was no compulsory formal institution. Currently, apprenticeship is both formal and informal. The formal apprenticeship is undertaken at an academic institution where a learner is first introduced theoretically into a trade before the practical specialisation. The informal stage is like the traditional apprenticeship where a willing learner is introduced to a mentor to work with and learn from. Though the formal apprenticeship system involves classroom tasks, it does not guarantee skills' acquisition. Research conducted in the United Kingdom by Walker and Zhu (2013) attempted to draw a relationship between education and productivity and argued that it is not always the case that education affects people's productivity. This is possibly the case because there are mismatches that occur at academic institutes: some learners do not enrol in courses that include some form of vocational module that will build their skill capability.

Within the ERP domain, if an employer refuses a learner access to its system, the learner cannot benefit from the skills' training. Without an ERP system at the host employers' environment, learners cannot be beneficial to employers after completing training because the core knowledge and skill acquisition of any learning programme are embedded in its practical component.

Apprenticeships consist of paid work and on-the-job training. Most apprentices have a contract of employment with their sponsoring firm and work for the firm, so they learn while they work. Following an apprenticeship model of learning, students can learn through a process of observation and gradual participation (Akkerman & Bakker, 2012, p. 154).

In SA, EL is better suited as it is learning by experience or learning by doing (Kolb, 1984, p. 20). EL is necessary within the concept of empowerment in ICT sector. EL is better suited here because the act of performing an activity makes-up for the act of learning. Following the assertion that education does not always affects people's productivity, and particularly that Black youths were deprived of quality learning in the past due to unjust educational system, the act of doing as an experiential form will make-up for knowledge deprived or lost for SA youth.

The authors argue that Service Learning (SL) is a better option to apprenticeship where empowerment is concerned. SL is closely related to skills programme, only that it involves an academic institution (such as universities) and the community in which it operates. SL simply is a teaching method that facilitates the creation of a knowledge-based reciprocal relationship between the academic institute and its community (Calvert, 2011, p. 123). It is closely related to Cooperative Education (CE).

This is another form of EL involving university undergraduate students undertaking full-time paid and discipline-related employment as a structured part of their programme of study. CE programmes provide learning opportunities for students that enable them to integrate their work and their academic experiences (Eames & Coll, 2010, p. 181).

There is also the concept of 'learning by doing'. It gives learners access to expertise through applied knowledge and infrastructure that is normally unavailable through public training systems (Kolb, 2014). We can only learn so much in the class but this will not take us far considering the continually changing ICT challenges. While researchers accept and acknowledge the importance of theory in learning, they do not disagree with the evidence that experience incorporated into learning far exceeds just classroom learning. Rudman and Terblanche (2012, p. 70) undertook a study within South Africa aimed at determining university auditing students' perceptions of the benefits of and constraints imposed by work experience gained from vacation work during their tertiary education, and whether the practical application of theoretical knowledge in a real-life situation helps students to better understand, conceptualise and contextualise auditing. Their findings demonstrated that vacation work enables students to reflect on and apply their theoretical knowledge when applying this knowledge in a business scenario and vice versa. In addition, the authors concluded that 'it is evident that work experience, as an educational tool, adds value to auditing students during their tertiary education'. This is an evidence that an ideal learning process of skills development is one that integrates practical experience with other ways of acquiring theoretical knowledge.

3.3 Experiential Learning Models

Experiential Learning was proposed by Kolb (1984, p. 20) and adopted by other researchers such as Rogers and Freiberg (1994), who explained knowledge creation in the context of psychology translating into human behaviour. Rogers and Freiberg's (1994) study focused on the use of EL in capacity building and empowerment and relates to psychotherapy, a humanistic approach and psychology which is manifested in certain principles. These principles are as follows:

(a) Significant learning takes place when the subject matter is relevant to the learners' interests;
(b) Learning which is threatening to the learner (e.g. new attitudes or perspectives) is more easily assimilated when external threats are at a minimum;
(c) Learning proceeds faster when the threat to a learner is low;
(d) Self-initiated learning is the most lasting and pervasive.

