



**THE SOUTHERN  
AFRICAN SOCIETY  
FOR COOPERATIVE  
EDUCATION**

**THE AFRICAN JOURNAL FOR  
WORK-BASED LEARNING  
VOLUME 4**

EDITOR: DR ROELIEN BRINK



## Journal policy

The *Southern African Society for Cooperative Education (SASCE)* is an independent publication, and serves as a medium for articles of interest to researchers and practitioners in work-based learning. The Journal provides a focal point for publication to address the increasingly important notion of work-based learning research from throughout the world. The broader context is that of linking formal institutional learning to the requirements of the world-of-work in a holistically conceptualised curriculum encompassing theory and practice. Currently, many diverse examples of the link between learning and work exist. *The African Journal for Work-Based Learning* tries to provide a forum for a scholarly understanding of the epistemological bases for learning *for* work, learning *at* work and learning *through* work.

While it is intended that the journal will be academic in nature, it should also serve as a resource for scholars, researchers and workplaces. Examples in the form of essays or discussion papers of best practice, good partnerships and cooperation will thus also be welcomed.

The journal appears minimum 2 times a year – with an additional ‘special issue’ if applicable. It is prepared designed, printed, bound and despatched by SASCE for Higher Education South Africa (HESA).

The views expressed in this journal are those of respective authors.

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# The African Journal for Work-Based Learning

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# The African Journal for Work-Based Learning

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## CONTENTS

<b>FOREWORD</b>	iv
<i>Shakeel Ori</i>	
<b>The state of work-integrated learning in the TVET sector in South Africa Presentation to the WIL Africa Conference, November 2015</b>	1
<i>Ken Duncan</i>	
<b>Work Integrated Learning – A Business Perspective Presentation to the WIL Africa Conference, November 2015</b>	8
<i>Bernice Haestier</i>	
<b>Transdisciplinary Work Integrated Learning Partnership Model In South African Higher Education –On The Road To Success</b>	14
<i>Katlego Modisagae, Cookie M Govender and Susanne Taylor</i>	
<b>A future perspective on Work Integrated Learning for South African Mine Surveyors</b>	30
<i>Hendrik Grobler</i>	
<b>Monitoring chemical engineering workplace learning, an element of international accreditation and recognition</b>	42
<i>Corina Mateescu and Thomas Groenewald</i>	
<b>Perspectives of Employers on Work Readiness of Work Integrated Learning Students: A Case Study of the Durban University of Technology</b>	61
<i>Themba Msukwini, Strinivasan Pillay and Brian Forbes</i>	
<b>Work integrated learning models of selected countries versus South African practices</b>	78
<i>Shepherd Bhero</i>	
<b>Article Guidelines – Notes to Contributors</b>	95

## FOREWORD

On behalf of the Southern African Society for Cooperative Education (SASCE) Board of Directors, it is my pleasure to invite you to the 2<sup>nd</sup> WIL Africa Conference, to be hosted by University of Johannesburg in South Africa.

The WIL Africa Conference is a premium annual event on Cooperative Education and Work Integrated Learning. Building from a very successful inaugural WIL Africa Conference in 2015, SASCE is equally excited at the anticipated success this year and would in advance like to thank government representatives, industry, education, Labour and student representatives who will be participating in the conference.

The Global advocacy by World Association on Cooperative Education, the continental advocacy by SASCE, more WIL adoption by universities around the world as an educational strategy and the South African Government position as reflected in the White Paper on Post-School Education and Training are all a reflection of the growing importance of WIL in student employability.

If Human Capital is the most important asset of any organisation, then the alignment between the required Human Capital profile and the quality, relevance and work readiness of the graduates from our institutions who are the talent supply, is critical and impacts on the employability of the students after their studies. The conference theme for this year is therefore **"WIL and Employability"**

The conference is at an appropriate time (even though convened at short notice). The participants here will be from educational institutions, industry and various Government organisations and also include WIL students/graduates. All these voices can contribute to a framework that is acceptable and practical.

The conference will again showcase best practice models and allow for interrogation of these and important policy issues such as the National Framework for WIL. Workshops are a key feature of the programme and these include Student Tracking Systems, WIL in TVET Colleges, Forming partnerships with Industry, etc.

Participants may therefore request funding from their institutional skills funding to attend the workshops and conference.

SASCE thanks the various speakers and panelists who have agreed to participate. More details of the keynote speakers and sponsors will be forthcoming shortly ([www.wil-africaconference.com](http://www.wil-africaconference.com)). The conference also has an Awards Banquet, where we recognise the contribution made by several organisations and individuals.

The NSA has supported the conference. Apart from the presentations, discussions and debates, the WIL Africa conference is also about networking. We expect that there will be many alliances and collaborative initiatives that will develop at the conference.

This journal has two sections. The first Section 'A' has two articles from the inaugural WIL Africa Conference and was presented by Ken Duncan titled "**The state of work-integrated learning in the TVET sector in South Africa**" and the second article by Bernice Haestier titled "**Work Integrated Learning – A Business Perspective**". These articles were not peer reviewed as they had already been presented and the authors had already reworked them with the inputs from the audience. This year there will be a Special Edition of this journal in December where all keynote speakers and accepted double blind peer reviewed papers will be published.

Section B is academic papers that were double blind peer reviewed by the editorial and reviewers team.

Your continued support for this journal and annual WIL Africa Conference is appreciated. I trust you will enjoy this edition and we, as the Board of Directors, are looking forward to collaborate with you all at the 2<sup>nd</sup> WIL Africa Conference.

*Shakeel Ori*

*Outgoing SASCE President*

[www.sasce.net](http://www.sasce.net)

## Section A

### THE STATE OF WORK-INTEGRATED LEARNING IN THE TVET SECTOR IN SOUTH AFRICA

Presentation to the WIL Africa Conference, November 2015

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Everyone connected with technical and vocational education and training (TVET) is familiar with the biennial World Skills competition, the most recent of which took place in Sao Paulo, Brazil, in August 2015. Since its inception in 1950, this competition has been recognised internationally as a showcase of excellence in TVET. Every two years, young trainees from around the world compete for gold, silver and bronze medals in a wide range of trades and occupations. The competition thus gives participating countries an opportunity to benchmark their vocational training systems against international standards. South Africa first entered the competition in 1993, and in 2015 was one of 55 countries competing in 50 trades. In the final 2015 medals count, we came 41<sup>st</sup> out of 50 and, on average score, 45<sup>th</sup>.

The usual experts did well: Brazil, China, South Korea, Switzerland, Germany, Austria and Australia. These countries excelled as they always have and it is instructive to note what they have in common. It is not their geography, the size or architecture of their economies, or the design of their basic education systems, which differ widely. What they do have in common is that their national, public TVET systems are strongly influenced by the industries and employers they are designed to serve. Each country accomplishes this in its own unique way, but a partnership between government and employers, between the public and the private sectors, is *the* common factor in all successful TVET systems around the world. It is a factor that is noticeably weak in South Africa, close to non-existent at times. That is why the quality of our TVET is patchy.

The South African Department of Higher Education and Training (DHET), responsible for the country's post-school TVET system, is aware of this problem and has declared its intention of improving the quality of TVET through closer relationships with industry generally and through work-integrated learning (WIL) in particular. According to the government's ***White Paper for Post-School Education***

**and Training**, “work-place learning must be seen as an integral part of qualification and programme design” (DHET, 2014, p. 64).

The current situation is far from that ideal. Neither of the two main curricular offerings of public TVET colleges in South Africa - the so-called ‘N courses’ and the National Certificate (Vocational) – incorporates compulsory workplace experience for the student. The dire consequences of this omission are a case study for higher education institutions that are considering abandoning WIL from their curricula: our public TVET colleges have become almost irrelevant to industry, with dismal pass and throughput rates and lacklustre labour-market outcomes for their graduates. Numerous studies, such as those conducted by the Organisation for Economic Cooperation & Development (OECD) in 2008 and Field, Musset, and Alvarez-Galvan in 2014, have highlighted the paucity of linkages between the TVET system and industry as a critical weakness.

Improvements are under way. WIL is now a key performance indicator in the DHET’s planning, monitoring & reporting systems for public TVET colleges. My own organisation, SSACI, has since 2008 introduced a programme of systematic, on-course workplace experience for students to all fifty public colleges, in which over 15’000 students now participate annually. And this number is growing rapidly. Training and support materials in the implementation of WIL are freely available for college personnel, students and employers. But there is still a long way to go before workplace learning becomes mandatory for every student in every vocational training programme.

This matters. It matters to students because of the four prerequisites for getting a job most commonly identified by labour-market experts – technical occupational or vocational skills, current workplace experience, workplace behavioural skills and connections to employers – only the first can be acquired in a college. The others require time in the workplace. So a TVET institution, such as a college or university of technology that offers its students no opportunities to undertake workplace experience is not training its students for employment; it is training for disappointment.

WIL matters to colleges as well. Studies locally and internationally have shown that it has a positive impact on students’ academic performance – and therefore on three of the college’s main performance metrics: pass rate, throughput rate and graduate employability (Akhoobhai & Schindler, 2015; SSACI, 2015; Roopnarain & Akoobhai, 2014; Marock & Harrison, 2009; Altman & Marock, 2008, Gewer, 2007 & 2008; Marock & Gewer, 2008). It also has a powerful washback effect on the curriculum. My own experience of working with colleges over the past ten years has been that nothing



motivates lecturers to raise their game faster than sending their students into the workplace for short periods during their studies. The net effect of many students in many courses doing WIL is to bring the whole curriculum into closer alignment with the skills needs of industry and generally to promote long-term cooperation between college and company.

Of course, WIL would never happen if it did not offer important benefits to employers. But it does. It provides them with cost-effective, partially-skilled labour on demand. It allows them to cherry-pick the best students as future employees. It reduces significantly the costs of recruiting and inducting such employees, because they have been pre-exposed to the company's systems, processes, technology and culture. It provides job-enrichment for existing employees who are willing to train and mentor the students, and helps to promote a culture of learning within the company. Not least, it enables a company to influence the local college curriculum by show-casing its operations as the model which students must be trained to implement, thus reducing further the need for, and cost of, future in-service training.

Relatively few South African businesses have grasped this opportunity, and WIL placements are hard to find for college and university students alike. A popular explanation for this is that the national economy is too small to accommodate large numbers of college and university students on temporary workplace experience. But this assertion does not stand up to examination. According to the South African Revenue Service, there are over half a million registered, tax-paying (i.e. profitable) companies in the country (SARS, 2012, p.103). If each company took only *one* student on WIL at a time, the economy could comfortably host at least 500'000 *full-time* workplace learners per year, or a million on six-month placements or two million on three-month placements. This is more than all the students at colleges and universities in the country (DHET, 2013, p.4 & p.19)<sup>1</sup>. The actual number of students requiring WIL, i.e. those in occupational and vocational courses, would be considerably lower. So the real problem is not lack of capacity for WIL but lack of employer willingness.

It seems to me that most businesses in this country are taking a fundamentally un-business-like approach to skills training. They pay corporate tax for, amongst other things, the funding of public TVET colleges, as well as a levy on their payroll for skills training specific to their sectors. When they do not get what they want from the agencies charged by government with the delivery of these services – namely, the TVET colleges and the Sector Education and Training Authorities (SETAs) –

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<sup>1</sup>The latest available statistics from DHET are for 2011, in which year total enrolments were 400'000 in public TVET colleges and 938'000 in higher education institutions (DHET: 2013, p.4 & p.19)

businesses generally do not try to improve them. They simply abandon their investment and procure from private training providers, at great additional cost, the goods they have already paid for through the taxman. Why not help fix the colleges and the SETAs so as to get value for money and obviate the need to pay for skills training two or three times over?

The answer to that question lies, I think, in a truth that is inconvenient for private-sector employers, at least in their dealings with the DHET<sup>2</sup>. Contrary to their assertions, they have never pulled their own weight with regard to skills training. For decades, the majority of artisans and technicians in South Africa were trained by state agencies and enterprises such as Eskom, Iscor (as it then was), SAR&H, the Department of Public Works and the defence force, whose mandates specifically required them to train beyond their own needs and who received tax breaks and indirect subsidies to do so. When, as frequently happened, the numbers so trained were too small to meet the needs of the economy, or skills outside those organisations' areas of expertise were required, the gaps were filled by state-sponsored immigrants from Europe. The result was that private companies seldom had to train to meet even their immediate skills requirements, much less those of the future. They simply asked the government to supply more – at state expense - whenever required. Over the years, the private-sector became accustomed to having much of its training done by someone else and paid for out of the public purse. This explains why the country experienced a skills crisis after 2001, when the state-owned enterprises, having been privatised, cut back drastically on training in order to make profits. It also explains why employers usually view training as a *cost to be minimised*, rather than as an *investment to be maximised*. The resultant lack of employer participation is the single greatest constraint on WIL in South Africa. It is a problem of an out-dated mind-set.

On the other hand, it is equally true and inimical to WIL that public TVET colleges are not responsive to employers' needs. This is largely because they are not dependent upon industry for their income. They are heavily subsidised by the state according to their enrolment and the delivery costs of the programmes and qualifications that the DHET requires them to offer. Since the industries for which the TVET colleges are supposedly training are not really their clients - merely distant end-users of their product - their performance standards are generally unrelated to industry. This structural problem in the way colleges are funded allows them, if they choose, to see WIL as nice-to-have rather than must-have.

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<sup>2</sup>The author has since 2013 been a member of the Artisan Training and Development Monitoring and Evaluation Team, a stakeholder forum convened by the DHET to solicit input on skills training from business, labour and civil society. The forum's deliberations often include recriminations amongst the parties about the unsatisfactory state of TVET in the country.

What can be done about all this? I believe that four steps must be taken, all of them do-able now. Firstly, the *business case* for WIL must be made clear to industry. Research conducted overseas and in South Africa has shown that apprentices, interns and other learners in the workplace can generate more value than they cost (DAI, 2013; OECD, 2010; Rauner, Heinemann, Piering & Bischoff, 2009; Mühlemann & Wolter, 2007; Zwick, 2007; Wolter, Mühlemann & Schweri, 2006; Machin & Vignoles, 2001; Bassi, Ludwig, McMurrer & Van Buren, 2000). In other words, they can work at a profit. Many employers that I have spoken to, do not believe this. They do not see that often, it is their own organisation of work-processes that is making the trainees unproductive. Yet, there are good examples of local companies using their workplace learners profitably. What is required now is sustained, well-informed advocacy from organisations like the South African Society for Cooperative Education and the professional associations to get this key message across to more employers.

Secondly, WIL must be incorporated into the core curriculum of every vocational and occupational qualification and training programme. The good news here is that the Quality Council for Trades and Occupations has fully accepted this principle. It is currently engaged in a long-term process of redesigning the occupational qualifications for artisan trades and non-artisanal occupations, each of which combines classroom theory and substantial periods of workplace experience in a single, integrated learning programme. How ironic that, even as this important reform is sweeping through the TVET sector, some people are arguing for the removal of WIL from higher education qualifications!

Thirdly, the funding formula for public TVET colleges and the levy-grant system must be restructured. The colleges and the SETAs must be made to sing for their supers. They should not get guaranteed funding from the fiscal regardless of how poorly they have served industry. Instead, like the rest of us, they should be paid strictly for services rendered to the client's satisfaction. The Minister of Higher Education and Training has initiated a far-reaching review, with ample opportunity for industry participation, of the functions and structure of the SETAs after March 2017. At his behest, the Treasury is analysing the cost implications of the various TVET initiatives put forward in the **White Paper**, in search of efficient and effective implementation strategies. Business should seize this rare opportunity to engage with the DHET and the Treasury, and thereby influence these far-reaching decisions.

Finally, the BBBEE codes – specifically Code 400 relating to skills development - must be revised to give more credit to companies for offering more kinds of WIL. Currently, the code is very restrictive, effectively limiting points for skills training to learning programmes approved by SETAs and offered by companies to their own employees. The DHET is pressing the Department of Trade and Industry, which

administers the codes, to give employers credit for providing all sorts of WIL opportunities to college and university students, as well as other support to the public TVET system. But support from business has been disappointingly muted. Again, business leaders do not seem to realize how great the opportunity that lies before them is. Perhaps they feel they have bigger fish to fry. If that is so, they should not blame the government for failing to provide scarce and critical skills in future.

The DHET has called for every workplace to become a training space. That is a noble and economically worthwhile objective. All of us interested in WIL have a part to play in making it a reality.

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## **WORK INTEGRATED LEARNING – A BUSINESS PERSPECTIVE**

### **Presentation to the WIL Africa Conference, November 2015**

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*“The capacity to learn is a gift. The ability to learn is a skill. The willingness to learn is a choice”*

*– Brian Herbert*

Tsogo Sun, Africa’s premier hospitality, gaming and entertainment group, warmly welcomes you. Let us start with an introduction of who we are.

A company of unparalleled variety, footprint and scale, Tsogo Sun is listed on the JSE and proudly encompasses a portfolio of 14 casinos and entertainment destinations, strategically located across nine provinces in South Africa, as well as over 90 hotels in South Africa, Africa, the Seychelles and the Middle East. This includes elegant, individually branded luxury hotels, full service through to select service and properties catering to the budget conscious travellers.

With a vision to provide excellence in hospitality, leisure, gaming and entertainment, our portfolio includes a variety of theatres, cinemas, more than 300 restaurants and bars; and over 250 conference and banqueting facilities, including the internationally and locally renowned Sandton Convention Centre.

Tsogo Sun hotels and resorts are renowned for comfort, service excellence, and characteristic African warmth - it is no surprise we offer some of the best hotels in South Africa and beyond. With more than 90 hotels from which to choose, our guests are able to relax and enjoy the trusted professionalism that has become our hallmark.

Tsogo Sun’s range of widespread hotels and resorts are designed to cater for every need. From Sun1 in the Budget category, through to the Select Service range of hotels, which includes well-known brands like SunSquare, Garden Court, StayEasy, to the Full Service category, encompassing our Southern Sun Hotels and Southern Sun Resorts, which cater for a fully serviced stay, there is a hotel to suit every budget and preference.

For the ultimate in comfort and service, our Luxury resorts and hotels offer an unparalleled experience. From the iconic Beverly Hills in uMhlanga, to 54 on Bath, our guests are always assured of gracious service, attention to every detail and an utterly unforgettable experience. This is what makes us the first choice for students wanting to complete their Work Integrated Learning within the Hospitality and Tourism sector in South Africa.

Before we start; it is important to be mindful that Work Integrated Learning is about learning and not about working. Work is the resource for learning. With this in mind we would like to share with you Tsogo Sun's experience with regards to Work Integrated Learning.

In order to be abreast of cutting edge, global training and development trends and technologies, Tsogo Sun consults widely. Extensive research in the field of learning was conducted by CEB; a global publicly traded, best practice insight and technology company that provides products and services to businesses worldwide. They have established that:

- Less learning = More learning
- Only 20% of learning is actually retained
- 80% of learning happens outside the classroom

To this end, Work Integrated Learning makes sense from an education perspective.

Much is written about Work Integrated Learning from an educators and governance perspective by many bodies locally and across the globe, but very little is available from the perspective of business actually implementing Work Integrated Learning into the workplace. Tsogo Sun has a long history of facilitating the placement of Work Integrated Learning students and has implemented and continues improving on our own strategy that enables the application of this important component of our education system within the requirements of the educators and governance.

Tsogo Sun consistently implements Work Integrated Learning strategy by clarifying and simplifying relationships, roles, responsibilities, processes, procedures, communication and realistic expectations between:

1. The student
2. The educator / provider
3. The employer (Work Integrated Learning administrators, teams, unit manager/management, mentors and employees)
4. Governing bodies

Our vision is to support education in South Africa whilst creating an employment stream and achieving a return on investment. The reason we participate in Work Integrated Learning is to ensure that students are able to complete their qualifications and transition from learning to working, equipped with the necessary skills and knowledge to add value to the industry. At the same time we can grow our employment brand and ensure a consistent recruitment pool.

There is enormous value in Work Integrated Learning in South Africa for all the stakeholders, namely the student, business, educators and government.

We see Work Integrated Learning as a component of a learning programme that focuses on the application of theory in an authentic working context, specifically designed into a learning programme and included in the learning outcomes required for the qualification. Work Integrated Learning develops skills that will assist in employability and also develops the personal skills of the individual.

