THE EFFECT OF *KAIZEN*-BASED TRAINING ON THE WORK-READINESS OF GRADUATES FROM SOUTH AFRICAN UNIVERSITIES OF TECHNOLOGY

by

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ABSTRACT

Universities, particularly those that offer vocationally-oriented programmes, aspire to increased student employment rates; while students in vocational education have expectations with regard to their employment prospects in their chosen fields. Concerns about graduate unemployment in the University of Technology sector in South Africa has led the sector to engage in collaborative, international interventions with the intention to enhance students' work-readiness. The focus of this study is a *kaizen*-based short course, known as the 'Employability Improvement Programme' (EIP), an initiative between the South African Department of Higher Education and Training, the Japan International Cooperation Agency, and South African Universities of Technology, with the intention to equip students with work-readiness skills and dispositions that are valued by employers. While potential employers generally regard University of Technology graduates as being technically competent, they have expressed concerns about students' work-readiness in terms of their inter-personal skills, as well as their internalisation of work-related values, including professional ethics.

The literature on work-readiness was drawn on to develop a conceptual framework for work-readiness in technical and vocational fields. The conceptual framework, that is, 'the main things to be studied – the key factors, concepts or variables – and the presumed relationship among them' (Miles & Huberman, 1994: 18) provided the key indicators by which the EIP was evaluated. The study also developed a theoretical framework based on Legitimation Code Theory's 'Specialization' dimension (Maton, 2014: 29-33). The Specialization dimension includes the concept of 'gazes'. The idea of the gaze, which is more commonly applied in fields related to the Arts and Humanities, was extended for application in technical and vocational education. The gaze of the technical practitioner is a 'trained gaze', but this gaze is insufficient for work-readiness. Drawing on concepts of work-readiness and the theory of specialised 'gazes', this thesis studied the effect of the EIP curriculum, pedagogy and spatial affordances across a range of technical and vocational fields. The evaluation methodology assessed the curriculum, pedagogy and spatial affordances the programme against a framework of abilities and dispositions that could enhance their future work-readiness.

The findings of the study revealed that participants displayed some features of work-readiness following completion of the EIP, but found that the short course was insufficient to address all work-readiness factors. The thesis thus shows that a short course has a limited ability to extend the trained gaze of the technical student to encompass work-readiness, and argues that longer-term, more integrated forms of training are necessary to expand the technical gaze of the University of Technology student towards work-readiness.

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DEDICATION

I dedicate this thesis to the memory of Nelisiwe Qokweni, my Work-integrated Learning mentee in whom I had seen the value of a work-ready intern.

For Simphiwe, my 10-year old grandson who became understanding beyond his age throughout this journey and whom I hope will be inspired by this journey to value education.

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GLOSSARY

Kaizen: *Kaizen* is a Japanese term derived from Japanese philosophy that means movement (*kai*) towards perfection (*zen*). *Kaizen* principles were adapted for workplaces and became synonymous with an approach to continuous improvement in Japanese manufacture (Wittenberg, 1994). *Kaizen* was further adapted for *lean* manufacturing processes internationally as well as in Japan (Brunet & New, 2003).

Employability: It is important to differentiate between 'employment' and 'employability', although the two concepts are inter- related. In basic terms, employment is about getting a job, while employability is about acquiring the skills, attributes and attitudes that enable a job seeker to function successfully in required work place roles (Knight & Yorke, 2003).

Lean education: *Kaizen*-based short work-readiness programme are referred to in much of the literature as 'lean education' (e.g., Candido, Murman & McManus, 2007; Murman, McManus & Weigel, 2014). 'Lean Education' derives from the Toyota Education Model of 'lean production' that is taught in Toyota factories in Japan and abroad, including South Africa (Zondo, 2018). Lean production is based on the *kaizen* principles of respect for others, the elimination of waste, continuous improvement, collaboration as key to productivity, and innovation as the end point of a work process. These concepts, rooted in *kaizen* philosophy, were adapted for manufacture, and have subsequently been adapted for different educational contexts (Alves, Flumerfelt & Kahlen, 2017). In describing the body of knowledge underpinning lean education, Murman et al. (2014) explain that it is derived from best practices that have been identified through field research and practice. Such practices are variable over time, which means that the underpinning knowledge base of lean education 'is subject to change' (Alves et al., 2017).