Other EL learning models and cycles were developed by researchers such as Greenaway (1995) who proposed a 3-stage learning cycle better applicable to management or staff training within a business. The three stages are Do, Review and Plan (DRP). The first stage is Do, which is to go forth and have an experience. Review reviews what happened and what can be learned, and Plan plans a way to tackle the next round of experience. James (1980) and Bacon (1987) proposed a 1-stage model where experience alone is supposed to be sufficient for learning while Neill (2002) proposed a 2-stage model that shifts from experience to reflection. Juch (1983) proposed a 4-stage learning cycle as well as a 5-stage model proposed by

Joplin (1981), Kelly (1955), and Pfeiffer and Jones (1975). A 6-stage EL proposed by Priest (1990) and Priest and Gass (1997) consists of six stages of experience-induce-generalise-deduce-apply-evaluate.

The Kolb (1984, p. 21) EL learning cycle (model) is the more appropriate cycle as it allows for a step-by-step learning process for a learner with an aim to build capacity. It is applied to this study. The methodology section below describes the way data were collected and analysed. This section is relevant to ascertain the quality of data collected and how relevant the data is to this study.

4 Methodology

This study attempted to answer the research questions addressed and was based on a qualitative research design that used a descriptive case study approach. According to Yin (2012) a case study focuses on a single object or subject and in this study, it is a South African skills programme. A case study is appropriate for this study because it allowed for the exploration and understanding of complex issues of society-based problems such as unemployment. The skills programme was developed for a real-life setting to ascertain its impact on learners and the organisation in which it was implemented.

The data sources used relating to the case study were secondary data and consisted of documents and archival records obtained from the SETA and SAQA websites. Of the ten accredited ERP specialised unit standards, purposeful sampling was used to select five unit standards appropriate for the skills programme. Purposive sampling was chosen based on the objectives of this study which are to explain the structure of an ERP skills programme to promote experiential learning and to understand how the skills programme can build capacity and employability for Black youths. Though purposive sampling is a non-probability sampling technique (Mukono & Tokosi, 2019, p. 3) of participants as espoused by Leedy and Ormrod (2014), the goal of its application is to understand a specific phenomenon (experiential learning) and not to represent a population by selecting information-rich cases for research. Purposive techniques were adopted to source only relevant unit standard documents related to the development of the skills programme. Participants were not recruited as the study objectives relate to the development of an ERP skills programme and not the assessment of participants' learning outcomes.

Purposive sampling enabled the selection of all documents and archival records most likely to provide data required for meaningful understanding of the phenomena (skills programme) under study (Poulis, Poulis, & Plakoyiannaki, 2013, p. 304).

4.1 Research Questions

The research questions that guided the scope of the study were as follows:

1. How can a skills programme for ERP be structured to promote experiential learning?
2. How can the skills programme build capacity and employability for Black youths?

5 Analysis

The analysis section showcased how meaning was derived from the data collected and its output presented. The unit standards chosen to develop the skills programme are presented as well as the application of the chosen Kolb's learning model to the study.

5.1 Skills Programme Requirements

Each unit standard was at NQF level 5 except one, but all were aimed at building theoretical knowledge upon the next unit standard as the learner progresses in the learning process. Each unit standard has an expiry date after which it is re-assessed and re-registered or phased out depending on its relevance to the industry. Unit standards are designed by SAQA in collaboration with industry experts and subject experts from a relevant industry and or SETA. NQF level 5 requirements meant that learners must have been adequately equipped with communications, computer and mathematical literacy skills at minimum NQF levels of 3 or 4. A total of five unit standards equaling 41 credits were used in developing the skills programme. All unit standards are part of an existing registered SAQA qualification. A description of each unit standard is provided in the next sections and arranged according to the sequence in the skills' learning process.

5.2 Unit Standards, Learner's Competencies, Knowledge and Outcomes

The five unit standards were purposed with empowering a learner with theoretical understanding of ERP concepts. Further information is provided in Table 4 on each unit standard. An understanding of unit standard 117711 (ICT concept called ERP) is important as this system is complex, thus learners understanding of its integrative approach will allow for a conceptualisation of how each integrative system unit not