There are numerous wider benefits of Work Integrated Learning, some of which are:

1. The country reduces unemployment.
2. The individual completes his/her qualification and graduates being more employable and possibly even employed within the company that hosted their Work Integrated Learning.
3. The education provider has a touch point with business where curriculum relevance can be evaluated and tested.
4. The employer has steady access to employable people that are enthusiastic and motivated and have already been exposed to and have performed in our business and corporate culture.

There are also some distinct advantages of Work Integrated Learning to our business. Some important ones are as follows:

The student would have invested time, money and effort in their formal learning at a learning institution by the time they commence their Work Integrated Learning. This means that they have already shown their commitment to their career choices and futures.

The learning during Work Integrated Learning is structured giving business direction on what needs to be covered.



The learning is also a requirement for their qualification and thus the students need to pass to graduate; consequently ensuring a motivated student.

The Work Integrated Learning students are not random employment seekers that have just walked in the door looking for work with no knowledge of our industry, working requirements or corporate culture; they have selected their career. These students are not new to our industry either and have a formal tertiary education. This bodes well for a dedicated and educated future employee.

By taking on Work Integrated Learning students we can identify the best new talent as possible entrants into the workplace. The on-boarding of the Work Integrated Learning students is easier for business and we can use the Work Integrated Learning period as an induction period and assess the students for recruitment. As a result the targeting of future employees that are knowledgeable and skilful in our industry is directed and focused.

There are no off job theory inputs required by the workplace, so the student is able to authentically experience the workplace for an uninterrupted period of time.

From Tsogo Sun's perspective, Work Integrated Learning also presents us with various challenges. There are hundreds of students searching daily for Work Integrated Learning opportunities. This can be taxing on our business as we need to attend to all these requests. Work Integrated Learning needs to be coordinated and well planned. The annual logistics required in order to successfully place up to 1 000 students, from in excess of 16 learning institutions being placed in up to 70 different properties across the country speaks for itself.

It is also of vital importance that the learning environments are appropriate for the students. Tsogo Sun has a long history of placing Work Integrated Learning students and thus we have learned and implemented over and above what is required from an education and governance perspective over a long period of time. We ensure quality of learning that occurs on our properties through the dedication of our teams as well as our close relationships with all the stakeholders.

A property may have up to 12 students from different schools all required to cover different curriculums at the same time. Our staff are committed to paying forward what they have learned during their careers and are able to accommodate these challenges.

Ultimately, whilst we nurture and grow prospective future industry employees, we should not lose sight of our business requirement of a return on our investment including opportunities within the SETA's relating to Discretionary and PIVOTAL grants (professional, vocational, technical and academic) as well as BBBEE benefits.

In order to make Work Integrated Learning work, all the stakeholders (students, educators, employers and government) need to have clear roles and responsibilities governing their relationships with clear processes and procedures that are followed as well as very defined and realistic expectations.

Within the framework of Work Integrated Learning; the students themselves have very distinct responsibilities to their host business. Above all, the students must be professional. They should be professional in their work ethic, attitude and appearance. This means they should take responsibility for their learning by demonstrating their willingness to learn. They must be enthusiastic in accepting challenges and exercise compatibility with our employees and guests. They should be able to accept suggestions or criticism gracefully. They would be required to be available for and participate in all learning and work experience required by the learning institution as well as the business. They would also be required to comply with all our workplace house rules, policies, procedures and hours of work. They would need to take responsibility for completing any timesheets or any written assessment tools supplied by the workplace to record their individual and relevant experience.

The student would be required to take full responsibility for their own accommodation and transport needs during their experiential training period as they would when they were attending lectures at their respective learning institutions. We do endeavor to assist in conjunction with their placement lecturers, by placing the students where possible, at properties where they have better access to accommodation and transport.

As a host workplace, Tsogo Sun will ensure that the students comply with the rules and regulations concerning our business and industry. We are committed to providing the students with appropriate learning experience as prescribed by the learning institutions in our work environment in order to achieve the relevant outcomes. We ensure the provision of appropriate facilities in order to enable student learning in accordance with the workplace component of their chosen qualification. We provide the student with adequate supervision at work and keep up to date records of learning and periodically discuss progress with the student. We do advise the student as well as the learning

institution of the terms and conditions of his or her experiential training as well as our workplace policies and procedures.

The keys to a successful Work Integrated Learning lies in cultivating close partnerships between the students, educators, workplace representatives and government structures. There must be an explicit synergy between business and industry requirements, academic outcomes, student preparation and legislation. The regulatory environment must be conducive to the practice of Work Integrated Learning in order for its benefits to have their full impact and for more South African businesses to buy into the concept of Work Integrated Learning, thus assisting our education system to be more successful in their ultimate goal of a high throughput of young people that are more employable.

It is vitally important for all stakeholders to be cognisant that Work Integrated Learning and employability is a link between learning and working and not the answer to unemployment, and expectations should be managed on all sides.

In conclusion, Work Integrated Learning is an important component of qualifications within the South African education system and context. Tsogo Sun supports this form of learning and will continue to do so as long as it brings value to all the stakeholders. Work Integrated Learning, when used effectively, is a cost effective structured process that facilitates learning and employability within the education system.

We look forward to continuing our support of education in South Africa as well as the unearthing of our future talented employees through Work Integrated Learning.

## Section B

### TRANSDISCIPLINARY WORK INTEGRATED LEARNING PARTNERSHIP MODEL IN SOUTH AFRICAN HIGHER EDUCATION – ON THE ROAD TO SUCCESS

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#### Abstract

South Africa's high unemployment rate makes education, training and skills development a national priority. Academics recognise the imperative to produce qualified, skilled and work-ready graduates. A work integrated learning (WIL) partnership model was developed to fast track student placements into industry and increasing their employability. Successfully implemented with Human Resource Management students, the model is being implemented by Commercial Accounting, with the hope of achieving similar successes. This empirical paper presents a WIL model to encourage academics to embark on transdisciplinary WIL projects with full awareness of the challenges and benefits involved. The South African education landscape and international calls for education-industry-government partnerships provide the context; experiential learning, the theoretical framework. Value is added on three levels. Strategically, to national skills development imperatives; theoretically, the cooperative education and WIL body of knowledge are increased and a practical contribution is made to implementation effectiveness of a revised, working WIL model.

**Keywords:** commercial accounting, higher education, human resource management, industry partnership, skills development, transdisciplinary, work integrated learning

## 1. Introduction

South Africa (SA) celebrated 20 years of democracy in 2014. The country, the 25<sup>th</sup> largest in the world, has a population of close to 52 million people (Statistics SA, 2011), of whom nearly 70% are under the age of 35. The country's high unemployment rate makes education, training and skills development a national priority. A National Development Plan: Vision 2030, guides the government in its endeavor to create 11 million jobs and to reduce the unemployment rate to 6% by 2030 (South Africa, 2011a). It is clear that the education sector has a big role to play in providing an educated and skilled workforce. This forms part of the mandate of higher education institutions as seen in the Higher Education Act (SA, 1997). The post-school education sector specifically, is involved in the development of qualified, skilled and work-ready graduates. One education strategy that is seen to contribute to this is that of experiential education, with its concept of work integrated learning (WIL). Forms of WIL have been part of academic programmes in SA's higher education system since the mining course commenced at the South African College in January 1895 (Lurie, 2002, p.9), although initially known by other terms, such as in-service training and then experiential training / learning. SA's White Paper for Post-School Education and Training states that workplace training and work-integrated learning must be a central part of the training system (SA, 2014). This is the context in which the WIL model was conceptualised. SA's higher education landscape consisted of 25 public higher education institutions in 2014. The University of Johannesburg (UJ) was established on 1 January 2005, as a result of a merger between a traditional university and a Technikon (university of technology/polytechnic) and offers programmes designed to prepare students for the world of work and for global citizenship. The WIL model outlined is evidence of striving to bridge the gap between classroom and the workplace.

A WIL Partnership Model was developed by UJ's Department of Industrial Psychology and People Management (IPPM) to fast-track student placements into industry; facilitate their gaining of relevant work experience and increasing their chances for employment after graduation (Govender & Taylor, 2015). The model was piloted and successfully implemented with Human Resource Management (HRM) students in 2013. This paper describes how the lessons learned from the 2013 and 2014 implementation of the HRM WIL Partnership Model have been used to introduce the model into another faculty and discipline (Commercial Accounting) at the university, with the aim of achieving similar successes.

This empirical paper presents a comparison and reflection on the transdisciplinary approach taken by two departments in different faculties of the same institution, introducing a common WIL model.

Transdisciplinary, for the purposes of this paper, refers to the collaboration of WIL project leaders from different disciplines employing the same WIL model towards the common aim of providing WIL experiences for students. Students participate using this model to complete their WIL in their discipline-specific programmes (as the purpose of WIL was to gain a discipline-specific deepening of knowledge and relevant experience). The paper presents the WIL model as a road already travelled, bypassing identified potholes, as the WIL model was conceptualised, developed and implemented previously. The aim is to encourage academics to embark on transdisciplinary WIL projects with full awareness of the challenges and benefits involved and, more specifically, to share the lessons learned prior to, during and after the process.

The changing South African higher education landscape, the National Development Plan and the international call for education-industry-government partnerships provides the context for this paper. Experiential learning/WIL provides the theoretical framework for the transdisciplinary approach. Recent research indicates that the HRM WIL model contributed to economic and social development for students, higher education and industry partners, elements that are important to ensure a vibrant society, particularly in the SA context.

## **2. Literature review**

The literature was reviewed under these sub-headings: Youth Unemployment in South Africa; WIL in SA Higher Education and the HRM WIL Partnership Model; Skills and Labour Legislation and WIL; and Implementing WIL across disciplines. Included as part of the literature review is an elaboration of aspects that makes this paper relevant in a country where almost 60% of unemployed people have never worked before, the majority of these being youth, and nine out of ten businesses would rather hire someone with experience (Blom, 2015).

### **2.1 Youth Unemployment in South Africa**

Approximately 30 million South Africans are under the age of 35, and of these, 12.5 million were unemployed in 2011: the official unemployment rate is at 25.5% (Statistics SA, 2015). SA's Human Resource Development Strategy (South Africa, 2010a) acknowledges that the complexity of the workplace is growing. This is accelerated by the impact of globalisation on national economies, production and trade, thus requiring greater flexibility and capacity in the workforce. Education and training are clearly key aspects to achieve this. Itin posits that it is becoming increasingly clear that the current education paradigm that guides the educational process "from kindergarten through doctoral programs" is not working (Itin, 1999, p. 97). New approaches and models are thus needed.

In order for SA to develop as a 21st century economy, the gaps in critical skills required for a range of social, economic and education strategies need to be closed. Recent education, training and economic policies have emphasised the need for workplace-based learning: the National Development Plan (South Africa, 2011a) speaks to the massive expansion of the further education and training sector, the increasing need for linkages between post-school education and workplaces and the funding of internships and work experience programmes. Skills shortages contrasted with the high rate of national unemployment are indicative of a mismatch between the supply of and demand for skills. WIL has been identified as one way of closing this gap, with industry and education working together (SA, 2011a).

## **2.2 WIL in SA Higher Education and the HRM WIL Partnership Model**

Experiential learning is the process of making meaning from direct experience. Experiential learning theory has evolved, with John Dewey (1938) attributed to being the ‘father’ of the theory, with other contributors being Kurt Lewin, Donald Schön (1983) and David Kolb (1984). In essence, the theories are based on the premise that learning is enriched by actual doing, and that certain skills are best acquired in an authentic workplace, under guidance and supervision of someone with relevant experience. In South Africa, the publication of the Work-Integrated Learning: Good Practice Guide (CHE, 2011) has popularised the term work integrated learning. The country’s legislative, policy and human resource development documents highlight the need for workplace experience as an aspect of skills development, with industry participation included as a key element of the success of such a model. Despite the numerous advantages of WIL to the various participants (Dressler & Keeling, 2011) there are also some challenges, specifically with the development of industry partnerships (Choy & Delahaye, 2011).

The promulgation of the Higher Education Qualifications Framework (HEQF) in South Africa in 2007 and the Higher Education Qualifications Sub-Framework (HEQSF) in 2013, introduced the term *work integrated learning* or WIL into the Department of Higher Education and Training (DHET) documents, which calls for the involvement of industry partners in WIL implementation. The most recent DHET (2015) document aims to provide a policy framework for what it terms workplace-based learning (WPBL), of which WIL is a part of. While it would be unreasonable to expect a WIL model or a policy such as WPBL to solve unemployment problems, as is indicated in the policy, “the economy is not also creating new employment opportunities; a policy of this nature can considerably improve the transitions from learning to work” (DHET, 2015, p. 2). Policies such as this will raise awareness of the various forms of WIL, thus making it easier to identify partner companies. The sourcing of industry

partners for the 800 Commercial Accounting students was eased by using the existing HRM Partnership Model database as well as involving the government sector skills authorities. The model, being a self-placement model, encouraged students to source their own workplaces, thereby adding to the WIL Industry Partners' database for the institution.

There are many advantages to the WIL Partnership Model (Govender & Taylor, 2015). Advantages for the three key role players include:

- For industry, as partners in the education process, the opportunity is not only to train students, but to increase their company productivity; companies may benefit from skills development legislation, gain mentoring experience, influence academic curricula of higher education institutions and the opportunity to evaluate the students as potential staff members. For universities, as higher education institutions, they benefit by industry involvement in academic programmes and curriculum design; ensuring that these remain updated; that lecturers keep abreast of industry developments and offer the possibility for research opportunities.
- Students, as the main beneficiaries of the WIL Partnership Model, gain relevant work experience; there is the probability of WIL resulting in a job opportunity and the integration of theory with authentic work under the guidance of a supervisor (Taylor & Govender, 2013).

### **2.3 Skills and Labour Legislation and WIL**

National legislation has an impact on the support industry offers for work integrated learning programmes. South Africa's skills legislation makes it attractive for industry to get involved in workplace education. The above clearly indicates the need for education institutions, especially higher education institutions, as providers of academic qualifications; industry (the sector that provides the practical work experience required for qualifications); and government (as the body that promulgates legislation) to work closely together. Cooperation and partnership between the three role players is deemed to be the key to successful human capital development, steering students on the road to successful entry level employment.

South Africa, with its stringent labour laws such as the Labour Relations Act (SA, 1995) and the Basic Conditions of Employment Act (SA, 1997), which protects the rights of workers in the workplace; the Employment Equity Act (SA, 1998a) and the skills development legislation (the Skills Development Act (SA, 1998c) and the Skills Development Levies Act (SA, 1999)) (and their amendments) makes it an imperative for companies to hire the right staff, with ideally the most competent person for the job to be hired. The WIL HRM Partnership Model is seen to offer an advantage here, as WIL students could



be viewed as serving a probation period, and may then be retained after their workplace learning has been completed should they meet the company's needs.

South Africa's National Skills Development Strategy III (2011-2016) was promulgated in January 2011. The strategy aims to ensure skills for productive citizenship for all South Africans. The Skills Development Act and the Skills Development Levies Act (and their amendments) require companies to pay a levy into the Skills Development Fund, part of which companies may recover if they comply with certain conditions. One of these conditions is proof that they have introduced students into their workplaces. Students absorbed into companies for WIL and work opportunities may thus make companies eligible for such skills and tax and students eligible for SETA stipends, bursary and employment opportunities (Taylor & Govender, 2013).

## **2.4 Implementing WIL across disciplines**

WIL is firmly entrenched in the Higher Education Qualifications Sub-Framework (SA, 2013) which calls for the collaboration of institutions of learning and industry partners in WIL implementation. The Oxford English dictionary definitions for the adjectives transdisciplinary, interdisciplinary and cross-disciplinary are aligned and indicate something relating to more than one branch of knowledge. The authors of the paper have taken a transdisciplinary approach in two regards: the model developed for HRM students is transferred and integrated for Commercial Accounting students, thereby allowing members of the team to contribute knowledge and skills, and to collaborate with each other from various disciplines and perspectives: HR, Accounting and Education Management.

## **3. Research method**

### **3.1 Research question/concern**

The phenomenological concern to researchers in this study was: how is the implementation of the HRM WIL Partnership Model across disciplines experienced and made sense of by the management members?

### **3.2 Research design**

The research design is a qualitative focus group method (Silverman, 2010) involving WIL managers collaborating to reflect on their experiences in the implementation of WIL across disciplines. The ontological and epistemological philosophy grounding this research is based on a constructivist (Mackenzie & Knipe, 2006) paradigm, with the researchers who are also participants, investigating and constructing a reality from their experiences as it is lived. Hermeneutic phenomenological

reflection (Van Manen, 1990) involves grasping the essential meaning of a phenomenon that elicits significant knowledge on its behaviour, experiences and outputs (Mackenzie & Knipe, 2006). The research design allowed researchers to extract essential findings that contribute to the management of WIL implementation in higher education, especially across disciplines.

### **3.3 Research participants**

Participants are the researchers who are also WIL managers and project leaders in their department, faculty and/or institution. The three participants are as follows:

- HRM WIL project leader (also a lecturer in HRM Programme).
- Commercial Accounting project leader (also a lecturer in the Commercial Accounting Programme).
- Transdisciplinary WIL project advisor (also the Institutional WIL Coordinator).

### **3.4 Research procedure**

Participants held regular sessions to discuss and reflect on the transdisciplinary implementation of WIL. Sessions documented the shared understanding of the three participants that were captured as management reflections. While the institutional WIL Coordinator linked the two disciplines together, the HRM WIL project leader presented the phases, processes and resources of the HRM WIL Partnership Model to the guest discipline. The guest, Commercial Accounting project leader embraced and implemented the WIL model in his discipline. This paper presents the reflections on the transdisciplinary journey of all three participants; with two of the three participants travelling the WIL road paved previously and hence able to advise the third traveler on how to avoid the WIL model implementation potholes.

### **3.5 Data analysis**

A thematic analysis (Van Manen, 1990) of the reflection focus group session notes allowed the researchers to map the road into three themes of the WIL journey as follows:

- Theme 1: Engineering the WIL road using HRM WIL Partnership Model – reflections of the HRM WIL project leader and institutional WIL coordinator.
- Theme 2: Implementing the WIL model in Commercial Accounting – reflections of the Commercial Accounting project leader.
- Theme 3: Understanding the transdisciplinary journey and avoiding the potholes – reflections of all three participants.

The findings section of this paper presents a narrative of the roadmap of the transdisciplinary WIL implementation journey.

### **3.6 Research contribution**

This research contributes to the body of knowledge, research methodology and practice as follows:

- Theoretically, to WIL management empirical evidence.
- Methodologically, the research design of hermeneutic phenomenological reflection research (Van Manen, 1990) allows researchers to become participants and vice versa; hence constructing new knowledge while researching the experience.
- Practically, outlines the When, What and How of implementing the WIL Partnership Model, thus paving the way for other similar transdisciplinary WIL implementations.

## **4. Research findings**

The focus group sessions revealed that the three participants experienced excitement and trepidation at various phases of the transdisciplinary WIL implementation. While the HRM WIL Partnership Model was effectively implemented in the HRM Programme, transferring the implementation to a different discipline and faculty held opportunities and challenges unique to that discipline. The findings of this reflection research are presented under these sub-headings: Engineering the WIL road using the HRM WIL Partnership Model; Implementing the WIL Model by Commercial Accounting; and Understanding the transdisciplinary WIL journey and avoiding the potholes.

### **4.1 Theme 1. Engineering the WIL road: HRM WIL Partnership Model**

UJ supports a 'learning to be' teaching, learning and assessment philosophy and strategy. This philosophy is embraced by the Faculty of Management in its aim to create graduates who are 'future-fit leaders'. Within the faculty, the department of Industrial Psychology and People Management (IPPM) offers a variety of qualifications in the Human Resources Management (HRM) programme. The HRM WIL Partnership Model was researched and conceptualised for pilot implementation in the HRM Diploma qualification in 2013. The aim was to meet national, sector and institutional imperatives, and an attempt to bridge the gap between theoretical lectures and practical industry experience for the HRM students. The model aimed to ensure that graduates would be equipped with the basic HRM skills, attitudes, values and knowledge for ease of transition into a formal workplace as HR Practitioners and HR Professionals (De Vos, 1998; South Africa, 2007).

The HRM WIL partnership model was implemented in five phases: design, develop and approval phase; preparation phase; implementation phase; evaluation phase; and review phase. Each phase consisted of identified processes (Taylor & Govender, 2013). This model was successfully implemented in 2013 (98 student participants), with a revised version implemented in 2014. An exciting development occurred in 2014: the Faculty of Financial and Economic Sciences (FEFS) requesting support for the introduction of this WIL model into the National Diploma (ND): Commercial Accounting, a first time inclusion of WIL in the Faculty.