Work-readiness: Work-readiness is a relatively new concept in the literature on employability, which has been defined as the 'extent to which graduates are perceived to possess the attitudes and attributes that make them prepared or ready for success in the work environment' (Caballero, Walker & Fuller-Tyszkiewicz, 2011). While there is not full agreement regarding what is meant by work readiness, or all the general skills and attributes that indicate work readiness, the literature suggests that in addition to the necessary technical skills, work-readiness comprises a range of personal and interpersonal dimensions, including positive, constructive dispositions, interpersonal skills, the willingness to contribute to a workplace, and professionalism in the way that work is conducted (Caballero et al., 2011). Work-readiness training is often offered to

students in the form of a short pre-employment programme and while there is an understanding that work-readiness needs to be addressed more consistently in the curriculum as a whole (e.g. Jackson, 2016), there is a growing body of literature that shows how a short course that focusses on particular work-related skills can positively impact students' work- readiness (Hazelton, Malone & Gardner, 2009; Pepper & McGrath, 2010). More detail on work-readiness concepts is provided in the review of the literature, while the specific approach to work-readiness in this study is explained in the conceptual and theoretical frameworks.

CHAPTER ONE INTRODUCTION TO WORK-READINESS

1.1 Introduction to Chapter One

The focus of this thesis is a *kaizen*-based short course, known as the Employability Improvement Programme (EIP), an initiative between the South African Department of Higher Education and Training, the Japan International Cooperation Agency, and South African Universities of Technology. The intention of the EIP is to enhance University of Technology students' work-readiness. While potential employers generally regard University of Technology graduates as being technically competent in their specialist fields, they have expressed concerns about students' work-readiness in terms of team-work and other interpersonal skills, as well as their internalisation of professional values and ethics (Williams, Cunningham & De Beer, 2014; Oluwajodu, Greyling, Blaauw & Kleynhans, 2015).

Section 1.2 introduces the EIP as the focus of the thesis and Section 1.3 presents the 'real world' problem and rationale for the study, the research problem, the research aim, objectives, the guiding research question and research sub-questions. Section 1.4 contextualises the study and motivates for why the EIP is worthy of study, while Section 1.5 provides background information on the larger socio-economic factors in South Africa and Japan. Section 1.6 concludes Chapter One and provides a guide to the thesis.

1.2 Focus of the thesis: Evaluating an international work-readiness intervention

The EIP was launched amongst South African Universities of Technology in 2011 as a component of work-integrated learning, and was offered to students in their second year of study, prior to them taking up internships in industry, or commercial workplaces, which usually take place in the third year of diploma programmes. Students enrolled in technical or vocational programmes have expectations with regard to their employment prospects in their chosen fields, while Universities of Technology aspire to increased student employment rates across their programmes. Concerns about graduate unemployment in the University of Technology sector in South Africa has led the sector to engage in collaborative, international interventions with the intention to improve students' employability in technical and vocational programmes. The employability of students is an extremely complex matter, and increasingly understood as a multifaceted relationship between education, society and the economy (Allais, 2017). Clearly, the EIP cannot bear full responsibility for the employability of University of Technology

students, but it would be expected to follow best practices in work-readiness training; thus the overarching research question guiding this study is: how might a short international intervention contribute to South African students' work-readiness? In evaluating the EIP, conceptual and theoretical frameworks yielded indicators that were drawn on to assess the extent to which the EIP was able to strengthen students' work-readiness across technical and vocational programmes.

1.3 The research problem, the research aim, objectives and research question

In section 1.3 the 'real world' problem, or background to the study is briefly presented. The research problem that was distilled from the 'real world' problem is explained, and the research aims and objectives are stated. The guiding research question and sub-questions are stated (see Section 1.3.3).