Table 4 Unit standards, leaner's competences, knowledge and outcomes

Unit standards	Learners competences	Learners knowledge	Outcomes
Understand the overall concept of an ERP solution SAQA ID 117711	End-user computing NQF 3 Mathematical literacy NQF 3 Communication skills NQF 3	– Understanding of the connection between business enabling systems and the processes they support – Gain an awareness of the way ERP systems can add value in a business environment – Comprehensive technical expertise in ERP systems – Create an awareness of some aspect of the business functionality, be it through direct experience or observation	– Explain how an ERP solution integrates various system-wide business processes – Evolution of a current ERP solution – Understand the overall architecture of an ERP system – Explain the concept of configuring and customising an ERP system
Identify and explain the ERP market, partners and competitors SAQA ID 119178	Communication skills NQF 4 Mathematical literacy NQF 4	– ERP partners, competitors and clients – Identify role players to include but not limited to pre-sales, consulting, training, developers and implementation	– Identify the ERP market – Identify the key players within a specific ERP market – Describe the role of the key players within a specific ERP market
Prepare for and contribute to enterprise resource planning SAQA ID 119181	Communication skills NQF 4 Mathematical literacy NQF 4	– Effective business processes evaluation that Includes but not limited to specific, measurable, value adding, controls and realistic measures.	– Preparing for a business process definition workshop – Facilitating a process definition workshop – Advising on business process fundamentals – Documenting the client's business process

(continued)

Table 4 (continued)

Unit standards	Learners competences	Learners knowledge	Outcomes
Assist in the configuration of an ERP module SAQA ID 115411	Communication skills NQF 3 Computer literacy NQF 3	Not explicit	– Demonstrating an understanding of the fundamental techniques of configuring an ERP module – Assisting in configuring an ERP module according to the identified business requirements – Demonstrating an awareness of the integration points between the relevant ERP modules – Carrying out procedures to test and verify the accuracy of the module configuration
Configure and customise the transactions to business requirements within an ERP system SAQA ID 119087	Communication skills NQF 4 Mathematical literacy NQF 4	Not readily available	– Explaining the detailed design requirements within a business process according to client's needs – Configuring or developing the enterprise resource planning system according to detailed design requirements – Carrying out procedures to test and verity the accuracy of the configuration

Source: South African Qualification Authority [SAQA], 2020. [Online]: http://regqs.saqa.org.za/search.php?cat=unit

only functions efficiently and effectively within, but also how the system activities and user decisions affect the functions of other units (Nwankpa & Roumani, 2014, p. 224).

The unit standard 119178 is an understanding of ICT commercial products and ERP software that is offered by a range of vendors that specialise in this software market segment. According to Jacobson et al. (2007, p. 2), the main ERP vendors are SAP SE (Germany), Oracle (USA), Sage (UK), Microsoft (USA), Unit 4 (Netherlands) and SYSPRO (South Africa) (Fortune Business Insights, 2019). ERP systems are highly configurable to accommodate the diverse needs of users across most sectors of the economy and are therefore usually offered in three different forms: generic, pre-configured and installed.

The unit standard 119181 empowers learners with capabilities of how to organise and prepare an ERP workshop for either in-house training or client training. An understanding of ERP will facilitate a successful workshop and training will contribute to both employer and client business.

Where a learner's ICT competence is below par, unit standard 115411 is designed to be practical and to enable learners to contribute to ERP configuration. Configuration is complex and advanced but with the assistance of a mentor, learners can participate in the configuration process, since configuration can constrain a business process (Lubis, Lubis, & Muda, 2016).

The unit standard 119087 is also practical in nature and allows for learners to develop and enhance their acquired manipulation skills got from their prior course. ERP customisation can be thought of in terms of systems development and organisational decision-making (Koch & Mitteregger, 2016, p. 103) and so requires advanced conceptualisation and analysis; thus, empowering learner's competence through capacity building.

An integrated EL process is depicted in Fig. 1 (Hawk & Shah, 2007, p. 4). The use of EL is proposed in this research in order to establish capacity building skills and empowerment through skills and knowledge acquisition through the skills programme and its impact in helping youths gain employment. In understanding the integrated EL framework to this study, an application of the Kolb's EL model is explained in the next section.

5.3 Applying Kolb's 4-Stage Experiential Learning Model

South African companies are reluctant to employ youths with no form of expertise as work experience can only be obtained through an opportunity to work. Kolb's 4-stage EL model was considered appropriate for this study because it takes a learner through a step-by-step process of becoming skilled and competent.