Table 1 presents a concise adaptation of the HRM WIL Partnership Model. PsyCAD refers to the psychological, career and academic development division that supports students across all faculties of the institution. POE refers to the Portfolio of Evidence that students are required to complete and submit for assessment on their WIL experience. SWOT refers to the strengths, weaknesses, opportunities and threats that must be reviewed after the WIL project implementation.

**Table 1: A Concise Adaptation of the HRM WIL Partnership Model** (Source: HRM Programme Advisory Committee Presentation - Govender (2015))

<b>HRM WIL PARTNERSHIP MODEL</b>		
<b>PHASE</b>	<b>PROCESS</b>	<b>RESOURCE</b>
<b>Phase 1: Design &amp; approve</b>	WIL model, partners, stakeholders, communicate	WIL Project Team, lecturer, students, business
<b>Phase 2: Prepare</b>	Awareness, information, workshops, agreements	Presentations, documents, PsyCAD, POE
<b>Phase 3: Implement</b>	Placement, indemnity, support, track	Workplaces, managers/mentors
<b>Phase 4: Evaluate</b>	Feedback, recognition	Research, POE assessment
<b>Phase 5: Review</b>	SWOT, improve	Reports, manage risks

## 4.2 Theme 2. Implementing the WIL Model by Commercial Accounting

The Department of Commercial Accounting is one of the four departments in FEFS and the only department in the faculty that exclusively offers diploma qualifications. For 2015, participation in the newly introduced WIL programme was voluntary, with students able to opt not to participate without having an adverse impact on their academic marks. This would allow a database of participating companies to be developed. The main objectives of introducing WIL in the Department were to (i)

have graduates who are not only academically competent but also ready to transition into the professional working environment more easily; (ii) foster closer relationships with companies and other organisations that have a need for the accounting graduates, and (iii) to assist students to be more capable of integrating knowledge.

The first objective is achieved by teaching students additional professional skills that would ease their integration into the workplace: CV writing, interview skills, job-searching skills, business etiquette, personal branding and reputation management, work-readiness and presentation skills. These skills had not previously been offered to students in the Faculty as part of the curriculum. The second objective is addressed by having the department's WIL coordinator, as well as students themselves, approaching organisations for work placement opportunities as part of the WIL programme. To address the last objective, an integrated assignment that all third year students are required to complete was introduced simultaneously with the WIL programme. The assignment integrates the four subject disciplines and is a group assignment where students have to contend with the realities of working in a team.

The department faced a few initial challenges when conceptualising the WIL project. Firstly, WIL had not been implemented in a Financial Accounting or Commercial Accounting discipline at this university, thus there were no established mechanisms and industry relationships to launch the programme. Secondly, the department did not have strong relationships with employer companies that employ the department's diploma graduates. This was despite the fact that the qualifications offered in the department were relevant to industry, and was of a high standard. Lastly, the department had 800 third year students (the intended WIL participants), which was much larger than the population of HRM students that participate in WIL. This had practical challenges in that the logistics for organising classes where additional skills are offered and assisting with the work placement of students become more complex.

The ground work and preparation for introducing WIL began in March 2014, 11 months before the programme was launched. From the onset, it was imperative that the department leveraged off the experience of two key advisors, Susanne Taylor (Academic Development and Support Division) and Cookie Govender (HRM Department), who had previously walked the WIL road and knew what cracks and potholes to look out for on this road. These two advisors had developed, piloted and implemented a fully-fledged WIL model for HRM students and were thus knowledgeable of pitfalls involved in launching such a programme. The months of planning involved numerous consultative

meetings between the Head of Department: Commercial Accounting, the institutional WIL coordinator and the advisors as well as meetings with external stakeholders like the Bank and the Finance SETA, which are sectoral government entities created to foster workplace-learning and skills development in the SA economy.

The advisors forewarned that the wider staff members in the department were expected to initially show resistance to the programme. The anticipated staff resistance was resolved using strong leadership, a determined WIL champion and the undeniable exemplar of the successful implementation of the model in the HRM discipline. The advisors' experience indicated that staff is normally negative towards change (fear of the unknown) and would perceive the WIL programme as an initiative that added extra workload. These concerns were addressed at the department's annual strategic meeting which took place three months before implementation. Furthermore, the advisors were well placed to provide the department with a realistic view of the workload that goes with the WIL project and as a result, the department was able to hire student assistants to support the WIL coordinator with tasks like recording attendance of WIL sessions, recording submission of WIL homework tasks and other related administrative tasks. At the time, the programme had already been sufficiently planned to demonstrate to its feasibility to staff, including potential pitfalls and how these could be circumvented. The advisors also indicated the importance of having appropriate introductory sessions where the programme; its objectives, the manner of its implementation etcetera, are explained to students. These sessions also dealt extensively with the student's role in the process, especially with regards to making an effort to secure a placement opportunity and ensuring that they plan well in advance for transport money and appropriate work attire for their work placement.

The Commercial Accounting discipline also benefitted from the already existing set of WIL documents developed in the HRM model. These documents included letters given to students to present to potential employers when seeking a work placement and questionnaires to be completed by the employer and the student upon completion of the work placement. In addition to this, the list of companies which previously granted work experience to HRM students was also made available as a resource.

#### **4.3 Theme 3. Understanding the transdisciplinary WIL journey and avoiding the potholes**

Frank discussion and continuous reflection on issues encountered with the implementation of the HRM WIL Partnership Model were shared to allow visible ruts in the road that could derail the WIL

project. The most important transdisciplinary lessons learnt included: early involvement of the academic colleagues lecturing in the programme; communication with students from the beginning of the academic year; introduction of the workplace readiness programme in the first term; and to approach the relevant sectoral authorities/SETAs for placement opportunities. The need to differentiate roles – planner, lecturer, and administrator – was highlighted, with the Commercial Accounting department appointing administrative support to manage the large number of students and the participating companies. The need for clear and unambiguous communication may seem obvious, but was emphasised. The documents issued to students and companies were shared and distributed. The aim of this was two-fold: firstly to communicate, but secondly with the intention of developing a standardised set of documents as students from both academic disciplines could potentially complete their WIL at the same company. The need for a project champion, someone who would also take responsibility for any conflict resolution, especially given the large numbers of students involved, was highlighted.

Despite the extensive support and advice from the advisors, Commercial Accounting did encounter challenges of its own in implementing WIL. The first challenge was that a detailed assessment of the workload of students prior to the introduction of the WIL programme was not done. This resulted in students submitting WIL tasks late, not submitting at all or missing WIL sessions. The majority of students indicated that their normal academic workload was large and WIL was seen as an extra burden. This was worsened by the fact that the WIL project was voluntary for the students. Secondly, some students appeared to be more interested in the work placement aspect and in the university letter that helps them when approaching potential employers than in the WIL sessions that teach them critical work readiness skills. The lessons would be considered and factored into the project planning for 2016. The implications for WIL benefits to all stakeholders are as follows: students would be placed in an organisation that is already familiar with the institutional WIL model; staff resistance is lessened and their confidence for WIL implementation is increased; for industry, the recruitment possibility becomes sustainable and external stakeholders such as government SETAs can achieve their skills strategy. Moreover, the implications for the transdisciplinary HRM WIL Partnership Model lies at a strategic level: revealing that there is an urgent need to revisit the existing WIL model and to include a stronger government link, thus ensuring a triple helix partnership of education, industry and government as partners in future WIL model implementation.

## 5. Discussion

This qualitative reflection paper presents the perspectives of three key WIL management members involved in the leadership, management and implementation of WIL in their discipline and/or faculty and/or institution. These reflections, as presented in the findings section, allowed the participants to self-reflect and group-reflect on the concreteness, meaningfulness (epistemology) and the essential nature (ontology) of the lived experience of the phenomenological concern: the experience and purposefulness of WIL implementation in higher education.

From the reflections of the HRM WIL project leader, it seems that implementing the WIL model in the HRM Programme was easier than implementing it in another discipline. Meaning and sense was made to try to understand why it was difficult to implement the same model in another faculty: the answer lies with a 'hands on' versus 'hands off' approach. The understanding also extends to how well the phases and process of the same model was received by the guest discipline and how effectively it was implemented. Hence the nervousness and simultaneous excitement is understood at the initial phases of the model implementation.

The reflections of the Commercial Accounting WIL project leader reveal that due to the vast differences (class size, voluntary, discipline specific knowledge) between the host and guest disciplines, nervousness and concerns were inevitable as the logistical challenges that comprised successful implementation presented themselves. The large class size of the module in which WIL was implemented, the voluntary participation of students in the WIL project, and student complaints of workload increase created new potholes on the WIL road.

The reflections of the institutional WIL Coordinator were that conducting lived research allows researchers to continue learning, adapting and creating new knowledge. While the old potholes on the WIL road were identified and new travelers or road users were alerted as to when to expect them, the new travelers themselves found new ruts in the road that required repairing. This means that new tool kits have to be created to repair both the old and new ruts on the WIL road and the model itself.

Significant to this study is that although new challenges arose during the WIL transdisciplinary implementation, new knowledge was also created in the sharing, learning and transdisciplinary negotiated solutions provided to each challenge. The end result: a model that is being streamlined and that is becoming adaptable to multi-disciplinary WIL student needs, thereby meeting national objectives (DHET, 2015; SA, 2013).



## **6. Future implications**

There are implications of this empirical qualitative paper for several of the WIL stakeholders. . For students, the paper presents the authentic reflection of their WIL project leaders, who are excited about transdisciplinary WIL implementation and who are committed to continued implementation of the model for students' benefit. Academics and support staff in higher education institutions may be more inclined (and encouraged) to introduce such a model in their discipline after reading the reflections of the participating project leaders. Line managers in companies are afforded an opportunity to contribute to skills development, whilst gaining exposure to possible entry level staff. Nationally, the country and Government benefit by such initiatives, which contribute to the national human resource and skills development targets.

## **7. Conclusion**

The Derry and Fischer statement (2005) that learning in the 21<sup>st</sup> Century can no longer be dichotomised into a place and time in scholarly institutions to acquire knowledge and to a place and time in the workplace to acquire knowledge, resonated with the authors. WIL, as an educational strategy, allows students to bridge the learning-work experience gap: the HRM WIL Partnership Model has achieved this. Lessons learned in the implementation of the model in the HRM discipline were shared with the discipline of Commercial Accounting in order to smooth the WIL road for this discipline's milestone: a first programme with a WIL component in the Faculty. Many of the WIL implementation hurdles or 'potholes' could be bypassed. Despite this, some bumps were encountered and new lessons were learned, which will be incorporated into the review cycle of the HRM WIL Partnership Model – and then shared with other parties interested to travel the WIL road using this model. A change management strategy should be incorporated into the WIL planning phase as well as including all triple helix partners would improve the WIL model implemented in this study.

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## **A FUTURE PERSPECTIVE ON WORK INTEGRATED LEARNING FOR SOUTH AFRICAN MINE SURVEYORS**

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### **Abstract**

The defining factor of the National Diploma (Mine Surveying qualification) is considered to be the experiential learning component of one year. It has long been considered that this compulsory one year exposure to the working environment enables the newly qualified Mine Survey diplomat to be of immediate use within the mining industry with very little site induction required to make the student a fully functional member of a production crew. With the introduction of a new Bachelor degree in Mine Surveying, this critical component of the current qualification will no longer form a core component due to a number of legislative and safety concerns. A model that will incorporate most of these requirements is required to replace the current experiential learning model. In order to ensure that all aspects of such a programme are considered, a critical review of current experiential learning practices has been made. A formal Industry liaison meeting of Mine Surveyors from the main mining companies in South Africa was held to discuss and evaluate the current state of Work Integrated Learning for mine surveyors. Questions were posed to these participants and responses noted using a student response system. An analysis of some of the shortcomings identified is used to provide a basis for the design of a new format of Work Integrated Learning in the form of a second level qualification framework to address the critical stage between graduation and professional registration.

**Keywords:** work integrated learning, department of mine surveying,

### **1. Background to the school of mines**

The Department of Mine Surveying at the University of Johannesburg, South Africa, takes pride in the seamless integration of mine surveying students into the mining industry. The Department is recognized in the mining industry for providing a comprehensive work integrated learning component coupled with teaching modules that maintain close ties with technological advances in the field. This is achieved both by individual research and regular industry visits to remain current. The South African

Mining Industry traditionally, has a conservative approach to education and high expectations of graduates entering the industry - requiring capable graduates who are well versed with the mining industry's specific culture.

The course in Mine Surveying has been offered since 1925. In the early days of the Mine surveying course, working men from mines on the Witwatersrand attended a "Sandwich course" that consisted of attending class for two working days' afternoons and a Saturday after completing a normal day's work. The curriculum included Physical training for 1 hour every morning and four workshops (Carpentry, Boilermaking, Electrical or Fitting) of which one had to be attended (Lurie, 2003). The issue of the quality and duration of work experience component was first raised by Munro in 1948, when he commented at the AGM of the Institute that *"...the theory of surveying can be learnt, but the art can only be acquired by long and patient experience,...success is usually associated more with training and judgement of the surveyor than theoretical knowledge,..."*. (Willows-Munro, 1948). By 1967, Lurie appealed to industry to support a full-time course which was finally introduced in 1976, when the first full-time diploma course in Mine Surveying was offered (Lurie, 2003). This course consisted of 18 months of academic work plus 18 months of Work Integrated Learning before graduation.

## **2. The evolution of WIL to its current state**

In the early years of the Mine Surveying programme, Munro suggested a model of practical experience that included *"...12 months in the sampling department, 6 months learner miner, 6 months in the study (mine planning?) Department followed by work in the survey department..."* in order to ensure that the individual obtained the required experience in order to be successful in the academic course as well as in industry (Willows-Munro, 1948). By 1964, Meyer remarked on his concern about the limited knowledge of practical issues of Mine Surveying students when confronted with problems outside the norm, placing the blame for this state of affairs squarely on the shoulders of the mentors who *"...allow unqualified surveyors to teach new men the routine jobs as quickly as possible and then forget about them, until one makes a mistake of course"* (Meyer, 1964).

The Technikon Witwatersrand diploma course model incorporated two years of theory, effectively underpinned by two years of work experience, before the student graduated. During the pre-1994 era, it was common to find that all registering Mine Surveying students would have been placed at a mining company referred to as "Learner Officials". In this era more than 95% of the students were males with English either as a first or second language and who, in most cases, would have completed

two years of compulsory National Service. That would mean that the student would already have been screened medically and physically and reached a certain level of maturity.

### **3. The current WIL model for mine surveyors**

Changes in the qualification model and curriculum changes post 1994 have reduced the requirements to the current model of 2 semesters of WIL and 6 semesters of academic work for the National Diploma in Mineral Surveying. Before 2012, the high demand for mine surveying students ensured that up to 90% of all students would be bursars by the end of the first year of study and not have a problem in placement for the WIL year. Changes in employment legislation and mining rights application have made the selection of students by mining companies more difficult. Currently, mining companies will select candidates for bursaries from specific historically disadvantaged groups and specific geographic communities where the mine is situated.

The activities currently covered in the WIL year (2 semesters) of the Mine Survey student align with the requirements of industry and academia through workplace learning that contains all the components defined by the Council of Higher Education (CHE) as “curricular modalities” for such alignment. These components include Work-directed learning, problem-based learning and project-based learning during the workplace-learning phase of the students’ studies (Council for Higher Education, 2011). Students are required to spend a minimum of one year working at a mine and are expected to provide meaningful work in their time on site. The UJ Work integrated Learning and Service learning policy defines Service Learning as an activity where “...students participate in contextualised, well-structured and organised service activities aimed at addressing identified service needs in a community” (University of Johannesburg Academic Development and Support, 2014). Unfortunately, the most critical component of work integrated learning, namely time to gain the experience, has been eroded over the years to accommodate increasing pressures on both academia and industry.

### **4. Non-core skills evaluated**

The non-core or soft skill outcomes of WIL are often overlooked. A mine surveyor by definition is expected to perform observations and complicated calculations under extreme environmental and risky conditions. Conditions include hot, wet and cramped conditions and extreme noise levels. Focus on the task at hand must be learned fast in order to perform tasks consistently and accurately. In such an environment, determination, resilience and adaptability, combined with the communication skills of a seasoned facilitator, are often required. Aspects such as the operation of moving machinery,

working at heights, moving equipment, rock conditions and heat and noise exposure must receive first priority within Mine Health and Safety Act (MHSA) and corporate Standard Operating Procedures (SOP's). Students learn to communicate verbally, graphically and in writing in such a manner as to comply with MHSA requirements.

The new surveyor is exposed to a mining sub-culture with its own rich heritage of language, behaviour, traditions and belief systems. Students not pre-exposed to this culture, may find themselves dealing with unfamiliar cultures in a completely unfamiliar part of the country. The student will be expected to learn the language of the industry, including the technical jargon and unique descriptions only found in the industry. Most students come from culturally diverse backgrounds. English could in some cases be their third or fourth language and the "mining language" will not conform to anything the student is used to. In order to function effectively and communicate outside the traditional roles and original culture requires the student to put into practice all the managerial and communication skills exposed to at university. On site, the organizational culture will influence every aspect of the student's life: behaviour, dress code, sense of worth, safety protocols and methodologies. During the WIL year, the student will have to become fully computer literate, obtain a driver's license and improve language proficiency.

## **5. Critical outcomes for the WIL phase.**

The following outcomes will have to be met during the WIL year and will contribute to the exit level outcomes required for the qualification. Amongst these outcomes are the following:

1. Solve well-defined to broadly defined problems in Mine Surveying;
2. Analyze and apply theoretical data to solve practical survey problems;
3. Communicate professional work to peers and other disciplines selecting appropriate modes of communication;
4. Perform effectively as a member of a team.

## **6. Analysis of the WIL model by industry representatives**

In order to obtain an industry perspective on the current Work Integrated Programme, an Industry liaison meeting with the managers of the main mining companies in South Africa was held. Representatives from SASOL, BHP Billiton, Anglo American, Impala Platinum, Lonmin Platinum, Anglo Gold Ashanti, the diamond industry, University of South Africa (UNISA) and Private practitioners attended the meeting. The sample of attendees is small, it is a representative sample of all the industries and companies who provide bursaries to Mine Survey students and have graduates in

training programs. In order to stimulate an open conversation, the Interwrite<sup>3</sup> RF Student Response System clickers were used to request anonymous responses on questions posed. A summary of the responses was discussed and recorded as part of the minutes. The purpose of the discussion was to determine the efficiency of the current WIL programme as far as graduate skills are concerned.

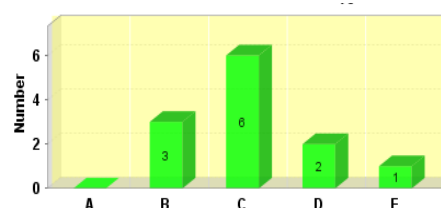
## 7. Strengths of the current WIL model for mine surveyors.

According to the draft guidelines of the UJ Good practice for Work integrated learning “WIL contributes to national objectives regarding skills development and economic growth by providing graduates with a solid academic underpinning in addition to relevant industry experience.” (University of Johannesburg, 2011). The main strength of the current WIL model is that it introduces the student to language and culture of the mining industry. This, in turn, assists the learning process as students can refer to their own practical experience in the industry “on-site” when exposed to new theoretical concepts and terminology. The quality control of the modules provided by the Technical Advisory Committee of the Institute of Mine Surveyors of South Africa ensures that the training remains current and any deviations and shortcomings are identified and corrected immediately. A part of this process is that any shortcomings as a result of poor mentorship are identified and, if necessary, holding the Mentor responsible for corrective action.

The industry liaison representatives were asked to respond to the following questions using the Response System.

Question 1: “Rate the knowledge performance of recent graduates?” The following responses were recorded:

- A. Excellent knowledge of important concepts – 0 Responses
- B. Good grasp of important concepts – 3 Responses
- C. Moderate grasp of important concepts – 6 Responses
- D. Poor grasp of important concepts – 2 Responses
- E. Unsatisfactory grasp of important concepts – 1 Response



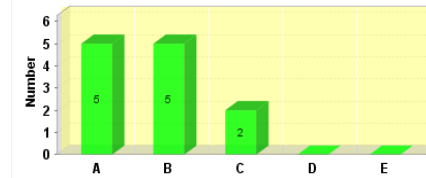
The response from the group was that it is unrealistic to expect a graduate to be competent in all practical aspects of the profession upon graduation.