1.3.1 The 'real world' problem/rationale for the study: Graduate Unemployment

The 'real world' problem, and rationale for the study, is the global increase in graduate unemployment. This is a concern for higher education institutions internationally (Redmond, 2006, Branine & Avramenko, 2015; Chan, 2015; Tomlinson, 2017), and in South Africa (Pauw, Oosthuizen & van Der Westhuizen, 2008; Kraak, 2015). South Africa has three types of University: Traditional Universities, Universities of Technology and Comprehensive Universities that combine elements of both. Universities of Technology, previously known as 'Technikons' offer vocationally-oriented programmes, usually of a technical nature. Most of the programmes offered by South African Universities of Technology are diploma-level qualifications that prepare students for direct entry into labour markets, supported by practice-oriented curricula, internships, and other forms of work-integrated learning. Diploma programmes educate technicians, technologists and practitioners whose skills contribute to developing economies. Although most programmes are designed for specific professions or occupations, and are accredited by professional bodies, many researchers and educators agree that there is a need to improve students' work-readiness in order to facilitate students' transition into the world of work (Brown Hesketh & Williams, 2003; Ahmad, Zainal & Rahmat, 2012;). In the past, and particularly because of the work experience obtained through the consistent practice of cooperative education, University of Technology graduates, on average, secured employment within 3 – 6 months of graduation (Sweeney & Twomey, 1997), while 60% of graduates had found work immediately after graduation (Moleke, 2005). This trend has reversed, and many Universities of Technology students currently struggle to find appropriate employment in the fields for

which they are qualified. Recent annual graduate surveys done at the research sites of this study indicate that, on average, only 40% of University of Technology graduates had found employment at the time of graduation (Kraak, 2015: 100). Of particular concern with regard to the graduate unemployment figures, is the reproduction of social inequalities with regard to who gains and who does not gain employment (Baldry, 2016; Rafferty, 2012; Fongwa, Marshall & Case, 2018).

While there are many factors that affect the employment of graduates, the mismatch between the skills that graduates develop through their University studies and those that employers require from graduates in the 21st century has been highlighted as a contributing factor (Pauw et al., 2008; Kraak, 2010; Kraak, 2015). Kraak (2015) argues that this skills mismatch has exacerbated South Africa's skills shortages and adversely affected the employment prospects of University of Technology graduates more than other higher education cohorts. Professor Lourens van Staden, Chairperson of the South African Technology Network, attributes the particular skills mismatch contributing to growing student unemployment to 'academic drift' (Dell, 2016). Academic drift in Universities of Technology can be ascribed to several factors, such as to the sector's research aspirations (Kruss, 2006), as well as to academically-driven quality assurances processes. All diploma programmes were declared invalid by the South African Council on Higher Education in 2008, and it was expected that these would be replaced by new programmes by 2016. The Council on Higher Education's programme accreditation process provided very little guidance for this national re-curriculation exercise with only the single paragraph below being the only CHE statement on diplomas:

> [A diploma] primarily has a vocational orientation, which includes professional, vocational, or industry specific knowledge that provides a sound understanding of general theoretical principles as well as a combination of general and specific procedures and their application. The purpose of the Diploma is to develop graduates who can demonstrate focused knowledge and skills in a particular field. Typically, they will have gained experience in applying such knowledge and skills in a workplace context (South African Council on Higher Education, 2013).

These few requirements left diploma curricula open to wide range of interpretations – with many understanding the adverb 'typically' to imply that workplace experience, whether in the form of clinical practice, industry experience, field work, or the many other forms of practice found in diploma programmes, was optional. Thus work placements have been omitted from many diploma programmes, while in some

departments, diploma programmes have been greatly reduced (or even removed) in favour of degree programmes. Work placements are costly and difficult to manage, and in times of the 'intensification' of academic work, rising student numbers (without concomitant increases in academic staff numbers), many lecturers do not have the time to visit students in their workplaces, meet with employers (Wedekind & Mutereko, 2016) or participate in training in support of student employability, particularly when there are pressures on them to publish research findings (Leibowitz, Bozalek, Van Schalkwyk & Winberg, 2015).

These, and other, complex challenges in the University of Technology sector have impacted graduate employability. Across the sector there is a growing concern that diploma programmes are no longer aligned to the changing economic environment, which continues to be shaped by persistent inequalities and challenged by economic globalisation. In the Technikon system it was assumed that students graduating from technical programmes were 'work-ready', and that their education assured them meaningful work and expanded life opportunities. The fact that University of Technology graduates increasingly are not able to find employment is largely a result of changes in the relationship between higher education, society and the economy (Allais, 2017), yet University of Technology graduates have, inevitably, been positioned as largely being responsible for this situation.