On the other hand, the ERP skills programme developed and proposed is outcome-based and aimed at developing learners to reach an appropriate level of competence. Competence means that learners can translate theory learnt in the classroom into problem-solving solutions when exposed in the workplace. The

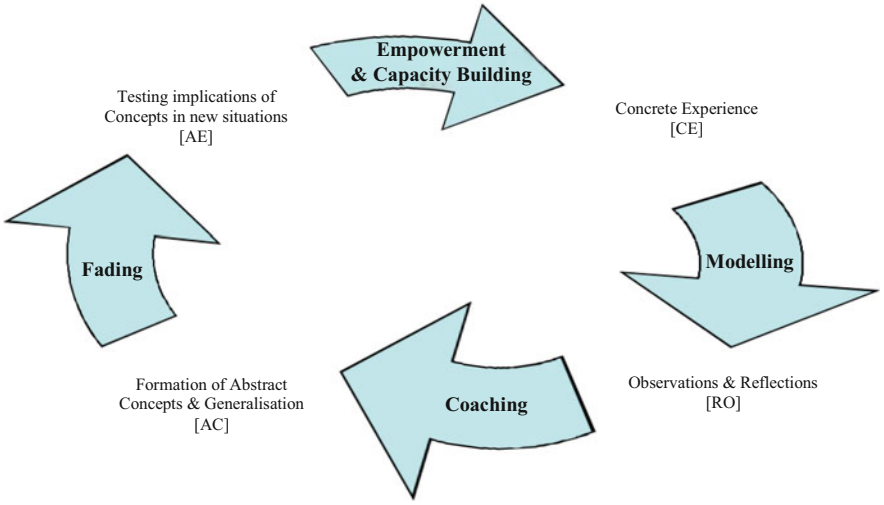

Fig. 1 An integrated EL framework. Source: Kolb (1984, p. 21) and Billet (1994)

method of instruction is adapted from Billet's (1994) study involving modelling, coaching and fading. Combining Kolb's 4-stage EL and Billet's instruction method produced an integrated EL model to achieve the skills programme objective of learner capacity and empowerment.

In the proposed model/framework, actual learning starts at the CE stage and develops learners using a modelling technique. Modelling is where an expert (ERP professional) at a firm executes a task so that learners can observe and build a conceptual model of the processes required in accomplishing that task successfully. In the ERP arena, there is a need to practically show learners how tasks are carried out. Unit standards 117711, 119178 and 119181 are important for this stage as they are theoretical in nature and can be conducted in a class setting. This forms the 30% classwork for the learners where theory is paramount. Key understanding of concepts, definitions, history of ERP and its environment are all taught here. This is necessary to broaden the learners' thinking. These concepts are important to initiate the learner into the practice phase, the RO.

Coaching is where learners perform the task at hand at the RO stage as the expert observes and monitors their activities. ICT requires hands-on work to understand and master. This approach develops the learners much quicker as they gradually begin to understand the concepts of the task. Repeated tasks, instructions and comments build confidence in the learners and act as a support tool towards their understanding. While the experts perform the task at experimental stages of the practice work, learners observe and learn. When learners are initiated into performing these tasks, experts observe and monitor their progress. Within the skills programme phase, unit standards 4 and 5 are necessary. These unit standards are

practicably designed requiring physical manipulation of an ERP system, be it a dummy or live system. The coaching is necessary to guide learners towards building confidence in themselves as well as learning from mistakes made. Experts undergo a state of reflection after each task through assessments and feedback. Learners also undergo reflections through self-evaluation and outcomes.

While the RO stage is more extensive and time-consuming because of its practical nature, the AC adapts learners to techniques of information gathering through fading. Fading is where expert's support to learners is gradually removed to enable learners to conduct their task independently. Unit standards 115411 and 119087 will be continuously used as support and referral aids for learners. Distant support is still provided to learners by way of advice and hands-on work in areas that are complex and requires complex manipulation to be done. Empowerment starts here as learners gradually take part in the decision-making process resulting in capacity building. Actual empowerment starts here as learners can develop additional methods of solving problems as well as mentor others. Capacity building takes place afterwards as learner's skills are developed through strategic thinking as they seize to be called learners. AC is a state of independence. At this stage, fading enhances knowledge creation, as well as skills development. Learners are not coached further, but rather monitored and supervised. Actual performance appraisal and evaluation take place here as tasks are not simulated any more, they are real tasks requiring real solutions. At this stage, it is appropriate to say that empowerment takes place because outcomes can now be measured.