<sup>3</sup> <http://www.einstruction.com/> Copyright 2002 - 2015 Turning Technologies



Question 2: “Do you feel there is any practical value in the current Work Integrated Learning module?”. The following responses were recorded:

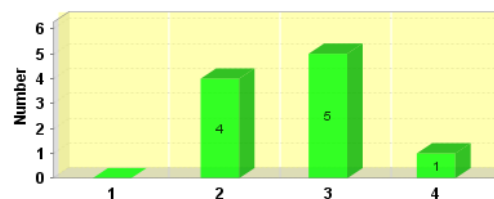
- A. WIL is most definitely a valuable experience – 5 Responses
- B. WIL is a valuable experience – 5 Responses
- C. WIL has some value – 2 Responses
- D. WIL has very little value– 0 Responses
- E. Undecided– 0 Responses



The group response indicated that WIL addresses the experience and internalization of knowledge that ultimately leads to competence, but that it does not need to form part of an academic qualification. One of the representatives commented that, should there be no WIL during the degree course, it will realign industry expectations regarding the work-readiness of graduates to a more realistic expectation that the graduate will require work integrated learning on site.

Question 3: Does the current WIL programme prepare students adequately for the realities of mining?” The following responses were recorded:

- A. Yes, most definitely – 0 Responses
- B. Yes – 4 Responses
- C. Undecided – 5 Responses
- D. No – 1 Responses
- E. No, absolutely not – 0 Responses



Due to the large choice of commodities and types of mining operations that a graduate may eventually end up working in, it was concluded that WIL has a greater impact when applied in the correct context with the theoretical foundation.

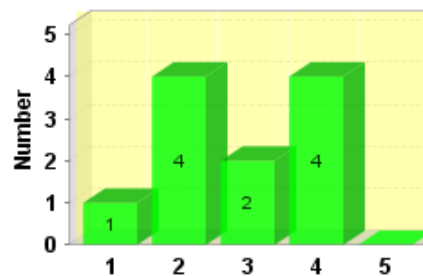
## 8. Weaknesses of the current WIL model for mine surveyors.

A challenge in the WIL process is the effective management of WIL students. Mining sites are located in geographically remote areas, up to 1 200km from the Johannesburg campus. Travelling to these sites and effective monitoring these students are not possible without intervention from the mines by providing the training.

Students must pass a stringent medical examination before being allowed on-site. Students may be declared medically unfit for the occupation they are studying towards and this would negate the possibility of the student completing the qualification.

Question 4: Should prospective student undergo an industrial medical as a pre-requisite entry to the degree? The following responses were recorded:

- A. Yes, most definitely – 1 Response
- B. Yes – 4 Responses
- C. Undecided – 2 Responses
- D. No – 4 Responses
- E. No, absolutely not – 0 Responses



The group response was divided almost equally between the “yes” and “no” responses. The discussion identified that it is not practical to require prospective students to undergo an industrial medical assessment. In the case of bursary students, such a medical may be done, but it would be difficult to obtain the same compliance from non-bursary students.

The WIL year is often seen by students, and training managers alike, as an ideal opportunity for students to re-register for outstanding subjects in which the student was not successful. Considering that it takes between 2 – 4 weeks for a student to complete on-site induction and entry and exit medical examinations prior to beginning the WIL and upon completing the WIL year, the exposure time is reduced to 11 months, including registration and finding of a suitable WIL provider. If leave of any type (family responsibility or sick leave) is not taken, this number may be reduced to 10 or less months. At the entry stage, provided that a suitable site is found, underlying medical conditions such as hearing, sight, lung disease or any chronic disease, may be picked up during the examination phase, which may prevent the student from continuing. Pregnancy will immediately disqualify a student from working on a mine. Physical fitness and heat tolerance have been found in the recent years to exclude more and more students as a result of a more sedentary lifestyle and dietary habits.

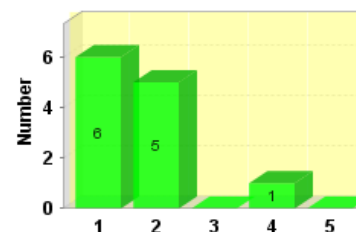
The difficult economic times experienced in the mining industry in the past three years is reflected in the drop-off in bursaries provided by mining companies. As a direct result, placement for WIL training has decreased significantly. The current WIL model is sensitive to risk aversion, Health and Safety issues and industrial action, such as the Marikana incident (The Mail and Guardian, 2014). Temporary mine closures due to seismic events and Department of Mineral Resources (DMR) interventions have been found to affect the availability of WIL sites.

## 9. Entry requirements

In response to the Higher Education Qualification Framework (HEQF), the new suite of Mine Survey qualifications will no longer include WIL during the academic portion of the qualifications. In contrast, it has been proven that industry experience provides students with a critical understanding of the terminology and spatial understanding of the mining environment. Over the last three years, it has been observed that some companies are reverting back to a form of an exposure year or a cadet program (Lloyd & Roos, 2015) in order to increase the success rate of first-time students. In order to understand this apparent contradiction better, the industry liaison panel was asked to comment on the suitability of such a program.

Question 5: “In an ideal situation, should a 1 year “apprenticeship” in industry be a pre-requisite entry to the degree?” The following responses were recorded:

- A. Yes, most definitely – 6 Responses
- B. Yes – 5 Responses
- C. Undecided – 0 Responses
- D. No – 1 Response
- E. No, absolutely not – 0 Responses



According to the panel, this proposal poses significant practical constraints regarding the selection and placement of students. It was observed that placement of graduates is becoming more difficult and that mining companies would be reluctant to accept the risk of investing money in prospective students that may turn out not to be suitable.

## 10. The second level qualification model

In order to register as a Professional Mine Surveyor, the graduate surveyor must complete a prescribed number of years working in industry and write an examination set by the Professional body<sup>4</sup>. The entry requirement for the Government Certificate of Competency examinations is a “letter of sobriety”<sup>5</sup> and an Education and Training Quality Assurance body<sup>6</sup> Level 5 Certificate or a Diploma plus at least 3 Years practical experience in mine surveying in the mining industry of which 1 year must be in the underground workings of a mine. One of the main criticisms of the GCC examination

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<sup>4</sup> PLATO

<sup>5</sup> A letter written by the mentor stating that the candidate is a person of sober habits and can be trusted to fulfill the responsibilities of a Mine Surveyor

<sup>6</sup> Education and Training Quality Assurance body [www.fieta.org.za](http://www.fieta.org.za)

throughput rate is the inadequate preparation of the candidates. Preparation and experience have to be linked. Competency cannot be expected if the candidate has not been exposed to or experienced a specific survey problem and has no grasp of how to apply the techniques to different types of problems. Willows-Munroe remarked on this in 1948 that *“...the theory of surveying can be learnt, but the art can only be acquired by long and patient experience, success is usually associated more with training and judgement of the surveyor than theoretical knowledge,”* (Willows-Munro, 1948).

Currently, a new format of providing a portfolio of evidence related to actual work experience is being investigated. The strategy of this period of post-graduate work integrated learning will be that the candidate will have gained experience in all aspects of the examination syllabus. The completion of a trial survey, which at this stage may be completed after the candidate has successfully completed all examinations, will become part of the pre-requisites for candidacy. It is hoped that this exposure will improve the quality of the candidates' knowledge through experience. A possible adaptation of the Queensland model offers an excellent model of Career Episode Reports<sup>7</sup> (CER) (Surveyors Board Queensland, 2014). This model requires a surveyor who wishes to apply for a mining endorsement regulated by the Surveyor's Act, Section 39 of 2003, to complete an Activity Planning Sheet for each section of Mine Surveying applied for, including opencut<sup>8</sup>, underground coal and underground metalliferous<sup>9</sup> (Survey Board Queensland, 2014). The German “Markscheide (Bergbau)” Candidates are required to spend up to two years in the relevant government department in order to form an understanding of the workings of the mining regulatory requirements before becoming eligible to write the qualifying examinations. Competence must be the culmination of Qualifications, Skills, Knowledge and Experience (Survey Board Queensland, 2014). It is recommended that the competence aspects of the GCC become a separate aspect incorporated into the second level qualification. The knowledge component of the examination can be more adequately examined and evaluated in the formalized education structures that exist, leaving the DMR to evaluate only the Health and Safety and competency aspect of the certification. The question was posed to the Industry Liaison Committee to comment on a proposal that would have candidates complete a portfolio of evidence similar to the Australian and German models before being allowed to write the final GCC examinations.

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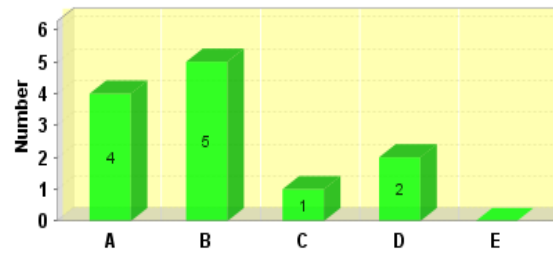
<sup>7</sup> The CER must contain evidence that the work has been done: field notes, calculations, plans and reports and written in the first person: “I carried out, calculated, drew the plan, wrote the report etc.”

<sup>8</sup> Surface or opencast mining methods

<sup>9</sup> Hard rock mining

Question 6: “Do you feel that it will improve the GCC examination pass rate if candidates were to present the trial survey portfolio before being allowed to write the GCC examinations?” The following responses were recorded:

- A. Yes, most definitely valuable – 4 Responses
- B. Yes, valuable – 5 Responses
- C. Undecided – 1 Response
- D. No, it would be of little value – 2 Responses
- E. No, most definitely not – 0 Responses



The value of assimilating theoretical knowledge with the completion of the required portfolio of practical evidence is felt to be a contributing factor to a better throughput rate for the survey examination.

## 11. The way forward

The new legislation, Higher Education Qualification Framework, has made WIL more difficult to be offered by universities, because of the requirements around sourcing placement and the overseeing work within industry due to, amongst others, the implications to health and safety issues. In addition, for professional registration, no credit is given to the WIL component of the studies. How can the student or graduate be adequately equipped to meet the expectations of employers and the DMR? The primary suggestion is the formalization of the second level qualification. This will provide the method in which a mine surveyor can be introduced to the real life conditions of a mining environment. The sense of responsibility, urgency of execution and focus on the task at hand, respect for superiors and team members alike under physically trying conditions, cannot be taught out of a book. The reality of the current South African situation is that, in order to achieve transformation in the demographics of the workforce, as well as improving access to further learning by previously disadvantaged community members, the possibility of a student being afforded the opportunity of an exposure year before starting their studies, is almost non-existent. It is therefore essential that great effort should be made to ensure a rigorous WIL component after the student graduates, but before legal responsibility is assumed. To address the work-readiness of graduates, a formalized 2<sup>nd</sup> stage qualification is suggested. This model will be designed to include detailed evidence of work completed and may include a compulsory period of work in the offices of the DMR. Challenges that will prevail in the future include:

1. What components of the current WIL can be incorporated into the new degree in the form of vocation- or laboratory work?

2. The specifics of second stage qualifications for graduates before being eligible to register as a professional.

The South African Mining Industry demands competent graduates that can be immediately put to work in a production environment with little or no additional training. WIL has been a part of the mining education industry in South Africa as long as the education programme has existed. It is considered an essential part of introducing and familiarizing a student to the culture, language and corporate ethics that a newly graduated person will be exposed to and expected to operate in. In response to stricter MHSA regulations and corporate regulations, potential employers and WIL providers are more reluctant to accommodate students for WIL opportunities. Experience gained by a student during the WIL component of the education must be in a safe, controlled manner; with reduced risk, should things not go according to plan. It is important to expose the student to realistic learning events to make meaning of the theory and lab work that they are exposed to at the university meaningful. Experience and competence require an investment of time and guidance by both student and mentor in order to ensure success. In order to cultivate a full-rounded mine surveyor to the mining industry, WIL must remain a very important component of the “rounding off” of a prospective mine surveying student.

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## MONITORING CHEMICAL ENGINEERING WORKPLACE LEARNING, AN ELEMENT OF INTERNATIONAL ACCREDITATION AND RECOGNITION

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### ABSTRACT

Workplace learning plays a significant part in engineering education. This article aims to contribute to the monitoring of work-integrated learning. The role of the Engineering Council of South Africa as signatory of various international accords and, in particular, the Dublin Accord is considered. The path of engineering education, training and career development is illustrated. Although the structures and ways of engineering education differ substantially internationally, a common range of competencies is expected. In the South African context, the criteria of the Council for Higher Education serve as guidelines. One criterion specifically pertains to monitoring. A qualitative study has been undertaken about the monitoring of the work-integrated learning modules of the National Diploma in Chemical Engineering. Administrative arrangements in the School of Engineering at the University of South Africa serve as backdrop for the study. The results of a purposive sample of 19 participants are presented.

**Keywords:** monitoring; work-based learning; work-integrated learning; work placements; workplace learning

### Literature Review

Whereas Alderman and Milne (2005) observe that work-based learning is now a significant part of numerous higher education qualifications, Todd and Lay (2011, p. 111) assert that “work placements are an essential part of any engineering degree”. Engineering qualifications aim at equipping graduates to apply scientific concepts with the view of developing solutions to actual real-life problems. Brodie and Irving (2008, p. 11) further substantiate that “*Work-based learning (WBL) is undertaken in a wide variety of higher education contexts and is increasingly viewed as a valuable, and increasingly essential, component of both the undergraduate and postgraduate student learning experience. However, the development of rigorous pedagogies to underpin WBL and its assessment is*



*still embryonic*". Through this article, the authors aim at contributing to the growing body of knowledge, by synthesising the contributing factors towards a reliable shared baseline of graduate competencies in engineering education; more specifically, the monitoring of work-integrated learning (WIL) in a chemical engineering programme. It must be noted that the terms 'work-based' and 'work-integrated learning', as well as 'work placements' or 'workplace learning' are used interchangeably.

One of the statutory functions of the Engineering Council of South Africa (ECSA) is the "*setting and auditing of academic standards for purposes of registration through a process of accreditation of engineering programmes*". A webpage, 'Education: Qualifications Recognised', of the ECSA spells out the common need of countries for engineering services. The page further points out that it is increasingly recognised that engineering competencies share a common baseline. Although detailed knowledge and local contexts may vary, the engineering professions, individuals in particular, are highly mobile. In the interest of international common minimum standards and the recognition of one another's qualifications, countries entered into various agreements, such as the *Washington Accord*—1989, the *Sydney Accord*—2001 and the *Dublin Accord*—2002 (Engineering Council, ECSA, International Engineering Alliance, Todd & Lay, 2011). The ECSA participates in benchmarking and monitoring co-signatories to these accords periodically. A new agreement was signed in July 2015 at the IEAM 2015 for International Engineering Technicians (International Engineering Alliance, 2015). This agreement will facilitate the recognition of equivalence at the practising technician level. This means that a person recognised in one country as having reached the agreed international standard of competence would be seen to meet the benchmark standard. Only minimal assessment of local knowledge would be required prior to obtaining registration in another country that is party to the agreement.

Another ECSA webpage, 'About ECSA: What Is ECSA?' states that the ECSA's mandate, as a statutory body, rests with the Engineering Profession Act (No 46 of 2000). Although accountable to government, the engineering profession and the public, ECSA is fully autonomous. ECSA, among others, collaborates in promoting a high level of education, training, and professionalism in the engineering profession, both nationally and internationally. Table 1 portrays the types of South African higher education engineering programmes that are accredited with ECSA, which also enjoy recognition by fellow accord-signatory countries. The qualification-type requirement of the three categories of engineering professionals is indicated. The ECSA document that provides further details is referenced.

**Table 1: ECSA accredited qualification-types and registration categories according to accords**

<b>ECSA require to register as</b>	<b>Qualification type/s</b>	<b>Study duration</b>	<b>Accord</b>	<b>ECSA document reference</b>
Professional Engineer	BEng, BSc(Eng) and Bing	Four years	Washington	E-20-PE, Revision 17, 30 November 2011
Professional Engineering Technologist	BTech	One year (post National Diploma)	Sydney	E-20-PT, Revision 8, 21 November 2012
Professional Engineering Technician	National Diploma	Three years, including two academic and one experiential training	Dublin	E-20-PN, Revision 6, 21 November 2012

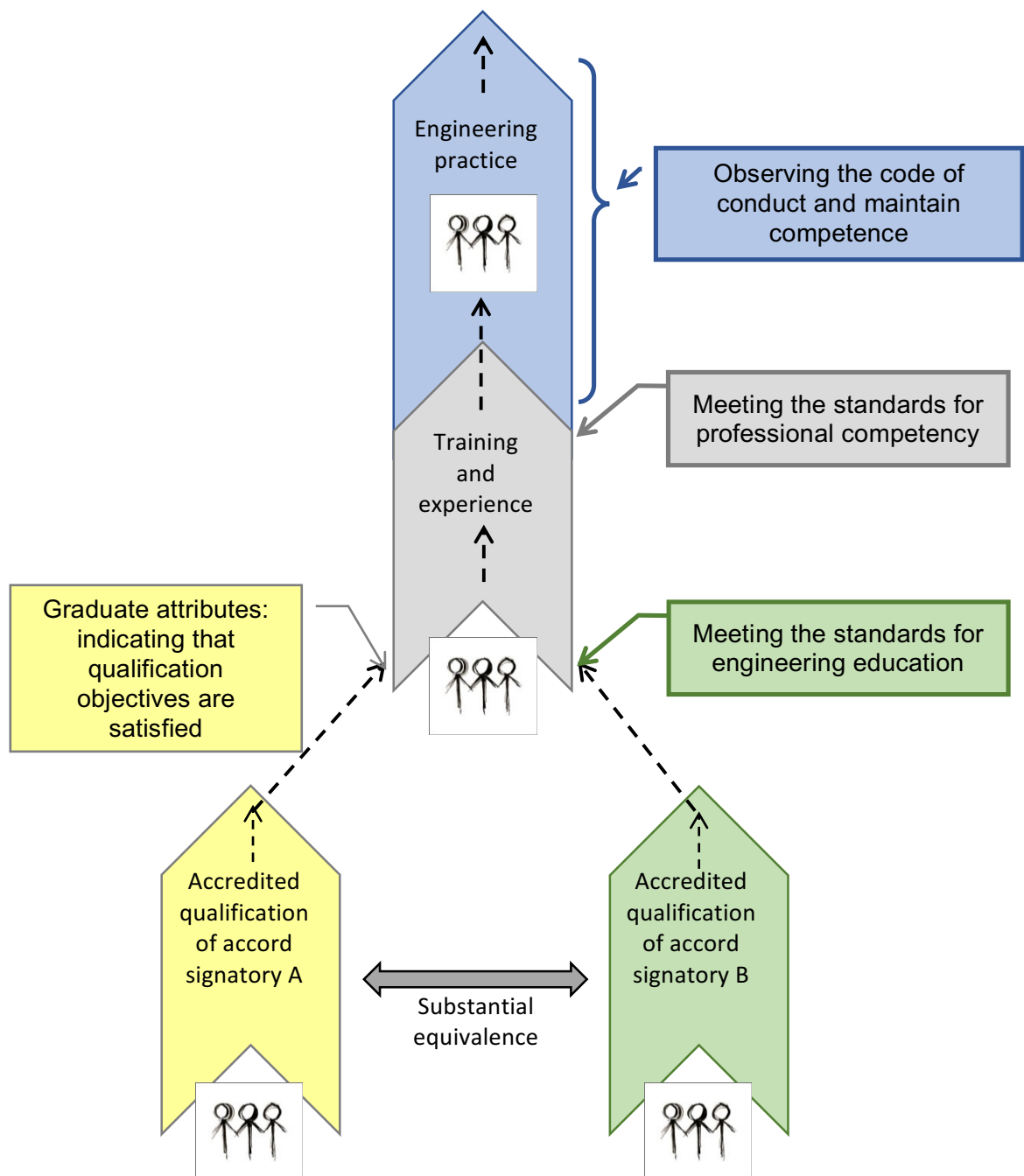
The Dublin Accord is of importance for the purposes of this article. Currently, the Dublin Accord has eight signatories, namely Australia, Canada, Ireland, Korea, New Zealand, South Africa, United Kingdom and the United States (International Engineering Alliance n.d.). It is an agreement that serves the purpose of international recognition of qualifications underpinning the registration of engineering technicians. Just over a decade ago, May 2002, the engineering bodies of four countries entered into an agreement of mutual recognition. The countries were Canada, the Republic of Ireland, South Africa and the United Kingdom.