1.3.2 The Research Focus and Problem: The EIP

In order to address concerns about their graduates' work-readiness, many Universities offer a variety of programmes to help students develop a range of transferable work-readiness personal and interpersonal skills (Hasan, Jano, Abdullah, Hussin & Putit, 2016). As part of their commitment to student employability, South African Universities of Technology offer a number of work-readiness programmes. The EIP, which is the focus of this study, is a *kaizen*-based 'capstone' short course. The EIP is based on the *kaizen* principle of continuous improvement, the provision of value or quality at all parts of the training process, including eliminating waste, respect for others and innovation as the end point of an iterative process (Alves, Flumerfelt & Kahlen, 2017). *Kaizen*-based training, also known as 'Lean Education', 'Six Sigma', or 'Conceive, Design, implement and Operate' (CDIO) (Murman, McManus & Weigel, 2014: 206; Candido, Murman & McManus, 2007), was developed in Japan for industry training, most notably at Toyota Vehicle Assembly Plants (Murman, 2017). The training principles for lean manufacture were adapted for work-readiness training at Universities and colleges, thus a programme such as the EIP can be recognised as having similarities with other

forms of *kaizen*-based work-readiness training.

The EIP was developed in Japan and its implementation in South Africa is supported by the Japan International Cooperation Agency (JICA) through a bilateral agreement with South African Department of Higher Education and Training (DHET). The DHET found the EIP training to be suitable for Universities of Technology and potentially useful to students in professional and vocational programmes. The DHET delegated responsibility for the roll-out of the EIP to each University of Technology's Cooperative Education Directorate, or equivalent directorate, in order to have a central location for the EIP, rather than locate it in a particular faculty for the purpose of ensuring that it would be implemented across the entire institution. The EIP is a short campus-based intervention intended to prepare students for the work placements or internships that are part of their formal programmes. The EIP is intended to help South African students develop work-readiness abilities and dispositions, such as time management, project management, understanding the work environment, and working in teams. The training programme is offered in two phases: 1) a half-day workshop on the principles of *kaizen* as applied to workplaces (such as 'the seven wastes' and an orientation towards delivery of quality products at appropriate cost), and 2) two and a half days of hands-on practical training that simulates a truck assembly plant in which students assume various roles that typically exist in workplaces, and receive feedback on their performance. The assembly plant runs are repeated several times to enable students to reflect on and improve their performance, and in the process, internalise the *kaizen* principles.

1.3.3 The Research Aim and Objectives: Evaluating the EIP

The research study intends to contribute a theorised understanding of work-readiness, through its particular focus on the evaluation of a specific work-readiness training programme, namely the EIP. In evaluating the EIP the study has following objectives:

- To conceptualise effective work-readiness curricula;
- To identify and/or develop appropriate work-readiness pedagogies;
- To identify the physical and virtual spaces needed to support work-readiness training.

The overarching research question guiding this study is: How could a short international short course contribute to students' work-readiness? In further focussing the research, the research sub-questions posed were:

1. How did the EIP curriculum conceptualise work-readiness?
2. How did the EIP pedagogy develop students' work-readiness?
3. How did the EIP's spatial affordances support work-readiness?

1.4 Why the Employability Improvement Programme is worthy of study

The EIP represents a considerable investment for Universities of Technology, the DHET and JICA, not only in terms of financial support, but also in terms of the time and commitment to the programme by the Japanese and South African facilitators, participating academic departments, the workplace supervisors who attend the EIP training sessions and provide feedback, and the student participants who enrol for the programme in the hope that their prospects of finding work in their field will be enhanced. Orientation in preparation for the implementation of the EIP at the South African Universities of Technology occurred in 2011 in Japan. The first iteration of the EIP was offered at two participating Universities of Technology in 2012 and grew annually to include all six South African Universities of Technology, as well as one Comprehensive University and one neighbour country's institution, by 2016. Over the period of its implementation, the Japanese facilitators handed over the training to the South African facilitators, who made various changes to the EIP in line with feedback and institutional needs. Thus between 2012 and the current time, six Universities of Technology, one Comprehensive University, one foreign University, three Japanese facilitators and eleven SA facilitators have been involved in the implementation of the EIP. Over the same period approximately 3,000 students have undergone training, and approximately 100 workplace supervisors have participated.