Skills acquired at the fading process empowers learners to become consultants who advice clients, test systems during and after project completion as well as train other learners. While entering the AE phase, learners are not learning theory and concepts but deciding through participation. Although the AE stage is supposed to be part of the entire learning process, it may not be part of the skills programme depending on the firm or service provider conducting learner training. At AE, skills and knowledge acquired through this spiral of learning are translated into full empowerment and capacity. Learners can be known as consultants and can initiate projects, become supervisors and team leaders as well as project coordinators. This is where every firm would want learners to be at the stage where they are fully independent of experts but still interdependent on teams.

The central research questions guiding the study are now addressed below.

5.4 How Can a Skills Programme Be Structured to Promote Experiential Learning?

The programme must include a combination of both theoretical classroom tasks (30%) and practical tasks (70%). The theoretical outcomes involve understanding ERP concepts, markets, partners, costs and features of the ERP system. The skills programme should be conducted at a training facility where training facilitators and

coaches must be provided to guide and mentor each learner. Training materials should conform to unit standards so as to meet the skills programme objective of EL acquisition. The skills programme structure should incorporate projects, assignments and case studies embedded in it especially into unit standards 117711, 119178 and 119181, which are all purely theoretical. These are the fundamental building blocks of an ERP consultant, that is, the ability to have a conceptual knowledge of ERP systems and its processes.

5.5 *How Can the Skills Programme Build Capacity and Employability for Black Youths?*

The skills programme can build capacity and employability based on the success of the level of skills a learner acquires and a subsequent employment thereof. Success is relative in meaning as the employment of a learner today may not necessary translate into success for the employing firm, but it is accepted in this study as a success. Another measuring scale will be the length of sustained employment after completion of the skills programme. The impact of this skills programme on unemployment in SA is anticipated to be significant especially among Black youths considering the high demand for Black (EE/AA) ERP professionals in the areas of SAP, Sage and Oracle domains.

The outcome of a random job search on the websites of PNET (PNET, 2013, 2019) and CareerJunction (CareerJunction, 2013, 2019) which are the two most popular job sites in SA is shown below (Table 5). First search was undertaken in 2013 and a recent search was undertaken in February 2019. Results for PNET, 2019 were based on new advertised jobs. Some jobs were re-advertised, notwithstanding, ERP skills demand is high.

With this demand, capacity and other opportunities can be created using an ERP skills programme framework by way of self-employment as independent contractors, or private consultants. This improves and increases a pool of human resources, which is beneficial to potential employers and clients.

Table 5 January–May (2013 and 2019) job search for ERP jobs

ERP domains	PNET (2013)	PNET (2019)	CareerJunction (2013)	CareerJunction (2019)
SAP	184	155	14	498
Sage ACCPAC	14	66	0	3
Oracle	93	45	6	231
Microsoft dynamics	10	666	3	45

6 Discussion

A skills programme is a short- to medium-term effective solution for any organisation seeking skilled individuals, while it is employment, empowerment and capacity building for learners. Short and medium-term effectiveness means it will address skills needs for organisations and for learners who enter the labour market as they can be employable because of their acquired skill. Firms will benefit from a skills programme largely because of immediate labour availability and government subsidy via the skills development fund. It is a three-month learning process; though formal qualifications are not issued after completion, it should be encouraged as a first step in bringing SA Black youths to a level that was formally difficult for them owing to their historical past.

The study makes it clear that work experience allows learners to better contextualise and apply their theoretical knowledge in real life or work place setting (Rudman & Terblanche, 2012, p. 70); it allows learners to gain much needed practical experience. Implementation of what Bloom (2010, p. 90) calls "second chance" programmes such as experiential learning programmes should be carefully designed. In the beginning, proper eligibility criteria (Abramovsky, Battistin, Fitzsimons, Goodman, & Simpson, 2011, p. 177) should be used to select learners and to test their baseline competencies. The latter will allow one to evaluate the effectiveness of such programmes or in other words whether the learning programme raised the training levels of the learners. The matching of employer and learner is therefore very important. The authors concur with Bloom (2010, p. 105) that paid work through learnerships as an example and EL programmes act as a tool to engage youth in training (the "carrot") and in the long term it also assists in building capacity for long-term labour needs.