In order to facilitate the mobility of the three categories of engineering practitioners mentioned in table 1, the three accords are multi-lateral agreements voluntarily entered into by the jurisdictional agencies of countries responsible for accreditation or recognition of tertiary-level engineering qualifications to assist in growing globalisation. The members demonstrate their commitment to the development and recognition of good practice in engineering education by being signatories (IEA, 2012). Admissions of new signatories to the Dublin Accord require two nominators, and a two-thirds majority of current signatories. A prescribed period of four years, during which comprehensive examination is undertaken, is further required. Amendment of the Dublin Accord requires a unanimous agreement of all the signatories; and the amendment of the rules and procedures, a two-thirds majority. A full year notice is required for resignation.

Todd and Lay (2011, 111) indicate that the accords imply that accredited qualifications would “give engineering graduates a range of [expected] competencies”. They continue to remark that “while the majority of competencies can be met by academic coursework and projects, university education tends to be somewhat distant from typical engineering practice and settings”. This, unfortunately, means that students are likely to obtain minimum to no “feel for working in the engineering profession”. Todd and Lay (2011), therefore, argue that gaining “work experience during an engineering degree [or diploma] is important in integrating and embedding knowledge gained at

university with industry". During work-integrated learning, students also get the opportunity to develop many soft skills that are not necessarily taught at university and to acquire a feel for what it is like working in the engineering field. Figure 1 illustrates the education, training and continued professional development paths based on the accords. The two upward chevron-shapes at the bottom of the figure, suggest two qualifications accredited by different signatories to the accord. Both are considered acceptable—because of their substantial equivalence—in preparing graduates for entering formative development, for registration.

Todd and Lay (2011) report that, internationally, the structures of engineering cooperative programmes vary significantly in that some have formalised alternating schedules—called sandwich programmes – whereas others make use of summer-holiday placements. In some instances students work part-time while studying; others have one or more work-terms midway in the programme. Todd and Lay (2011, pp. 118–120) present a best practice case study in which engineering students register in their second year of study for both a pre-placement paper/module/subject and a placement paper. During the third year of study, students register for a post-placement paper and a second placement paper. A resource fee is payable by students for each of the four papers. The pre-placement paper includes CV-writing skills; how to approach interviews; an introduction into reflective practice on experiences; and how to set learning objectives. If students do not succeed in securing a placement, they are refunded with the placement paper fees and may re-register the following year. The post-placement paper focuses on reflective practice and producing portfolios of learning evidence.



**Figure 1: Illustration of the engineering path of education, training and continued professional development** (based on a combination of the International Engineering Alliance, 2011, slides 4 & 9)

Groenewald (2009) points out that in the South African context; the Higher Education Quality Committee (HEQC) is a permanent structure of the Council on Higher Education (CHE). The CHE is an independent statutory body which is responsible for advising the South African Minister of Education about higher education policy matters. The HEQC, led by an executive director, has executive responsibility for quality promotion and quality assurance of all higher education institutions. The CHE published in 2004 two sets of criteria, one for institutional audits and the other for programme accreditation. In 2014 the CHE published guidelines for distance education institutions including

guidelines on how the 2004 general programme accreditation requirements need to be interpreted for various distance education contexts; namely the *Distance Higher Education Programmes in a Digital Era: Programme Accreditation Criteria*, (CHE, 2014, pp. 81-107). It is stated that work-integrated/based learning requires careful planning and support (p. 104) because of the added complexity to design, manage, support and assess to ensure equivalence of experiences across a distributed and diverse body of students. The HEQC's work-based learning criteria, in summary, include:

- Ensuring adequacy of staffing for WBL, and the effectiveness of management and coordination of WBL in terms of criterion 1 (CHE 2004b, 8, ix) and 15 (CHE 2004b, p. 20, 3.2.1.5) for programme accreditation purposes.
- In accordance to criterion 1 (ix, p. 8) and 15 (3.2.1.5, p. 20) for programme accreditation and criteria 7, 8 & 11 for institutional audits, quality with regard to:
  - Promoting the understanding of students about the specific occupation they are being trained for (CHE 2004b, 8, criterion 1[ix]).
  - Students mastering the techniques and skills required for the occupation.
  - WBL forming an integral and essential part of the curriculum (CHE 2004a, pp. 11-12, criterion 8).
  - WBL contributing to achieving the purposes of the programme/qualification (CHE 2004b, pp. 16-17, 3.2.12).
  - The learning contracts/agreements with experiential learning providers are clarifying the objectives and outcomes of WBL, the respective roles and responsibilities (CHE 2004b, 20, 3.2.1.5, criterion 15; CHE 2004a, pp. 10-11, criterion 7; and CHE 2015, p. 104, criterion 15(ii)).
  - Mentoring of each student, which helps students to recognise their strengths and weaknesses; develop their existing and new abilities; and gain work practice knowledge.
  - Regularity and effectiveness of communication between WBL parties.
  - Progress in monitoring and recording systems.
  - Workplace assessment (CHE 2004a, p. 14, criterion 11).

With regard to monitoring and assessing workplace learning, Muscat and Mollicone (2012) report that examinations were traditionally mainly used as method at the University of Malta to gauge the progress and achievements of undergraduate engineering students with regard to their ability to come up with a solution to a given problem while under pressure, which is regarded as an important characteristic of engineering practitioners. However, Muscat and Mollicone (2012, p. 66) recognise

that examinations do not necessarily assess important characteristics such as *“making appropriate assumptions to solve a problem; using a bottom-up approach to problem solving; thinking laterally about a problem; making a connection between the problem in hand and fundamental theories; and the ability to work in groups”*. This is where monitoring students during work-integrated learning by the relevant lecturer and assessment by workplace mentors and supervisors play an important role in the overall evaluation of students’ competence.

Groenewald (2009, pp. 78-79) points out two ends of a continuum regarding the focus of assessment and monitoring, namely competence and capabilities, and that elements from both ends of the spectrum may well be included.

This literature review started with the significance of workplace learning for engineering qualifications. It then portrayed the statutory role of the Engineering Council of South Africa and the international accords to ensure common minimum standards that would enable mobility between signatory countries. The Dublin Accord is of particular importance to engineering technicians. The literature reviews pointed out the differences in the structure of engineering programmes. The South African higher education quality criteria were focussed on and concluded specifically with monitoring. The literature review contextualised the research undertaken. The methodology follows hereafter, then the findings, and a discussion of the results concludes the article.

## **1. Methodology**

Substantial transition has taken place since Tesch (1990, p. 1) remarked that *“there was a time when most researchers believed that the only phenomena that counted in the social sciences were those that could be measured”*. More than two decades later, Chilisa (2012, p. xv) asserts that *“the community of social science researchers is experiencing a struggle as it comes to terms with social justice issues that arise from the research process itself”*.

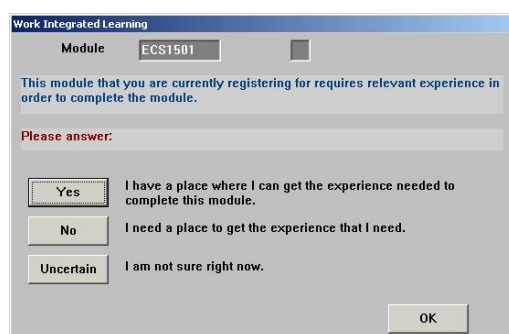
Chilisa (2012, p. 7) cautions that researchers *“have the power to label, name, condemn, describe, or prescribe solutions”*, and attempts to sensitise researchers not to perpetuate self-serving research paradigms. Chilisa (2012, p. 2) describes a paradigm as *“a methodological approach with a philosophical base that informs assumptions about perceptions of reality, what counts as knowledge and ways of knowing and values”*. The impact on the way in which research questions are conceived; the research approaches adopted; the nature of the data gathering instruments; how data analysis and interpretation is done; and also how research findings are disseminated. Chilisa (2012, p. 7 and p. 22), therefore, urges researchers to be *“guided by the four Rs: [relational] accountable responsibility,*

*respectful representation, reciprocal appropriation, and [the] rights and regulations of the researched"* and to adhere to ethical guidelines and protocols. Relational accountability implies the accountability of the researcher that all parts of the research process are related. Respectful representation entails how the researcher creates space for the voices of the researched to emerge; and how the researcher attends and recognises the voices of the researched. Reciprocal appropriation means that both the researched and researcher derive benefits.

## 2. Background and overview

The work-integrated learning modules of the National Diplomas offered by the School of Engineering, in the College of Science, Engineering and Technology (CSET), at the University of South Africa (Unisa) are year modules. Students may start registering near the end of November until 24 December, the previous year and from the first full week in January until the end of February of the year in which they intend doing the module/s. Students may only register for the first work-integrated learning module after having successfully completed ten academic modules (96 credits obtained). Furthermore, they may only register for the second work-integrated learning module if 15 academic modules have been completed. These conditions are applied to ensure that students have acquired an adequate academic frame of reference in order to relate work experience to.

The tendency at South African residential universities of technology (UoTs) and comprehensive universities is to 'label' the academic or 'theoretical' semesters S1 to S4 (or in some cases T1 to T4). Work-integrated learning, in turn, has long been generally known as P1 and P2, for practical semester 1 and 2 respectively. The established term, commonly used in industry, is experiential learning, rather than work-integrated learning, and the term workplace learning is used by Sectoral Education and Training Authorities (SETAs). Higher education uses the term work-integrated learning (WIL) to differentiate from service learning.



**Figure 2: An example of the pop-up that appears when a student wants to register for a work-integrated learning module**

When a student enters the code of a work-integrated learning module ('P1 or P2') for registration, it triggers a pop-up that forms part of the Unisa registration system. Refer to figure 2 for an image of the pop-up and note the three response items. One of the items must be picked for the student to proceed with registration for the module. The data captured—Yes, Uncertain, or No—in this way enables the lecturer to get an overview of the employment or placement of students for the specific module. A sequel report format exists to enable the lecturer to extract the information on demand. The report's column headings include:

- STUDENTNR                      The student's Unisa number
- PLACEMENT                      The response given by the student to the pop-up
- STUDENT                      Student's surname; initials & title
- MODULE                      The relevant module code
- HOME                      Home telephone number on the Student Administration System
- WORK                      Work telephone number on the Student Administration System
- CELL                      Cellphone number on the Student Administration System
- EMAIL\_ADDRESS                      Student's e-mail address on the Student Administration System
- REGION                      Based on postal code, the Unisa regional office allocated to
- ADDRESS\_LINE\_1                      Address captured on the Student Administration System
- ADDRESS\_LINE\_2
- ADDRESS\_LINE\_3
- ADDRESS\_LINE\_4
- POSTAL\_CODE
- D & DISABLEMENT                      Code and description of student's self-disclosed disability

The report mentioned above can be manipulated as required in Microsoft Excel, for example by sorting the responses about placement. The self-disclosed disability columns further enables the lecturer to accommodate the specific needs a student may have.

Unisa is required to furnish the South African Department of Higher Education and Training with evidence that students are indeed active. The institution decided in 2005 that the submission of assignments will serve as a means towards this end. If a student is employed (studying with the view of career advancement) at the time of registration; or if a student acquired a placement with a suitable (and preferably accredited) company to gain the relevant work experience, the student submits the first 'assignment'. This entails confirmation of the organisation, its contact details, and the



qualifications and experience of the mentor. The information submitted is scrutinised by the lecturer, suitability assessed and the data captured.

The lecturer modifies the format of the report mentioned above to capture the core data contained in 'assignment' submitted by students. The modified Microsoft Excel spread sheet serves as the lecturer's management tool. The column headings therefore include:

- Student's surname and initials
- Student number
- Company's name where employed or based for work-integrated learning
- City — important for the lecturer's geographical location purposes
- Telephone number
- Cellphone number
- Mentor's name
- Mentor's Engineering Counsel of South Africa registration
- Assignment 01
- Assignment 02
- Assignment 03
- Student's final submission for assessment
- Date of monitoring visit
- Email address of student

About mid-year, a progress report ('Assignment' 02) is submitted, which ideally must be verified by the workplace mentor. If a student only succeeds in securing a placement by about mid-year, 'Assignment' 01 is submitted and 'Assignment' 02 about three months later. Once 'Assignment' 02 is received, it signals time to monitor the student *in situ* and assess the quality of the work-integrated learning.

By examination time (October – November), 'Assignment' 03 is submitted for assessment which typically includes a file containing the portfolio of 'evidence' of learning, the student's project (where applicable), the learning logbook, and the mentor's report. After assessment, the lecturer adds the student's monitoring report and submits the student's final mark for the module. If a student only acquired a suitable placement well into the year, extension is normally granted and 'Assignment' 03 submitted in about January the following year when the supplementary examinations are written.

### 3. Population

The analysis of data from the registration report and the lecturer's own spread sheet for management is presented in table 2, which is divided into two to represent the data of each module. The reason for the difference in numbers of the two sets of data is because not all students that registered for 2013 submitted assignments. A total number of 88 students registered for one or both work-integrated learning modules. This number represents the total potential population.

**Table 2: The 2013 population of Chemical Engineering WIL module registrations**

Chemical Engineering Practice 1					Chemical Engineering Practice 2				
Placed	Uncertain	Need place	At a company	'No job'	Placed	Uncertain	Need place	At a company	'No job'
57	11	24	60	15	37	11	6	34	—
Total: 92					Total: 48				
Total: 75					Total: 34				

### 4. Preparation

The lecturer approached preparation for monitoring keeping in mind the lessons derived and the guidelines established during a monitoring pilot (Groenewald, 2009, pp. 81-85) and the contemporary qualitative research paradigm. The document (based on Groenewald, 2009, p. 84), which serves as a structured interview schedule (Chilisa, 2012, p. 205; Schurink, 1998, p. 299) used for monitoring, includes:

- Identification details of the student to be monitored
- Identification details of the work-integrated learning site
- Basic details of the workplace mentor
- Documented work-integrated learning experienced by the student concerned
- Student's progress documented over against a checklist
- A summary of the discussion with the workplace mentor (or supervisor) and the lecturer's observations
- A summary of the interview with the student and the lecturer's feedback
- Notes on any observations about developments in the field concerned that might influence future work-integrated learning of the qualification concerned

In order to be sure of the location and routes to the workplaces where students had to be monitored, the lecturer employed Google Maps for GPS coordinates, directions and on route photos. In some cases, specific maps and GPS coordinates were acquired or provided. In one case the lecturer experienced difficulty in finding the organisation because the specific street name was used in both a

residential suburb and the industrial area. In another case, the main route had been closed and the lecturer had to follow a detour.

Many chemical plants have strict safety and/or security protocols. In one case, it resulted in the lecturer being late, because she had to sit through a safety induction first and pass a test prior to be permitted into the plant for the monitoring visit. Security scanning further presented challenges in that only underwear without metal is permitted and documents must be without any staples or clips.

## 5. Results

### 5.1 Sample

The sample could not only be described as purposive, but also as accidental, intensified or targeted. Strydom and De Vos (1998, p. 198) describe purposive sampling as *“based entirely on the judgement of the researcher”*. They further state that such a sample *“is composed of elements which contain the most characteristic, representative or typical attributes of the population”*; a notion supported by Henning, van Rensburg and Smit (2004, p. 71) who qualify it as *“people who fit the criteria of **desirable participants**”*. Chilisa (2012) also clarifies a purposive sample as people identified because of their relevance to the researcher’s area of interest. The lecturer decided to include all the monitoring visits of 2013 in the sample, which is an example of a purposive sampling decision.

According to Strydom and De Vos (1998, p. 198), an accidental sample *“happens to cross the researcher’s path”*, which describes the self-exclusion of potential participants in that the lecturer only intended to visit those students who submitted their second assignment for monitoring. Chilisa (2012, p. 170) qualifies intensified sampling as *“individuals ... selected in which the phenomenon of interest is strongly represented”*, namely students who progressed to make their monitoring visit worthwhile. According to Strydom and De Vos (1998, p. 199), target sampling is a strategy which is purposeful and systematic, whereby *“controlled lists of specified populations within geographical districts are developed”*. Challenges that face the lecturer restricted the sample; in that there are prescribed procedures regarding travelling arrangements at Unisa. Some students did not give sufficient advanced notice in order to arrange for transport; whereas others cancelled at last minute, making alternative travelling arrangement unfeasible.

The documentation of 19 monitoring visits served as sample for this research exercise. Visits were paid to three provinces of South Africa. Two visits to KwaZulu-Natal: one at Jacobs, near Durban, and one at Pietermaritzburg. Two visits to Rustenburg in the North-West province. The remaining 15 visits

required substantial travelling in the Gauteng province. Visits to the north of Gauteng were paid to Pretoria, Samrand and Centurion. Visits to the west of Gauteng were paid to Chamdor and Krugerdorp. Visits to the east of Gauteng were paid to Springs, Boksburg, Kempton Park and Modderfontein. Visits paid to the greater Johannesburg Metropolitan included Bruma, Clayville and Cleveland.

## **5.2 Ethics**

Neither students, nor mentors were informed about the research, because it is believed that informing them might have adversely influenced the results. However, no personal or company identifying data are divulged. The research is restricted to the monitoring visits as such.

## **5.3 Findings**

Henning, van Rensburg and Smit (2004, p. 101) state that *“the true test of a competent qualitative researcher comes in the analysis of the data, a process that requires analytical craftsmanship and the ability to capture understanding of the data”*. The lecturer captured data of each monitoring visit in the monitoring document previously piloted (Groenewald, 2009). The documents were read several times by the authors, spaced over a period of time, which allowed for the data to ‘simmer’. On a specific day the ‘meaning phrases’ of each document were extracted to be considered collectively. Matching meanings, repetitions, related meanings, and so forth were identified, and data were grouped. To remain truthful to the participants their wording captured during monitoring visits was used to produce the narrative of findings.

The workplace mentors had an average of 14 years of experience. According to the University of South Africa Experiential Learning Policy, a mentor “means a suitably qualified, experienced (preferably professionally registered) person at a host organisation who will supervise and mentor the student for the duration of the WIL module”. Two mentors (an employee and a self-employed consultant) had 40 years of experience (the highest); one had 27 years of experience (second highest); another one had four years of experience (the lowest); and there was one who had five years of experience (second lowest); the remainder varied from eight to 10, 2 x 12, 4 x 13 and 1 x 14. There was no indication in respect of two of the mentors. The tutorial letters for the WIL modules specify that the student’s mentor or supervisor must have a background in chemical engineering. According to ECSA requirements, the mentor or supervisor should further be a registered professional engineer/technologist, or should be a registerable mentor (a chemical engineer or technologist with at least three years of industrial experience).

Unfortunately, the monitoring visits of four (4 = 26.6%) students did not allow for interviewing the workplace mentor. In one case, the mentor's sick leave was extended, resulting in the interview only feasible for the mentor. In the third case, the student did not inform the lecturer of a change in the mentor. In the final case, the mentor was called out of the office due to an unexpected event which required attention.

Several mentors used the intensifier 'very' to give expression to their feedback about the student, for example:

- 'Very good', or 'very good attitude towards work' (also 'passionate' and 'committed')
- 'Very happy with the student', and 'really very happy with the student's progress' — lecturer to speak to the supervisor. In another case the mentor worked afternoon shift — and the lecturer got the impression that the student did not realise the importance of interviewing the 'A very good student'
- 'Very helpful and keen to contribute' (and 'adds value to the company')
- 'Very hardworking' (also 'doing a great job' and 'work up to standard')
- 'Very energetic and excited' (and 'always keen to learn')
- 'Very friendly'
- 'Very trustful'
- 'Very accurate and precise'
- One mentor used the intensifier 'too', saying 'the student is sometimes too inquisitive'

Another theme expressed by several mentors is 'growth' of the student, or that the student has 'grown' or 'grown up' or 'grown self'. In one case the mentor remarked that the student was initially very 'bumpy' and shy, but has overcome those and is now a brilliant student. Several students either advanced in the company; and were given the opportunity to study with the company; or acquired expertise since they commenced working for the company. Associated with this theme are comments about having 'gained confidence'; and that maturity is often reflected in commitment and passion. A comment about an older student is that 'she is not one of them', differentiating her from the attitude young students often display. One person has already advanced to deputy director of the company with proven competence and substantial responsibilities.