Despite the significant resources invested in the EIP, it has not been evaluated. An evaluation of the EIP is thus timely. Through the evaluation process knowledge can be built more broadly on the strengths and limitations of short interventions towards students' work-readiness in technical and vocational fields. Since Kirkpatrick's seminal doctoral dissertation on the evaluation of a training intervention in the 1950s and subsequent publications (Kirkpatrick 1959; 1975) there has been growing acknowledgement amongst educational research communities of the value of rigorous evaluation of training interventions (Hazenberg, Seddo & Denny, 2015; Chalmers & Hunt, 2016), and of evaluation research more generally (Chen & Rossi, 1980). There are fundamental complexities in the systematic appraisal of the quality of teaching and learning, and no easy answers, which is what makes educational evaluation a worthwhile enterprise for doctoral study (Posavac, 2015). Several research centres specialise in evaluation studies and the supervision of doctoral students in educational

evaluation including Stanford University's Centre for Assessment, Learning and Equity, Bristol University's Centre for Educational Assessment and Evaluation, Oslo University's Centre for Educational Measurement, the University of Pretoria's Centre for Evaluation and Assessment, and many more. There have been many doctoral studies on the evaluation of formal and non-formal educational interventions across a number of different fields that have resulted in publications in both general educational and specialised evaluation peer-reviewed journals, such as Evaluation, Evaluation and Programme Planning, Studies in Educational Evaluation and Evaluation in Higher Education. The theory-based evaluation of training interventions is particularly pertinent to the Doctor of Education degree, which has the purpose of theory-building for the purpose of addressing meaningful professional challenges towards the improvement of practice (Lundgren-Resenterra and Kahn, 2019).

1.5 The challenge of transfer across contexts

The contexts for work-readiness training in Japan and South Africa could not be more different. Japan is a highly developed country; its economy is currently ranked as the third largest globally. Japan's population reached 126.42 million people in December 2018, but Japan has a low number of unemployed citizens, 2.4% in December 2018. Unemployment continues to fall as its economy grows; 2018 was the ninth consecutive year of unemployment decline. Currently the number of people in work in Japan is 66.64 million, the most since comparable data became available in 1953 (Japanese Ministry of Internal Affairs and Communications, 2019).

In the same time period, the South African economy went into technical recession, with 6.2 million (27%) of South Africans unemployed and actively seeking work (Statistics South Africa, 2019). Van Broekhuizen (2016) has suggested that unemployment figures of 35% are more probable, given the many South Africans who have given up and are no longer actively seeking formal employment. South Africa's high rate of unemployment is a deep concern for this study, and the University of Technology graduate unemployment figures are a particular concern. University of Technology graduates have long contributed to economic growth through the provision of skilled technicians and other professionals (Du Prė, 2009), thus rising graduate unemployment in this sector is particularly detrimental to the South African economy, although Allais (2017) warns that we should not over-claim the relationship between higher education and the economy. She argues that labour markets are looking for distinctions between candidates rather than the value that a higher education system might add to a particular industry (Allais, 2017).

South Africa is understood to have a dual economy (Hull & James, 2012), that is, it has two distinct economic sectors that are characterised by different levels of development, different levels of access to technology (particular digital technologies), and different patterns of supply and demand. The 'dual economy' concept was originally proposed by Boeke (1953) to describe the coexistence of modern and traditional economic sectors in a colonial economy. The South African economy is one of inequality in which high-tech and low-tech, high skills and low skills, and high income and low-income sectors co-exist. Thus advanced technologies and a high skills job market is evident in one sector, while at the same time large parts of the country exist at subsistence level (Turok, 2016). Dual economies are common in developing countries, particularly where one sector serves local needs and the other serves the global export market. Dual economies tend to result in a rural poor subsistence sector and an urban employed sector. It is pertinent to this study that there has been no attempt to understand the trajectory of employment in a dual economy for the purpose of increasing employment opportunities. Bouare (2017) argues the need to develop a planning model to determine the optimal trajectory of employment in a dual economy from which strategies to increase employment in South Africa could be proposed. McDonald, Grant-Smith, Moore and Marston (2019), in the Australian context, point out that attention has not been given to the development of employability strategies for disadvantaged youth that address the social, political and labour market contexts in which their unemployment has emerged. There is thus a larger argument to be made about the disjunction between promoting individual employability through work-readiness training and larger social, political and economic contexts.

Against the background of unemployment and the inequities of South Africa's dual economy, it is hardly surprising that labour relations in South African workplaces are complex and challenging. The World Economic Forum's 2018 World Competitiveness Report shows that not only does South Africa have low levels of productivity, but also has extremely poor labour relations (ranked 137 out of 137 countries) (Shwab, 2018). These labour relations are closely linked to low levels of trust between employers and employees (Jordaan & Cillié, 2016). Employment relationships in many South African organisations are adversarial, ascribed to economic and political pressures, resulting in a 'poor work ethic … and an inadequately educated workforce' (Shwab, 2018: 286). The issue of labour relations and constructive engagement in the world of work are important factors in work-readiness training in the South African context.