Since the Service SETA in South Africa does not have an existing ERP skill or learnership programme, this makes the development and skills programme accreditation costly, lengthy and time-exhausting. Measuring success using prior data on a learner's participation in any ERP programme is not possible. However, lessons from other disciplines and countries highlight the success of EL (see McLeod, 2013). This is a reason why the ERP skills programme framework was developed to be simplistic and adjustable to meet challenging ICT issues. A skills programme should be implemented at other SETA's that do not currently have it. Service SETA is one of the very few SETAs that has and implements a skills programme.

7 Limitations

In developing the skills programme, the time-line was lengthy, cumbersome and costly because of the processes required in the accreditation process as set-out by Service SETA. All ERP unit standards used in this study were more than 5 years old

thus lacking currency as they were designed by SAQA and are still not been updated. This may affect the relevance of the inclusion of some unit standards in this study. No available study of this nature in SA can be found to make comparisons and learn lessons from. It is important to note that with the advent of COVID19 and its consequence on employment, there is a possibility of an overhaul of SA educational curriculum which may reduce EL practices because of fewer employers.

8 Future Research

Avenues for future research could include a quantitative study aimed at evaluating the skills programme framework implementation and its actual impact on a broader scale on both the learners gaining employment and firms employing learners. It is important to undertake a longitudinal study to first track the sustainability of an ERP skills programme within an industry: and secondly to track learner employability. There is an opportunity to undertake an academic study to improve on existing EL models and implementations.

Abbreviations

AC	Abstract concepts and generalisation
AE	Testing implications of concepts in new situation
CE	Concrete experience
EL	Experiential learning
ERP	Enterprise resource planning
ICT	Information and communication technology
IT	Information technology
NQF	National qualification framework
RO	Reflections and observations
SA	South Africa
SAQA	South African qualification authority
SDG	Sustainable development goals
SETA	Sector education and training authority
SL	Service learning
WBL	Work-based learning

References

Abramovsky, L., Battistin, F., Fitzsimons, F., Goodman, A., & Simpson, H. (2011). Providing employers with incentives to train low-skilled workers: Evidence from the UK employer training pilots. *Journal of Labour Economics, 29*(1), 153–193.

Airhihenbuwa, C. O., Shisana, O., Zungu, N., BeLue, R., Makofani, D. M., Shefer, T., Smith, E., & Simbayi, L. (2011). Research capacity building: A US-South African partnership. *Global Health Promotion, 18*(2), 27–35.

Akkerman, S. F., & Bakker, A. (2012). Crossing boundaries between school and work during apprenticeships. *Vocations and Learning, 5*(2), 153–173.

Andrews, P. (2017). Race, inclusiveness and transformation of legal education in South Africa. https://doi.org/10.2139/ssrn.3110039

Bacon, S. B. (1987). *The evolution of the outward bound process*. Greenwich, CT: Outward Bound.

Billet, S. (1994). Situating learning in the workplace - Having another look at apprenticeships. *Industrial & Commercial Training, 26*(11), 9–16.

Bindal, T., & Goodyear, H. (2014). Newly qualified doctors' views of their job shadowing experiences. *British Journal of Hospital Medicine, 75*(9), 528–532.

Bloom, D. (2010). Programmes and policies to assist high school dropouts in the transition to adulthood. *The Future of Children, 20*(1), 89–108.

Calvert, V. (2011). Service learning to social entrepreneurship: A continuum of action learning. *Journal of Higher Education Theory & Practice, 11*(2), 118–129.

CareerJunction. (2013). Retrieved May 24, 2013, from http://www.careerjunction.co.za.

Careerjunction. (2019). Retrieved August 18, 2020 from http://www.careerjunction.co.za.

CIA.gov. (2020). Retrieved August 18, 2020, from https://www.cia.gov/library/publications/the-world-factbook/geos/sf.html

Cunningham, I., & Dawes, G. (2016). *The handbook of work based learning*. London, UK: Routledge.

Department of Higher Education and Training (DHET). (2020). National list of occupations in high demand: 2020, No 43937. Available at DHET: http://www.gpwonline.co.za

Department of Higher Education and Training (DHET). (n.d.). National skills development strategy 111. Available at DHET: http://www.dhet.gov.za

Eames, C., & Coll, R. K. (2010). Cooperative education: Integrating classroom and workplace learning. In *Learning through practice* (pp. 180–196). Dordrecht, Netherlands: Springer.

English, J., & Hay, P. (2015). Black South African women in construction: Cues for success. *Journal of Engineering, Design and Technology, 13*(1), 144–164.