A third theme related to the commentary of mentors about students is 'keenest to learn'; with comments such as 'asks whenever there is a need for explanation'; 'always asking questions relevant to her work'; 'inquisitive'; and even tenacity—'would not stop until mastery'. A mentor expressed

admiration that the student is willing to work without pay for six months in order to gain the required experience. Another mentor expressed approval of the student's implementation of ideas.

The monitoring visit of four (4 = 26%) students included a chemical plant tour offered by the students. The lecturer had been impressed by the student's plant and/or process knowledge; the detail of explanations; and the demonstrated understanding of the engineering behind the processes. Two students were capable of running the plants on their own. One visit took more than four hours from induction to exit, because of the distance between the units that required a lot of walking, which was exacerbated by the temperature of above 30°Celsius.

One mentor was 'very impressed with the workplace visit by the university' and said 'he wished when he was a student his lecturers came and visited him when he was a student'.

Some students also made use of the intensifier 'very' to give expression to their work-integrated learning, with wording such as 'very good learning experience'; 'very thankful/grateful to the company for providing the opportunity' or allowing him to continue his studies; and 'very happy in this workplace'. Expressions associated with this theme included 'learned a lot', 'excited about the experience', 'happy with the support of mentors and colleagues', and also an expression of 'enjoyment of the work'.

An encouraging theme that emerged is that at least three students acquired permanent positions as a result of their work-integrated learning. A third student, who initially wanted to quit, not only got an increase in salary, but her circumstances changed for the better. The lecturer persuaded the student not to quit when she wanted to.

It transpired, quite interestingly, that two students were serving as mentors; one for a residential student from a university of technology; and the other for full-time students undergoing stints of experience. In both cases the students serving as mentors had several years of experience with the company.

The 'growth'-theme that emerged from mentor feedback, is mirrored by the theme that emerged from feedback from students, namely, 'now understanding theory' and 'understanding the process very well'. One student remarked that he first gained practical experience and then theoretical knowledge. One student revealed that he is piloting a plant to test the improvement of water

treatment; which is quite encouraging.

Unfortunately, the lecturer also picked up less encouraging issues. In one case, the mentor expressed that the student needed to show more initiative about his university studies, although mitigated that the student's work in the plant is good. In this particular case, the lecturer returned the student's submitted portfolios, due to a lack of learning evidence. One company is perceived 'not to be open to take students' and has no internal coordination of work-integrated learning. One student previously worked at another plant where she did not learn much, but fortunately got a better placement. One company was prepared to take students, but only those sponsored the Chemical Industry Education and Training Authority (CHIETA).

One of the mentors expressed an interest in Unisa's master degree programmes in order to further his/her own studies. This is an example of additional benefits derivable by the university as result of monitoring visits conducted in the workplace.

Apart from the few discouraging issues, and the additional benefits gained through the monitoring visits; a number of themes emerged, namely:

- Both mentors and students made use of the intensifier 'very' to convey their feedback
- Mentors observed growth and students reflected on the understanding they acquired
- Most mentors remarked on students who were keen to learn
- There is evidence of personal benefit derived from workplace learning

## **6. Discussion**

Although rigorous pedagogies may not yet exist, the research serves as anecdotal evidence that workplace learning takes place; students experience growth; and students derive career development and/or substantive appointments as a result of their workplace learning performance.

During accreditation visits, the Engineering Council of South Africa (ECSA) accreditation teams review the documentation of the monitoring visits. The documentation includes the checklist of the tasks comprising each of the work-integrated learning modules. In this way, ECSA goes some way towards its role as signatory of the Dublin Accord.

It is recognised that this research is merely an entry into the topics of monitoring and of international accreditation. It is therefore suggested that this research be extended to other engineering disciplines,

as well as repeated in chemical engineering, in order to gather more qualitative data and finding more themes. Thereafter, a questionnaire could be developed and administered for monitoring and hypotheses testing.

Further, the project could be conceived to research some or several criteria espoused about work-integrated learning by the South African Council for Higher Education (CHE).

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**PERSPECTIVES OF EMPLOYERS ON WORK READINESS OF WORK INTEGRATED LEARNING  
STUDENTS: A CASE STUDY OF THE DURBAN UNIVERSITY OF TECHNOLOGY.**

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**Abstract**

The Durban University of Technology is being used as a case study to probe concern of work readiness of Work Integrated Learning (WIL) students. It is interesting to note that this study discovered that 66.67 percent of employers who host students for WIL agree that they are ready to hit the ground running in the workplace. This is opposed by 2.56 percent of employers that indicated that they disagree that WIL students are work ready. The other interesting aspect that was revealed by this study is that employers, in their busy schedule, are eager to support underperforming students by paying more attention to them and giving them more duties to help them find their feet. Moreover, a majority of employers believe that if learners are not afforded with this type of support, this could lead to their failure. Employers also indicated that it is extremely important to formalize the Work preparedness programme to be a credit bearing module.

In this investigation, Co-operative Education Practitioners refer to every person who takes part in the facilitation of WIL e.g. WIL Co-ordinators, Learner Support Practitioners, Co-operative Education lecturers, Placement Officers, University Mentors, Academic Staff.

**Keywords:** Employers; Work Integrated Learning; Work Readiness; Co-operative Education Practitioners

## **1. Introduction and background**

There is a concern that students are inadequately prepared before being placed in industry to do Work Integrated Learning (WIL). Also, the Co-operative Education Practitioners as well as the external partners or employers are not sufficiently supported to drive this challenging work. This may, as a result, have an adverse impact on the students as they would drop out or perform badly on this programme. It must also be noted that these students are from different backgrounds. Some of them are from rural areas where there is scarcity of industries. The opportunity of getting a placement in industry is a very unusual experience to them.

In South African higher education institutions, students are assisted to find experiential learning by their lecturers, supported by university Co-operative Education Units (Tailor, 2011). A similar model is implemented at the University of Waikato in New Zealand. In the Waikato science placement programme, placement co-ordinators secure the placement for the student (Laslett and Zegwaard, 2011). The general model that is utilized by Universities of Technology (UoTs) such as the Durban University of Technology is that students, before completing their course work, would first be required to take part in a Work Preparedness Skills Workshops where they would be taught CV writing skills, work ethics and interview skills by an expert. In most cases, an industry representative would be invited to talk to students about industry expectations. These workshops are compulsory, but at this stage, there is no academic credit. This is done in order to prepare them for the world of work. After having completed this type of student preparation, one has to wonder whether justice has been done to improve the student's work readiness. If cognition is not taken, some students may feel neglected or lose interest and enthusiasm. This may also lead to the collapse of the Co-operative Education practice. This paper looks at the perspectives of employers who employ DUT students for WIL. This would be followed by the processes of placements in industry or programmes where Work Integrated Learning can take place as stipulated in the Higher Education Qualifications Sub-Framework document (Government Gazette No 36003, 2013). Alderman and Milne (2005) stated that the main focus of these workshops is to assist students on the following:

- articulate the knowledge, skills and attributes that they will be taking to the placement
- articulate the knowledge, skills and attributes that they want to develop
- learn strategies for taking control of their own learning and
- gain a greater understanding of their professional responsibilities while on the program

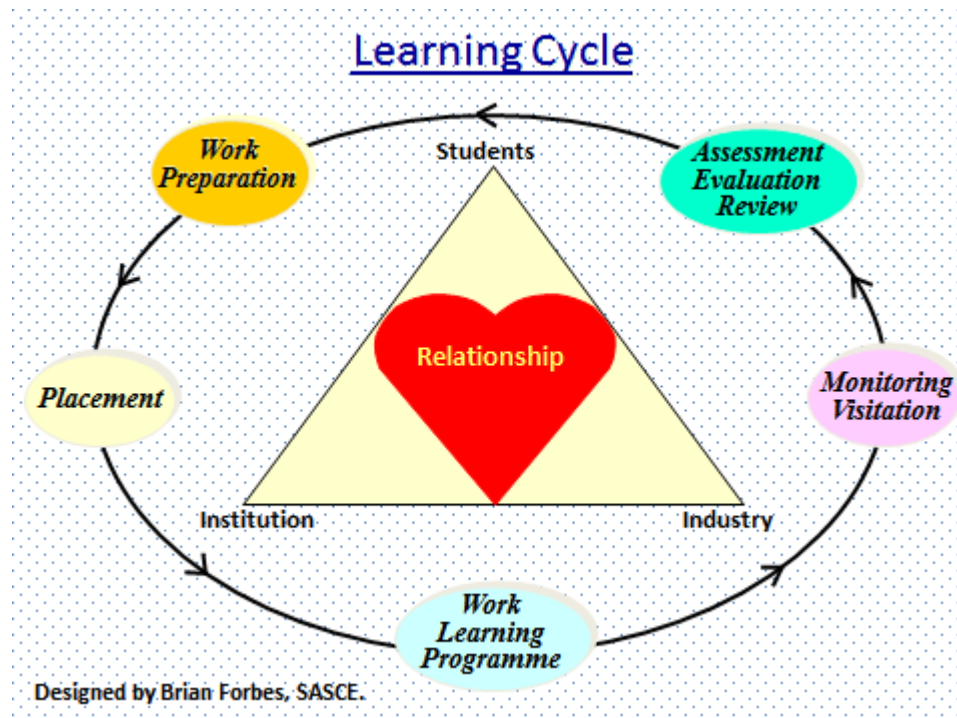
Bartkus and Higgs (2011) reflected in their chapter Research in Co-operative Education that work-education research has gained added respect in the academic and workplace communities. They

further pointed out that in their view, this has arisen from two other sources in addition to scholarly research, namely; (1) student's preference for courses that prepare them for work/practice and (2) the expectations of stakeholders including course accreditation authorities, employers and marketing departments of universities who are likewise interested in work readiness and broader preparation for society as well as work. They believe that research is the only one part of the driving force for the adoption and perceived value of work-education experiences. Also, according to Harvey (2000), there is a growing pressure on higher education to develop the relationship between the academy and employment. The primary purpose of higher education is to prepare students for the world of work. In South Africa, Universities of Technology (UoTs), former Technikons, have always offered programmes in which a learner has to be placed in the relevant programmes to undertake Work Integrated Learning.

Higher education institutions are criticized because they do not offer adequate soft skills, generic skills that one needs to learn across any walk of life (Kruss, 2004). In recent years, some Universities of Technology (UoTs) in South Africa are attempting to address this concern by introducing Work Preparedness programmes and workshops. The Durban University of Technology is in the process of incorporating General Education in all the programmes that are offered (GEG, 2012). Its goals are to help students think critically, develop values, understand traditions, respect diverse cultures and opinions, and most importantly, put that knowledge to use. Students thus develop such attributes as the capacity to cope with daily challenges, master the self and understand their role in the broader context through social interaction. General Education is grounded in the daily life of a person: dealing with supervisors and co-workers, choosing associates, managing the family, and spending leisure time in a socially desirable and personally satisfying way (GEG, 2012). Work Preparedness will be covered as part of the topics in General Education, more importantly; it will bear an academic credit.

The recruitment for placements in industry is done by employers in such a way that it resembles a real life situation. A curriculum vitae based selection would initiate the process, followed by interviews and the placement of the best candidate. This in itself is part of work readiness. The process of WIL placements takes place by following the learning cycle that was designed by Mr Brian Forbes from the Southern African Society for Co-operative Education (SASCE) at the time is shown in Figure 1 below as part of his unpublished work. Work preparation is followed by the actual placement as mentioned earlier on. It should be noted that according to the DUT practice which is also supported by the Higher Education Quality Committee (HEQC), a workplace approval must be conducted at a work site before a student is placed in order to ensure that training requirements are met as stipulated in the student training manual. The Higher Education Act of 1997 assigns responsibility for quality assurance in

higher education in South Africa to the Council on Higher Education (CHE). This responsibility is discharged through its permanent sub-committee, the Higher Education Quality Committee (HEQC). The mandate of the HEQC includes quality promotion, institutional audit and programme accreditation. As part of the task of building an effective national quality assurance system, the HEQC has also included capacity development and training as a critical component of its programme of activities (CHE, 2004). The work learning programme is structured in such a way that a student performs productive work. For instance in some disciplines, especially in Science and Engineering, a student would be required to undertake an investigation that would benefit the host organization. It should also be added here that each student that undertakes WIL at DUT is required to be formally registered at DUT whilst reporting at the workplace. Registration of WIL students offers a variety of protection for both the student and the employer, for instance, registered students are covered by insurance. The Co-operative Education Practitioners would support these students by continuous visitations to ensure that they are registered, monitor the progress and make an input to their work. Hoskyn and Martin (2011) explained that such monitoring and supervision is inherently quite intensive in order to provide students with appropriate mentoring and development of reflective skills. At the end of the training period or (in some cases, this is done throughout the training) the student's work is evaluated and assessed. In some programmes, a debriefing session is hosted in order to discuss the success and the shortcomings of this practice. Campbell and Zegwaard (2011) reported that the role of Co-operative Education and Work Integrated Learning requires support in the form of academic programmes of study, and within work placement briefing and debriefing practices to equip students with a critical sense of mind, desire, and capacity to develop an ethical professional identity.



**Figure 1: Learning cycle of WIL**

Makhitha (2007) explained that well prepared students do not only save the employer money and time but also contribute to overall performance of the organization. 'A co-op program (which is termed as WIL programme in this study) can provide the company with continuous supply of qualified individuals who, because of their experience, are better prepared to assume management responsibilities in the future', this was explained by Braunstein, Loken, Takei and Wang (2011, p. 278) as one of the benefits of co-operative and work integrated education for employers.

According to Du Pre` (2009), WIL is and should always be an integral part of a UoT's education programme to provide students with relevant work experience. This comes as a result of the partnerships and relationships with UoTs and external partners such as Industries, Commerce, Government, Communities as well as Nongovernmental Organizations. Du Pre` (2009) further explains that institutions have realized both the potential and the need for co-operation, partnerships and joint ventures with industry and business, linked to an entrepreneurial approach. These partnerships and relationships between the university and industry are a driving force of the learning cycle that is shown in **Figure 1**. The key objective is to expose the students to actual working environment so that they can become value-added graduates preferred by employers. Gamble, Thompson and Zdenkowski (2007) also support this when they explained that the reasons for the introduction of co-operative education are firstly to provide students with relevant work experience that would enhance their employability upon graduation, and secondly, to foster relationships

between universities and external partners. After having said all of the above, there is a concern that emanates from the industry sector to the effect of the under preparedness of WIL students that undertake placement in their organisations.

Bailey and Major (1998) state that apart from giving access to higher education, work-based learning enables employers to achieve project development which might not otherwise have been undertaken, it gives them access to students who may bring a fresh perspective to bear on problem solving, and presents them with opportunities for partnerships which may prove beneficial in the future. Some employers also see the potential for recruitment through work-based learning. It is not unusual for students to be offered paid vacation work and permanent positions on completion of their studies.

## **2. Methodology**

A literature study was undertaken to find answers to the research questions. The overriding objective was to translate the researcher's information needs into a set of specific questions that the respondents were willing and able to answer. On completion of the literature study, closed-ended questionnaires were developed to extract the required data from all targeted stakeholders. Asner-Self and Schreiber (2011) pointed out that a literature review is a thorough, critical analysis of other's thoughts, theories and research on a particular subject that should eventually lead to the research questions. In terms of the quantitative and qualitative approaches, the investigation was planned to unfold in a number of categories as listed below. The questionnaire consisted of Section 1 (Personal details of the respondent) and Section 2 (Specific to the investigation). Respondents were asked to reflect on their views on the following types of 5-point Likert scales:

- Strongly agree; Agree; Not sure; Disagree; Strongly disagree.
- Extremely important; Important; Not sure; Least important; Not important.

This research employs a Single Case Study (DUT case study) that lends itself to a quantitative analysis. Yin (2009) defines a single case study as 'an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between the phenomenon and context are not clearly evident'. The approach uses questionnaires to gather information that was interpreted by means of a table, a pie and bar charts. The questionnaire was developed by designing questions that are informed by literature. In order to ensure repeatability and reproducibility, some respondents were requested to fill the same questionnaire again after sometime. Also, a telephonic conversation was arranged with some of the respondents who have already filled a questionnaire to go through the same questions to ensure repeatability.



The results are based on responses from targeted population that included different industries that employ DUT students for WIL. The questionnaire was filled by industry representatives who attended workshops, advisory boards as well as events that were hosted by the Co-operative Education Unit at DUT. Data were analysed and converted to percentages as shown on the presented results. This investigation relies on the experiences and opinions of the respondents.

### **3. Key questions:**

- a) Please state your field of expertise and current position.
- b) How long have you been in the current position?
- c) How long have you been an industrial supervisor or involved in the training of students for WIL?
- d) In your opinion. Does the WIL programme contribute positively towards the employability of the student?
- e) Please comment on the work readiness of WIL student immediately after the placement.
- f) In your opinion. Would lack of support for learners contribute to their failure?
- g) How do you deal with the difference of the student's ability in terms of performance at the workplace?
- h) How important is formalizing the work preparedness programme to bear an academic credit?

### **4. Response**

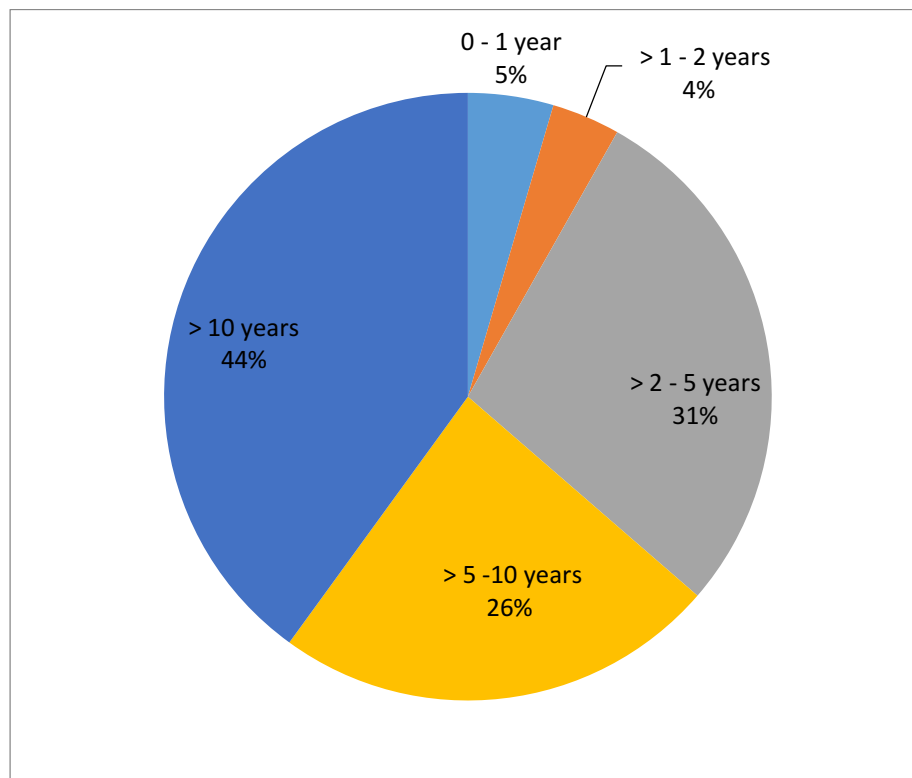
From a total of 108 questionnaires distributed to industry participants, a total of 100 responses were received back (92.6 percent response rate). A high response rate was attributed to the fact that questionnaires were handed-out and collected back at the same event.

The results in table, bar and pie charts are expressed in percentage (Van der Merwe & Viljoen, 2009). Pie and bar charts were used to elaborate important aspects and findings.