Felstead, A., Gallie, D., Green, F., & Zhou, Y. (2007). Skills at work, 1986 to 2006. In *ESRC centre on skills, knowledge and organisational performance*. London: Universities of Oxford and Cardiff.

Fortune Business Insights. (2019). Retrieved June 30, 2020 from https://www.fortunebusinessinsights.com/enterprise-resource-planning-erp-software-market-102498

Fourie, L.C.H., van Rensburg, G. J., & Serfontein, B. (2005). An analysis of the ICT skills auditfor dti and ISETT SETA, p. 50.

Gackowski, Z. J. (2003). Case/real-life problem-based learning with information system projects. *Journal of Information Technology Education, 2*, 357–365.

Gama, N., & Willemse, L. (2015). A descriptive overview of the education and income levels of domestic workers in post-apartheid South Africa. *GeoJournal, 80*(5), 721–741.

Greenaway, R. (1995). Powerful learning experiences in management learning and development: a study of the experiences of managers attending residential development training courses at the Brathay Hall Trust (1988-9). Doctor of Philosophy thesis. Centre for the Study of Management Learning, University of Lancaster.

Hannaway, D., Marais, P., Govender, P., & Meier, C. (2018). Growing early childhood education teachers in rural areas. *Africa Education Review, 2018*, 1–18.

Hawk, T. F., & Shah, A. J. (2007). Using learning style instruments to enhance student learning. *Decision Sciences Journal of Innovative Education, 5*(1), 1–19.

Ilonen, S., & Heinonen, J. (2018). Understanding affective learning outcomes in entrepreneurship education. *Industry and Higher Education, 32*(6), 391–404.

Jacobson, S., Shepherd, J., D'Aquila, M. & Carter, K., (2007). The ERP market sizing report, 2006–2011. AMR Research, 29, Market Services report.

James, T. (1980). Can the mountains speak for themselves? *Scisco Conscientia, 7*, 107–117.

Joplin, L. (1981). On defining experiential education. *Journal of Experiential Education, 4*(1), 17–20.

Juch, A. (1983). *Personal development: Theory and practice in management training*. New York, NY: Wiley.

Kelly, G. A. (1955). *Theory of personality: The psychology of personal constructs*. New York, NY: W.W. Norton.

Kingdon, G. G., & Knight, J. (2004). Race and the incidence of unemployment in South Africa. *Review of Development Economics, 8*(2), 198–222.

Kirlidog, M., van der Vyver, C., Zeeman, M., & Coetzee, W. (2018). Unfulfilled need: Reasons for insufficient ICT skills In South Africa. *Information Development, 34*(1), 5–19.

Koch, S., & Mitteregger, K. (2016). Linking customisation of ERP systems to support effort: An empirical study. *Enterprise Information Systems, 10*(1), 81–107.

Kolb, D. (1984). *Experiential learning: Experience as the source of learning and development*. Englewood Cliffs, NJ: Prentice-Hall.

Kolb, D. A. (2014). *Experiential learning: Experience as the source of learning and development*. Upper Saddle River, NJ: FT Press.

Kuckes, N. (2014). Designing law school externships that comply with the FLSA. *Clinical Law Review, 21*, 79.

Leedy, P. D., & Ormrod, J. E. (2014). *Practical research planning and design* (10th ed.). Essex: Pearson Education Limited.

Leon, A. (2014). *Enterprise resource planning*. New York, NY: McGraw-Hill Education.

Lubis, A. F., Lubis, T. A., & Muda, I. (2016). The role of Enterprise Resource Plan (ERP) configuration to the timeliness of the financial statement presentation. *International Journal of Applied Business and Economic Research, 14*(11), 7591–7608.

McKeever, M. (2017). Educational inequality in apartheid South Africa. *American Behavioral Scientist, 61*(1), 114–131.

McLeod, P. L. (2013). Experiential learning in an undergraduate course in group communication and decision making. *Small Group Research, 44*(4), 360–380.

Mukono, W., & Tokosi, T. O. (2019). Premier service medical investments: Challenges and perceptions of healthcare practitioners in the adoption and implementation of healthcare information technology (HIT), in *Proceedings of the South African Institute of Computer Scientists and Information Technologists 2019* (pp. 1–10).

Naidu, S. (2011). *An autobiography of teaching and teacher evaluation in an apartheid and post-apartheid South Africa - Part One*. Retrieved November 17, 2020 from https://files.eric.ed.gov/fulltext/ED530235.pdf.

Neill, J. T. (2002). Are the mountains still speaking for themselves? A defining tension 20 years on. Unpublished paper. University of New Hampshire, New Hampshire.

Nwankpa, J., & Roumani, Y. (2014). Understanding the link between organizational learning capability and ERP system usage: An empirical examination. *Computers in Human Behavior, 33*, 224–234.

Pfeiffer, W., & Jones, J. E. (1975). *A Handbook of structured experiences for human relations training 1-5*. La Jolla, CA: University Associates.

PNET. (2013). Retrieved May 24, 2020 from http://www.pnet.co.za/#s=home

PNET. (2019). Retrieved February 14, 2020 from http://www.pnet.co.za/#s=home

Pool, I. A., Poell, R. F., Berings, M. G., & ten Cate, O. (2016). Motives and activities for continuing professional development: An exploration of their relationships by integrating literature and interview data. *Nurse Education Today, 38*, 22–28.

Poulis, K., Poulis, E., & Plakoyiannaki, E. (2013). The role of context in case study selection: An international business perspective. *International Business Review, 22*(1), 304–314.

Priest, S. (1990). Everything you always wanted to know about judgment, but were afraid to ask. *Journal of Adventure Education and Outdoor Leadership, 7*(3), 5–12.

Priest, S., & Gass, M. (1997). *Effective leadership in adventure programming*. Champaign, IL: Human Kinetics.

Ratele, K. (2008). Masculinity and male mortality in South Africa. *African Safety Promotion, 6*(2), 19–41.

Rogers, C. R., & Freiberg, H. J. (1994). *Freedom to learn*. Columbus: Merrill Publishing Company.

Rudman, R. J., & Terblanche, J. (2012). The perceived advantage of work experience as a learning tool for university auditing students. *Southern African Journal of Accountability and Auditing Research, 13*, 57–71.

Sachs, J. D., Schmidt-Traub, G., Mazzucato, M., Messner, D., Nakicenovic, N., & Rockström, J. (2019). Six transformations to achieve the sustainable development goals. *Nature Sustainability, 2*(9), 805–814.

Sanahuja Vélez, G., & Ribes Giner, G. (2015). Effects of business internships on students, employers, and higher education institutions: A systematic review. *Journal of Employment Counseling, 52*(3), 121–130.

Schofield, A., & Dwolatzky, B. (2019). 2019 JCSE-IITPSA ICT skills survey, 10th edition: Joburg Centre for Software Engineering (JCSE) and IITPSA (Institute of Information Technology Professionals South Africa). Retrieved from https://www.iitpsa.org.za/wp-content/uploads/2019/09/2019-JCSE-IITPSA-ICT-Skills-Survey-v1.pdf

Senge, P. M. (2014). *The fifth discipline fieldbook: Strategies and tools for building a learning organization*. New York, NY: Crown Business.

South African Qualification Authority [SAQA]. (2020). Retrieved May 24, 2020 from http://www.saqa.org.za/show.asp?id=2783

Statistics South Africa [SSA]. (2018). Retrieved February 14, 2019 from http://www.statssa.gov.za/?page_id=1854&PPN=P0211

St-Jean, E., & Audet, J. (2012). The role of mentoring in the learning development of the novice entrepreneur. *International Entrepreneurship and Management Journal, 8*(1), 119–140.

Sweitzer, H. F., & King, M. A. (2013). *The successful internship: Personal, professional, and civic development in experiential learning* (4th ed.). Boston, MA: Cengage Learning.

Tokosi, T. O. (2008). An evaluation of the use of experiential learning (skills programme) in building capacity amongst South African unemployed disadvantaged groups. Unpublished Masters Dissertation, HAN University, The Netherlands.

Walker, I., & Zhu, Y. (2013). The impact of university degrees on the lifecycle of earnings: some further analysis. BIS Research Paper No. 112.

Yin, R. K. (2012). Case study methods. In H. Cooper, P. M. Camic, D. L. Long, A. T. Panter, D. Rindskopf, & K. J. Sher (Eds.), *APA handbooks in psychology. APA handbook of research methods in psychology, Vol. 2. Research designs: Quantitative, qualitative, neuropsychological, and biological* (pp. 141–155). Washington, DC: American Psychological Association.