### **5. Results and discussion**

It is interesting to note that 53% of the respondents were female whilst 47% were male. According to SENSUS 2011 - South Africa, the ratio between females and males in South Africa is 51 percent versus 49 percent respectively. In order to ensure the collection of quality data, the questionnaire for the respondents from organisations/employers asked them to mark the years of experience on the position they are occupying. It was noted that 44% of the respondents had an experience of over 10

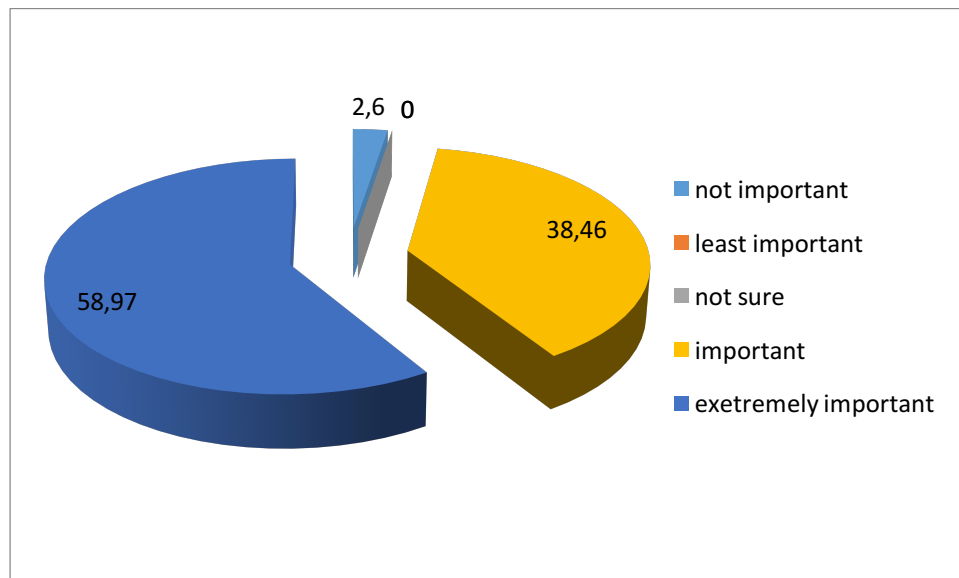
years. This means that these respondents were senior members of staff who could accurately reflect the quality of WIL students and recent graduates as well as the expectations of employers as shown **Figure 2**. This is followed by 31 and 26 percent who had 2 – 5 years and 6 – 10 years experience respectively. These are also fairly senior member of staff in different organisations. Respondents that had 0 – 1 year and over 1 year experience constituted 5 and 4 percent respectively. This means that their opinion did not make a large impact on this investigation.



**Figure 2: Years of experience of respondents from industry**

The work preparedness programme which includes workshops and factory visits is currently not bearing a credit towards any qualification at DUT. However, it is compulsory for a student to attend these workshops. There is no penalty in a case where a student chooses not to take part. It was realized that there was a need to attach a credit to the work preparedness programme. This is aimed at improving students' enthusiasm to take part and as a result improve work readiness. Baker, Caldicott and Spowart (2001) explained that while studying at university, students will have expectations of the industry that they are preparing to enter. They further pointed out that students need to be well prepared for the experience so that disillusionment can be limited or, at least, managed. As part of the questionnaire, respondents were asked to comment on the importance of formalizing the work preparedness programme to bear an academic credit. The results below depict the opinion of 99 respondents. 58.97 percent indicated that it was extremely important for DUT to engage on this exercise as shown in **Figure 3**. This was also supported by 38.46 percent of respondents

who felt that this was important. Only 2.6 percent thought that this idea was not important. Lay and Todd (2011) stated that the challenges in the engineering programmes include finding placements for academically and/or practically challenged students. They further explained that if students are both technically and academically challenged, it is almost impossible to find and recommend them for work experience (and maintain a good relationship with the employer).



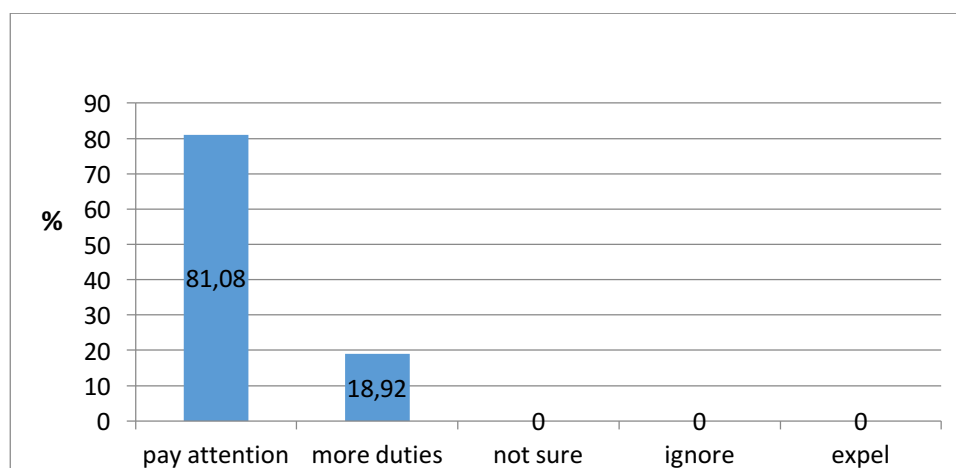
**Figure 3: Formalize work preparedness to be credit bearing**

Ferkins and Fleming (2011) mentioned that in some instances, industry supervisors expect unrealistic outcomes from a student; equally, the opposite can occur where a student is not sufficiently challenged. On the question of readiness of WIL students to perform adequately at work, it was agreed by 66.67 percent that these students were found to be readily prepared as shown in **Table 1**. Only 2.56 percent disagreed. This may be attributed to the fact that some employers recruit students that are misplaced or chosen a wrong career. A small percent of 17.95 was not sure whether WIL students are work ready. In some cases you find that an employer would allocate a student to a supervisor who is still new in its employ. This could also result in this uncertainty.

**Table 1: Important question to enhance work readiness**

%	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
In general, are WIL students adequately prepared to perform at work?	12.82	66.67	17.95	2.56	0
Would the lack of learner support contribute to the student's failure?	47.37	52.63	0	0	0
Does WIL contribute positively towards the student's employability?	28.21	64.10	5.26	2.56	0

Large employers have a tendency of placing more than one WIL student. It does happen in some cases that there is a noticeable difference in the abilities and performance of students, even if they are from the same class. This study also investigated how the employer would handle such differences. **Figure 4** shows that 81.08 percent indicated that they would pay more attention to the underperforming student. This coincides with the large percentage of graduates who indicated that employers or Industrial Supervisors made a positive impact towards their learning during WIL in **Figure 5**. 18.92 percent said they would assign more duties to weak students in order to help them find their feet and gain confidence. It is interesting to find out that no employer said they would ignore or expel such students as shown in **Figure 4**. Hoskyn and Martin (2011) stated that the role of the workplace supervisor is more important (especially where there is a large number of students) as there is a need to brief them to ensure that they are receiving appropriate workplace support.



**Figure 4: Handling differences in student's abilities**

Mentoring is one way of providing support for learners in the workplace (Brennan & Little, 1996). This study revealed that a large percentage of employers suggested that lack of learner support can contribute to student's failure as shown in **Table 1**. However, note should be taken that, as stated by Howison, Lazarus and Oloroso (2011), private sector organizations have the additional pressure to be profitable; for them, students must add value or they will not be considered. Employer commitment to work based learning will clearly help encourage a supportive learning environment (Brennan & Little, 1996). However, commitment alone may not guarantee that the emotional support, practical support and political support is in fact readily available. This suggests that there has to be collaboration between employers and the university in order to design a model the can address these types of support. A number of research reports across different disciplines have identified that employers consider that it is important for graduates to have a broad range of both cognitive and behavioural competencies (Hodges, 2011). It therefore follows that the diversity of skills will be

expected to be deployed by students who are undertaking work placements. Bartkus (2001) emphasizes the importance of students' social skills, that the successful workplace experiences are enhanced when the student is able to communicate effectively in an interpersonal work environment. Barriers to a successful work experience cited by students were a lack of support from the Faculty in their programme and a lack of courses relevant to their jobs (Rowe, 2011). It was also stated in the White Paper (2013) that student support at undergraduate level should be taken seriously as a vital and strategic activity for all universities. This study reveals that a large percentage of employers suggested that lack of learner support can contribute to student's failure as shown in **Table 1**.

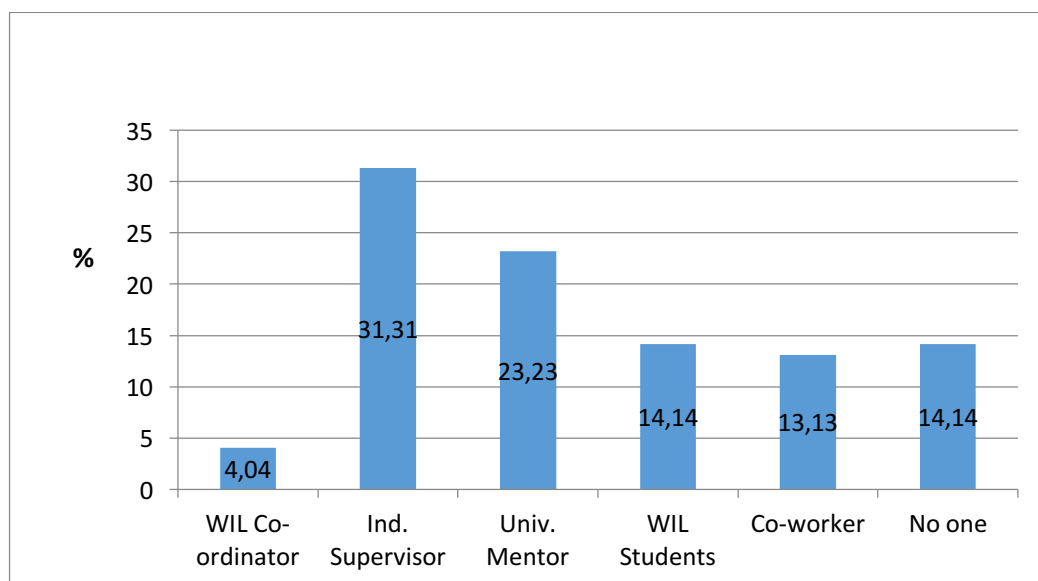
Students value the 'realism' benefits of Co-operative Education/WIL experiences that improve their employability (Crump & Johnsson, 2011). A study of sport industry expectations of key student and graduate competencies indicated that, to maximize the co-operative education experience for students and to enhance employability, academic programmes within the university need to provide opportunities for students to develop competencies including the ability and willingness to learn, the use of initiative and personal organizational skills Ferkins and Fleming (2011). DUT believes that its adoption of the WIL model implementation of the processes thereof, contributes positively towards the employability and hence the marketability of its students when they graduate. 64.10 percent of employers agreed to this as shown in **Table 1**. 2.56 percent disagreed and 5.26 percent is not sure. It should be noted that some of the representatives of employers graduated from traditional universities where WIL is not compulsory; hence they may be immune to this practice. These representatives may be part of the 5.26 percent that is not sure about the fact that WIL does contribute to the student's employability. Ferkins and Fleming (2011) pointed out that many sport and recreation organizations use Co-operative Education and work placement programmes to identify potential employees.

Graduates were asked to identify a person that impacted positively on their learning during their WIL period. They were asked on the questionnaire that was designed for them to select one person out of a choice of the WIL Co-ordinator, Industrial Supervisor, University Mentor, Fellow WIL students and Co-worker (other employees). The highest percent of 31.31 was attributed to the Industrial Supervisors or employers as shown in **Figure 5** below. This is due to the fact WIL students spend the whole training period (which is six months or a one year depending on the requirements of their academic programme) in the care of the employers. As mentioned earlier, Little and Nixon (1995) also recognised workplace supervisors that are in close and continuous contact with learners during the period of work based learning. Therefore, the perspective of employers on work readiness of WIL students is quite significant. It needs to be acknowledged that each student commences their work

placement with different knowledge, skills and experiences (Hodges, 2011). Furthermore, each student will have different career aspirations and professional development needs.

There are 14.14 percent of graduates who indicated that fellow students made a positive impact towards their training. Brennan and Little (1996) pointed out that although students may well have always made use of each other on an informal basis, the interest is now on developing student supported learning in a systematic way. They further explained that within work based learning, there seem to be less reports of student supported learning, where reported, learner support groups seem to be particularly beneficial for those programmes in which learners are primarily based in the workplace.

It is also interesting to realize that 14.14 % of the graduates indicated that there is no one who made a positive impact on them during WIL as shown in **Figure 5**. This could be attributed to the inexperienced supervisors from the employer's side, misplaced students as well as lack of or poor visitations by University Mentors during WIL placements. This was further unpacked as a matter of concern. Going back to the questionnaires, it was found that the majority of the 14.14% of respondents were graduates from the Faculty of Accounting and Informatics in which WIL is not a compulsory module. Furthermore, some of the respondents were old graduates who enrolled during the time when WIL was not a structured module with respect to visits and other forms of student support. Student learning will involve more than skill acquisition and the development of workplace competencies (Hodges, 2011). They will also learn a great deal about themselves, providing an enhanced understanding of their strengths and weaknesses as well as their likes and dislikes.



**Figure 5: Who impacted positively on your learning during WIL?**

## **6. Recommendations**

- This study recognizes the fact that there are students who would be underperforming in the workplace during their training. Therefore an investigation must be undertaken to measure the improvement of weak students after more attention has been paid to them by employers.
- There should be an incentive for the facilitator during the mentorship. This could be around weekends. After a three months period, it is expected that the participant will exit the training sufficiently equipped with knowledge and competencies.
- The skills programme can also be used to enhance the quality, competencies and personality traits of learner support facilitators.

## **7. Conclusions**

It is documented in literature that in some instances, industry supervisors expect unrealistic outcomes from students; equally, the opposite can occur where a student is not sufficiently challenged by the assignment or work that they are required to perform. According to the opinion of the employers, WIL students are adequately prepared to enter the world of work after having gone through the work preparedness programme. In some international institutions such as the University of Waikato in New Zealand, a student is required to enrol for a pre-placement paper at second year level. It is recommended that DUT and other UoTs in South Africa should formalize the work preparedness programme and offer it as a credit bearing module. This would encourage students to take it seriously and attend its classes regularly.

A larger percent of employers in this study indicated that the lack of learner support may have negative impact on the success of WIL students. Therefore, learner support mechanisms such as the visits by university mentors, coaching and monitoring should be improved. However, this must be done carefully to ensure that it does not lead to spoon feeding the student as this may have a negative effect on them after the training. It was also pointed out in literature that during Co-operative Education/WIL students' anxiety increases when there are no clear expectations, when the student's role is not clearly articulated, and where there is a poor or no integration of the practice back to the previously learned theory

Literature also recognizes the fact that students value the 'realism' benefits of Co-operative Education/WIL experiences that improve their employability. A study of sport industry expectations of key student and graduate competencies indicated that, to maximize the co-operative education

experience for students and to enhance employability, academic programmes within the university need to provide opportunities for students to develop competencies including the ability and willingness to learn as well as the use of initiative and personal organizational skills. Based on the response of the employers who took part on this study, WIL does improve the employability and the marketability of students who have undertaken it. Therefore, attempts to minimize it or removing it from the curriculum must be discouraged. Also, industrial supervisors were singled out by graduates to have had a positive impact on their learning during WIL. This suggests that they must be properly supported in terms of capacity building in order to boost their confidence in the work that they do. This can be achieved by offering short courses and hosting workshops to train them and improve their skills.

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# WORK INTEGRATED LEARNING MODELS OF SELECTED COUNTRIES VERSUS SOUTH AFRICAN PRACTICES

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## Abstract

Work integrated learning (WIL) is gaining prominence as a fundamental part of the curriculum for professional development of graduates. Graduates denied WIL are less attractive to employers, hence the growing unemployment worldwide. Although work-based learning comes in different forms, the primary objective is the same, i.e. to bridge the traditional gap between theory of the lecture room and practice of the workplace. The student gains a combination of academic competence as well as operational competence, thus gaining both hard and soft skills required at work. Work-ready graduates are sought after by employers. The models of work based learning in use elsewhere, as suggested in the literature, are compared with the work-integrated learning as practiced in South Africa. The WIL applied to the National Diploma in Engineering Metallurgy at the University is used as a reference point. Literature recommends that a professional body be established to oversee the professional development of graduates. In South Africa the Engineering Council assumes this role. The timing and duration of work-based learning varies in different models. In South Africa WIL is divided into Practical 1 and Practical 2 (P1 and P2), each with a minimum of 18 weeks. However, the norm is that P1 and P2 run in tandem for six months each. In terms of timing, industry prefers students that have completed the theoretical modules to avoid interruption in the WIL schedule. The South African government plays a pivotal role in offering financial support to students during WIL.

**Keywords:** commercial accounting, higher education, human resource management, industry partnership, skills development, transdisciplinary, work integrated learning

## 1. Introduction

This paper reviews some models of work integrated learning (WIL) in comparison with practices for the qualification of national diploma in South Africa with best practices applied in other countries. Work-based learning, often known as experiential learning in South Africa, is recognised as pivotal to

the acquisition of the national diploma. The adequacy and shortcomings of the current practice will be assessed using global models.

Patrick et al (2008) define work integrated learning (WIL) as “an umbrella term used for a range of approaches and strategies that integrate theory with the practice of work within a purposefully designed curriculum.” Work placement forges “a nexus between theory and practice” (Van Hattum-Janssen & Mesquita, 2011). This allows an undergraduate student to transition between the present academic theory and professional future (Martin & Hughes, 2009). In the Australian higher education system, WIL broadly refers to on-campus and workplace learning activities and experiences that link academic theory with real-life work practice through work placements supervised by industry and higher education (Bates, 2011). In South Africa, Geertsema, Hendrick and Groenewald (2010) define work integrated learning as a process of placing students in the workplace for hands-on experience. A workplace activity is linked to the formal academic programme for purposes of gaining first-hand experience. The process must allow for abstract conceptualisation, experimentation, real and concrete experience and reflective observation. This is typically done in terms of a log book with supervision by a workplace mentor. Students apply their knowledge gained and by doing and experiencing the daily routines. Fernandes et al. (2014, p.63) contend that students must “feel the importance of what they learn and understand how and why Chemistry, Maths, or any other subject is important for their future work as engineers”.

According to the University of South Africa (2010), the focus of work integrated learning is to make theory relevant to the work environment. This would socialise students into the workplace environment and thus developing appropriate competences. WIL thus aims to bridge the chasm that traditionally exists between theory and practice. The student is not employable until he or she has been socialised enough at the workplace to acquire some hands-on practical work experience. Laboratory-based activities are still part of the theory tuition (Geertsema et al., 2010). The laboratory work is general, and falls short in the quest to develop specific competence levels, knowledge, skills and attitudes acquired at work. Only the real workplace within a formal organisational structure can create whole individuals with a combination of interpersonal attributes and technical skills under the supervision of university staff and industry mentors, according to Geertsema et al. (2010).

In the conventional setting, the primary focus in a university is to “get the exams passed” at the end of a period specified for the curriculum. This approach is in essence passive and reproductive. Much of the supposed learning ‘goes to waste’ (Collin & Tynjälä, 2003). The academic instruction and

qualifications appear fragmented to the extent that students sometimes fail to find relevance of some theoretical constructs for practical use. In most cases, lectures and work place practice come as separate batches separated by a period, such that by the time a student enters the work station, either memory fails or the lecture room theory does not appear to be immediately relevant for practical use. The link between theory and practice is not quite obvious from lectures alone. The dissonance between theory and practice lies in the compartmentalisation of “academic competence” and “operational competence”, which were defined by Bravenboer and Lester (2016), quoting Barnett (1994). In a competitive job market, the employers’ quest for employable graduates who would ‘hit the ground running’, as it were, is ever compelling. Employability in this case is “work readiness” of the new graduate as determined by the level of skills, knowledge, attitudes and commercial understanding that will enable the new graduate to make productive contributions to organisational objectives soon after commencing employment” (Mason et al., 2009, p. 1). A suitable candidate for the workplace carries technical and interpersonal skills, as well as attitudes and demeanour required by potential employers (Bridgstock, 2009).

According to the Higher Education Quality Committee (HEQC) of South Africa, WIL as the component of a learning programme that focuses on the application of learning in an authentic learning workplace context under the supervision and/or mentorship of a person/s representing the workplace. It addresses specific competencies identified for the acquisition of a qualification that makes the learner employable and assists in the development of related personal attributes (HEQC 2004). The fundamental aim of work integrated learning is to make the graduate employable or skilled for self-employment and hence able to contribute to the national economy. There is little value in having academically qualified citizens who are unemployed. Apart from swelling the social benefit budget, unemployed graduates develop an underlying sense of worthlessness, which potentially breeds social unrest. Therefore, the education system must nurture a populace that adds to the economy and not merely deplete it.

There is need to design a university curriculum that can solve the problems of industry. The “inert knowledge” acquired in traditional educational settings must link with real life contexts (Collin & Tynjälä, 2003). WIL is thus necessary to make education user-friendly for industry (MOHE, 2012). Employability, according to Finch et al. (2013, p. 3), is “the ability to secure first job”, maintain employment or gain promotion and ability to secure new employment elsewhere. An educational curriculum can only be relevant if it supports the current industrial practices (Poropat, 2011).

## **2. Transferable skills from work based learning**

Transferable skills are important for employment of graduates but cannot be easily learned or quantitatively measured (Lim, 2014). Transferable skills are intangible attributes that need continuous reawakening from time to time (Crisp, 2012). McQuaid and Lindsay (2005), quoted by Lim (2014), identify three levels that include:

- Basic skills of literacy, writing, verbal expression and numeracy,
- Key skills relating to reasoning, problem solving, adaptability, team working and
- High level skills such as business acumen and continuous learning ability.

These attributes can be gained during WIL placement in industry. Knight (2007) also suggests that WIL develops emotional intelligence, group work, listening and assimilating, oral communication, professional knowledge, relationship with clients and engenders confidence and effectiveness (Lim, 2014, p. 150). The complex challenges of the workplace demand ethical values of professionalism and reliability as well as emotional strength to contend with pressure of work and cope with uncertainty (Andrews & Higson, 2008). Students can only acquire these through exposure to WIL; otherwise university lectures on their own cannot impart these competences.

In Malaysia, multinational corporations have sought to develop skills that are transferable through work-based learning. Such vital skills include critical thinking, analytical thinking, logical thinking, efficient use of information, structured and systems thinking, writing skills, “packaging” skills, creativity/new ideas/originality, making informed judgement and self-reflection. Some of these characteristics are qualitative and it is not known how they could be accurately measured or objectively used to compare employees.

## **3. Comparative analysis**

The work integrated learning in South Africa is compared with work-based learning practices as reviewed in the literature. The model of WIL at the National Diploma in Engineering Metallurgy at the University of Johannesburg is used as the reference point. The criteria set by the Engineering Council of South Africa (ECSA) and objectives of the Higher Education Quality Committee pertaining to work integrated learning are the basis for the comparative analysis. The procedure of present investigation involves juxtaposing the models of work-based learning in the literature with work-based learning employed by South African universities. Secondary data is drawn from documentation and general sentiments expressed by some stakeholders of WIL. The bulk of relevant information was drawn from existing secondary data on areas that include:

- Monitoring the development of transferable skills
- Timing and duration of work integrated learning
- Responsibilities of WIL stakeholders
- Student stipend during work integrated learning
- Outcomes of work integrated learning

#### **4. Monitoring professional development of transferable skills**

Given that work places are varied and diverse, it is necessary to standardise the content of work-based learning for students vying for the same qualification. Bravenboer (2016) contends that it is necessary to have a professional body with the responsibility of validating academic qualifications to ensure appropriateness for the workforce. In the USA, criteria for professional qualification are set by the Accreditation Board for Engineering and Technology (ABET, 2009) whose responsibility is to authenticate all American engineering degree programmes. Students are expected to develop skills in areas such as project management, leadership, collaboration and teamwork in preparation for the professional world (Van Hattum-Janssen & Mesquita, 2011). In Malaysia, the Malaysian Engineering Accreditation Council accredits engineering courses for professional proficiency and in the United Kingdom; the UK Engineering Council is the overall arbiter, although the responsibility may be mandated to sub-units of specific engineering functions, e.g. National Occupational Standards (Bravenboer, 2016). Professional recognition gives confidence in the credibility of qualifications attained by graduates.

In South Africa, the Engineering Council of South Africa (ECSA) is responsible for accrediting engineering curricula of universities. The career development of engineering in South Africa is assessed through criteria defined as ECSA exit level outcomes, which must be fulfilled at culmination of a period of study. All final year modules, including work integrated learning at the end of a programme, have defined exit level outcomes (ELOs) that must be fulfilled as a precondition for graduation. However, these ELOs are not universally applicable. The department offering the study programme has the mandate to choose appropriate ELOs for which ECSA needs objective evidence of how each criterion was met. The transferable skills acquired during only one year of work integrated learning may not be as comprehensive as discussed in the literature. However, the ELOs initiate the process of soft and hard skills development that will continue for the whole working life as observed by Crisp (2012).



## **5. Timing and duration of work integrated learning**

In Europe, higher education institutions have introduced a number of changes in curricula under the auspices of the Bologna process (Heitmann, 2005). New teaching and assessment methodologies have been adopted for purposes of improving student motivation to achieve not only technical competencies, but also the development of “transversal competencies” (Fernandes et al., 2014, p.55). Smith et al. (2005) referred to these innovations as “pedagogies of engagement” where students learn by doing the tasks relevant to a specific subject. WIL engenders meaningful learning that leads to critical thinking, autonomy and development of other higher-level skills (Van Hattum-Janssen & Mesquita, 2011). These are essential human qualities and abilities required in the twenty first century (Fernandes et al., 2014).

The mid-degree year out at work is used as usual practice in many countries. In the 1960s, many undergraduate programmes, particularly in Great Britain (Van Hattum-Janssen & Mesquita, 2011), had a period initiating students into the world of work through experiential work. At the University of New South Wales in Australia, the Bachelor of Planning is the only undergraduate planning degree available in Sydney. It includes a one year of full-time paid mid-degree placement in the public or private sector. Having to spend one year of mid-degree employment effectively extends the duration of the degree from four years to five years, which in some cases is considered a disincentive. Most Australian universities are now integrating a work-based year where students can take a year off from academic studies to work in a related industry. The National Association of Graduate Careers Advisory Services (NAGCAS) of Australia reports that engineering students are commonly required to have a minimum of 12 weeks industrial experience over the course of their degree programme (NAGCAS, 2009).

In Nigeria, the Students Industrial Work Experience Scheme (SIWES) was a government initiative for skills development in agriculture, engineering, technology, environmental science, medical sciences, and pure and applied sciences. As part of SIWES, students spend four months in polytechnics at the end of ND I, four months in College of Education at the end of NCE II and six months in the Universities (Information and Guideline for SIWES, 2002). However, the SIWES format in the Nigerian model does not clearly indicate the place of industrial training. Estate management students at Obafemi Awolowo University undergo industrial training for three months in part three and six month in part four of university (Oladokun & Ayodele, 2014). Students in the School of Applied Sciences at Nuhu Mamalli Polytechnic in Zaria, Nigeria, felt that the skills acquired from SIWES are inadequate because of the brevity of the industrial training programme and antiquated facilities (Olugbenga, 2009).

The Malaysian Engineering Accreditation Council (MEAC) stipulates a minimum of two months industrial training for students to obtain the council accredited bachelor's degree in engineering (Engineering Programme Accreditation Manual, 2007). The Universiti Teknologi PETRONAS has gone beyond the MEAC minimum duration and has extended the undergraduate students internship to a compulsory eight months in the second semester of third year before they can obtain their four-year degree. If the industrial internship is well structured, the students would benefit from the extended hands-on experience as suggested by Van Hattum-Janssen and Mesquita (2011).

The work-based learning models in the reviewed countries come in various forms and varying durations, probably determined by what developers of the educational curriculum deem to be adequate industrial exposure for "work-readiness". In South Africa, the current practice makes it mandatory for students on a national diploma programme to undergo a minimum of 18 weeks industrial experience split into equal periods of Practice (P1) and Practice 2 (P2). The common practice however is six months for P1 followed by six month of P2. The end of each is marked by a comprehensive report that is assessed by the industrial mentor and the university WIL coordinator.

The Engineering Council of South Africa ideally prefers that the industrial mentor, also referred to as supervisor, be a registered professional engineer or technologist in order that as a certified professional mentor may be in a position give sufficient guidance in the professional development of the student. Without professional registration, the supervisor may lack the skills to guide the student accordingly. The mentor's academic qualifications and experience have to be shown in the logbook as documentary evidence of suitability of the mentor to guide the student into the work environment. In the P1 report, the student demonstrates that in the first six months of industrial placement, he or she has acclimatised to the workplace, understood the business line of the host company and has become familiar with the major engineering processes of the company. The P2 on the other hand requires that the student demonstrates proficiency in the application of engineering concepts. The P2 report therefore is a collection of investigative projects of an engineering nature. A project according to Jackson (2015 p. 11) "brings the realities of the corporate setting, professional ideology and the multi-faceted nature of targeted occupations which they are unable to glean purely from textbook learning". Thus as Collin and Tynjälä (2003) report, WIL transforms students' explicit "book knowledge" into implicit knowledge for problem solving.

In terms of timing, work integrated learning in South Africa has to take place within the three year period of the national diploma after the first year of university instruction. In the first year, the student

is still grappling with basic “service” courses such as Mathematics, Physics and Chemistry. By the second year, the student has reasonable grasp of the relevant subject matter and considerable theory to take to the workplace. Most students were asked when they would want to go through WIL preferred a period between S3 and S4 for several reasons, namely:

- The work exposure assists in demystifying the technical jargon used in lectures.
- A step back from the onslaught of lectures is a welcome break for some students.
- The stipend is an attraction for most students who may not have any form of financial support.
- Work integrated coming early gives the student opportunity to either reevaluate his or her career choice or come to terms with it.

For other students, early WIL breaks the momentum of university instruction making it difficult to pick up the tempo after some months away from the lecture room. The employers of late, have been increasingly preferring students who have successfully completed all theoretical modules so that, first, WIL is not interrupted by students having to leave work to go and finish outstanding modules. Second, it is easier to plan work for permanently present than one who comes and goes. Third, an unbroken period of WIL is often a smooth transition from student to worker. Employers tend not to like students that take breaks to attend lectures. The prospects of employment for such a student, particularly one that has to repeat modules, are not as good as for those of a student who is ready for the full stretch of work integrated learning.

## **6. Responsibilities of work integrated learning stakeholders**

Martin and Hughes (2009) identified four key role players positioned for maximising the WIL experience as follows:

- Programme administrators
- Learners themselves
- Academic supervisors
- Workplace supervisors

Programme administrators have the duty to incorporate WIL as part of the entire curriculum and not as a stand-alone appendage (Martin & Leberman, 2005). Operational competencies have to be developed throughout the entire programme and not only to the isolated WIL component (Fleming et al., 2008). Both academic development and work related exposure are essential for development of hard and soft skills in students. The increasing prominence of WIL has driven many universities to identify the generic skills and attributes their graduates should have at the stage of graduation (Bell

et al. 2003). However, university curricula do not put emphasis on non-technical competencies and expect WIL to fill the gap. In the South African context, programme design is a cooperative effort of the WIL coordinator and the head of department following criteria laid down by the Engineering Council of South Africa and also guided by the precepts defined by the Higher Education Quality Committee (HEQC, 2004). The University of Johannesburg WIL Logbook for Engineering Metallurgy (2014, p3) specifies responsibilities as follows:

- Maintaining and administering the experiential training system,
- Monitor the compliance of work done to these guidelines,
- Guide students regarding experiential training,
- Evaluate students on completion of experiential training periods,
- Evaluate adequacy of experiential training, and
- Keep a database of approved companies.

Engineering metallurgy students are placed in metal production plants such as smelters, fabricators and foundries. Students have a responsibility to demonstrate the willingness to learn by showing an active participatory attitude, even before the WIL experience. Therefore, identifying the suitable placement for specific learning outcomes is among the foremost roles that the student should fulfill (Fernandes et al., 2014). In search of WIL placement, Martin and Leberman (2005) as quoted by Martin and Hughes (2009, p 21-22) suggest that students prior to WIL must:

- Talk to previous students about their project experiences,
- Choose organisations that are known to value student contributions,
- Talk to more than one organisation about what they have to offer,
- Sit down with the workplace supervisor to discuss both sets of expectations from the experience,
- Clarify the role you are fulfilling before you start, and
- Be clear with your workplace supervisor about your background and existing experience.

Searching for WIL placement is a mammoth task considering that in most cases the student is still green and lacks the necessary skills of communication and networking with industry. However, for the University of Johannesburg, previous students often help current students in getting placement. A lot of ground work is required from students in preparation for the challenging workplace, where supervisors expect a student to be prepared to be open minded and experiment with new and old ideas; identify approaches for specific situations and to think about how to add value to the organisation, thus “leaving a mark or “make an impression”. Martin and Leberman (2005) further

advise that graduates can enhance their WIL experience if they choose something of interest, to enjoy oneself at work, to do as much as one can in as many roles as possible and execute planned tasks well.

Although the university has a responsibility of making sure that students secure WIL placement, engineering metallurgy students at the University of Johannesburg have in the past demonstrated reasonable personal attributes in searching for their own WIL placement. The WIL workshops conducted by coordinators have helped sharpen the skills of landing a placement for WIL. Word of mouth, the web/email enquiries, telephone calls to potential workplace supervisors and personal visits are all employed to the best advantage. With the economic downturn, the closure of some host companies has led to a depletion of WIL opportunities and the university through the WIL coordinator and the Metal Casting Technology Station has had to assist in getting industrial placement for some students experiencing difficulties. The extract from the logbook used in WIL training of Engineering Metallurgy students reads (2014, p3):

#### **7. The student must...**

- Register for WIL at the appropriate time
- Obtain the necessary documents
- Familiarise with the necessary requirements for experiential training
- Ensure that the work conforms to the requirements set out by this document
- Ensure that all the necessary documents reach the university on time
- Ensure that the employer is approved for experiential training
- Inform the employer about all requirements
- Conduct self well and uphold the ideals of the University of Johannesburg

It has been observed that workplace supervisors, particularly those running WIL for the first time tend to feel burdened by having to mentor. Supervising a WIL student is an extra activity that is not specified in their job description. Some supervisors have expressed that they expect a student to self-manage and show initiative at work and not expect to be “spoon fed”. The supervisor’s sentiments are in direct contradiction to expectations of most students that are ushered into a workplace setting for the first time. According to a study of Griffith University, students expect to be given specific work responsibilities in the placement and having regular debriefing or feedback sessions with workplace supervisors as essential for developing generic skills at workplace (Bell et al. 2007). Fleming and Martin (2007) observe that at times, it takes time for some students to settle down and establish an effective relationship with workplace supervisors. The conflicting expectations create a barrier between a

student and a workplace supervisor, and make it difficult to share experiences and achieve the full benefits of WIL. It would be logical that once the company has accepted to place a student, the workplace supervisor is obliged to assume mentoring of students as part of his or her job description. The extract from logbook on the responsibilities of employer and workshop supervisor WIL Logbook for Engineering Metallurgy (2014, p3) reads:

#### **8. The employer must...**

- Appoint a mentor for the student
- Provide work requirements for student, e.g. PPE, T & S
- Supply work content of:
  - Adequate metallurgical content
  - Sufficient variation
  - Appropriate level
- Monitor and evaluate the student during working
- Ensure student submits a report to UJ on completion

Most of the above responsibilities are assumed by the employers save that not all mentors are able to pay travel and subsistence to students as the logbook indicates, but further discussion is given under “**Student stipend during work integrated learning**”.

University supervisors or WIL coordinators and workplace supervisors play a significant role in ensuring student satisfaction during WIL experience (Fleming & Martin, 2007). In this collaboration, the academic and workplace supervisors establish a conducive environment where students are able to link theory and practice (Bell et al., 2003), making WIL an integrated process. Students need appropriate supervision and support during their WIL experience to acquire competences and reflective reasoning (Fleming & Martin, 2007). Hence, the learning outcomes of WIL must be clearly spelt out. Bell et al (2003) report that the university supervisor has limitations in executing WIL in that:

- Effective link between theory and practice would demand full commitment of the university and the employer in terms of time and resources (Bell et al., 2003).
- Academics are well disposed to develop employability skills among students since most lectures are heavily skewed towards academic content rather than vocational matters (DfEE & HEQE, 2000).
- There is controversy among some academics on whether to prepare students for higher degrees or for employment (Sleap & Reed, 2007).

Martin and Hughes (2009, p. 27) propose that it is the responsibilities of the university supervisor to find work placements and liaising with students during placements. Creating a network of current and potential employers is essential. The Department of Metallurgy allows students to develop job-searching skills first before the university supervisor can intervene. The WIL Logbook for Engineering Metallurgy (2014, p. 3) further indicates the responsibilities of professional bodies mainly ECSA as follows:

#### **9. Responsibilities of ECSA**

- Providing guidelines for professional registration,
- Facilitating professional registration when sought,
- Protecting the Engineering Profession, and
- Ensuring high standards of education and ethics.

ECSA gives credibility to professional qualifications as the custodian of all engineering qualifications to the extent that both universities and industry join hands in human capital development through sponsorship of education and training.

#### **10. Student stipend during work integrated learning**

According to NAGCUS (2009), work integrated learning may be paid or unpaid; or full-time or part-time; or formally endorsed as part of a university course..." NAGCUS (2009, p. 7). In Nigeria, the students' Industrial Work Experience Scheme (SIWES) is responsible for payment of students and supervisors' allowance. However, the scheme is reported to be fraught with delays in disbursement. Sattler (2011) reports that students in Ontario, Canada, get weekly pay cheques at a minimum wage rate, and that some industries give the students a stipend at the end of the placement. Cooperative education (or Co-op) is a Canadian intense form of WIL usually longer than other forms of WIL and is remunerated. In the European Union, the cost of dual system education/training is borne by the State through training allowances (CEDEFOP, 2010).

In the South African model, Govender and Taylor (2015, p. 57) report that "although organisations may elect to pay stipends to students, this is not an expectation in the WIL partnership model." This suggests that companies have no obligation to pay student stipends. Where companies cannot pay, the government has provided funding for student stipends via several agencies such as the Sector Education and Training Authorities (SETAs). The paucity of literature on remuneration of students

during work integrated learning suggests that student stipends are not the primary focus. Further research into this matter is advised.

## **11. Outcomes of work integrated learning**

Work-based learning has demonstrated ‘superiority’ over traditional delivery-based approaches to teaching and learning and is challenging, motivating and enjoyable. The interdisciplinary character of the engineering curricula is unique and rewarding in terms of holistic career development and employability. Interdisciplinary teamwork is motivating to students and fosters effective learning. Students believe that teamwork generates “transversal skills” such as collaborative working, problem-solving, time management etc. Students have identified the benefits of diversity in trifling innovative ideas and perspectives essential for the engineering environment (Van Hattum-Janssen & Mesquita, 2011; Fernandes et al., 2014).

The Department of Metallurgy has identified three ECSA exit level outcomes (ELOs) relevant to the report to be submitted for assessment on completion of P2, namely ELO4, ELO8 and ELO11 to WIL. The criteria for WIL designed by ECSA are broad-based and designed to bring about considerable multi-tasking and work-readiness of an engineer. In ECSA exit level outcome 4 (Investigation), students must have mastered the ability to conduct investigations of technical problems through experiments, analysis and interpretation of results in order to draw valid conclusions. In order to meet Exit-level Outcome 8 (Individual, team and multidisciplinary working), students must have acquired competence to work effectively as an individual, in teams and in multidisciplinary environments. This involves development of interpersonal and communication skills. In Exit-level Outcome 11 (Workplace practice), students are expected to be in a position to solve workplace engineering problems using academic knowledge.

## **12. Conclusion**

Work-integrated learning has become a topical global subject. Institutions world-wide are embracing WIL as an indispensable element of professional development. However, the need for a professional body with an oversight role on holistic development of an employable engineer is universally acknowledged in the literature. The Engineering Council is the custodian and gate keeper of ensuring successful outcomes of WIL in South Africa. There are diverse views and preferences regarding the timing and duration of work-based learning. In South Africa, the duration for P1 is a minimum of 18 weeks and normally run for six months, followed by an equal duration of P2. The South African



industry prefers that students complete all theoretical modules first to avoid breaks in the WIL schedule.

For a successful WIL in South Africa, stakeholders (the university, industry, student and ECSA) must take full individual responsibilities defined in the logbook. The literature has little discussion on the thorny issue of stipend. The scant literature suggests that student remuneration is not central to the objectives of WIL. In South Africa, it is also not obligatory for host companies to pay student stipends. The government through various agencies facilitates student support. However, some companies are generous in this regard.

### **13. Recommendations**

The work-integrated learning for Engineering Metallurgy is well structured and consistent with constructs recommended in the literature. There is however need to carry out research to identify befitting timing for WIL in order to gain maximum benefit from developing both academic and operational competences. Despite the positive aspects of work integrated learning, the proposed Bachelor of Engineering Technology (BEngTech) which is scheduled to start in 2017 will not have WIL as a module. This means that industry will have to assume a larger role of training with the support of ECSA.

### **14. Acknowledgements**

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