Given the significant differences in the two contexts of work-readiness training, it is important to be critical of the assumption that training based upon the success of Japan

is transferable to South Africa. 'Technical rationalism' is the term used by Schön (1992) to describe practices that underestimate the role of local cultures in implementing change. Research on South African Higher Education policies and practices has raised many questions about the suitability of a technical rationalist approach as the dominant informant for educational change in South African higher education institutions (McKenna & Quinn, 2012). Smith and Sadler-Smith (2006) argue that while a technical rationalist approach may provide a starting point for understanding change, technical rationalism obscures local issues and practices. When technical rationalism is the dominant approach to work-readiness training in higher education policies and practices, there is likely to be misalignment between the work-readiness training offered and realities that the economic, social and labour market challenges pose to University of Technology graduates. Thus the import of a Japanese work-readiness training programme for the highly complex South African University of Technology context should raise alarm bells.

The context in which work-readiness training occurs is important, but this is not to say that countries cannot learn from each other; indeed, there have been many successful international partnerships in support of improved graduate employability and work-readiness. There are promising developments in the ways in which countries in the global South can learn from both developed and developing countries. For example, the successful collaboration between the Hochschule Wismar University of Applied Sciences, South African Universities of Technology and the Namibia University of Science and Technology (formerly the Polytechnic of Namibia) to develop the employability skills of participating students in Germany, Namibia and South Africa has been published (Reinhard, Pogrzeba, Townsend & Pop, 2016). The Southern Africa-Nordic Centre (SANORD) reports on how researchers from southern African and Nordic countries have engaged in mutual learning over time on how to improve knowledge building towards addressing the sustainable development goals, including the right to quality education and decent work and economic growth (Halvorsen & Ibsen, 2017). Successful international collaborations tend to be aligned to Alvesson (2012) and Trowler's (2008: 56) notion of 'multiple cultural configurations', the key tenets of which are that hybrid approaches provide more useful and intricate tools for informing change than 'top-down' and technical rationalist approaches.

1.6 Guide to the thesis

This chapter provided a broad framework for thinking about the work-readiness of University of Technology graduates in the South African social, political and economic

contexts, and outlined some of the challenges posed to work-readiness training in equipping graduates with the skills and dispositions that are valued by employers. In the next chapter, which overviews the literature on work-readiness, key areas of work-readiness are critically examined, and a conceptual framework of work-readiness is developed for the study. Chapter Three theorises work-readiness, focusing on the interpersonal and intrapersonal dimensions of work-readiness, drawing on Maton's (2014) Legitimation Code Theory. The research design and methods used in the study are described and motivated in Chapter Four. Chapters Five to Seven present the research findings in terms of the evaluation of the EIP curriculum, pedagogy, spaces and equipment. The final chapter, Chapter Eight, concludes the study, summarising how the research sub-questions were addressed, explaining the contribution that the thesis makes to knowledge, addressing the implications of the study for practice, and proposing a programme for further research.

2 CHAPTER TWO: A REVIEW OF THE LITERATURE ON WORK-READINESS TRAINING

2.1 Overview of Chapter Two

This review of the literature focuses on research studies of short courses intended to enhance students' work-readiness. Section 2.2 introduces the literature on work-readiness, focussing on work-readiness training in Sub-section 2.2.1, and on *kaizen*-based work-readiness training in Sub-section 2.2.2. In order to align the literature review with the research questions that guide the thesis, the review specifically addresses the research literature on work-readiness short course curricula (see Section 2.3), on pedagogies for work-readiness (see Section 2.4), and on the affordances of physical and virtual spaces for work-readiness training (see Section 2.5). In Section 2.6, a critical reflection on the literature is provided, including areas of concurrence (Sub-section 2.6.1), contention (Sub-section 2.6.2), and gaps in the literature (Sub-section 2.6.3). Finally, in Section 2.7, a conceptual framework towards understanding *kaizen*-based work-readiness training is developed, drawing on key concepts in the literature on *kaizen*-based work-readiness training.

2.2 An introduction to the Literature on Work-readiness

It is important to differentiate between 'employability' and 'work-readiness', although the two concepts are interrelated. Employability is about acquiring 'a confluence of understanding, subject-specific and generic social practices (or skills), metacognition (reflection or strategic thinking) and … incremental self-theories' (Knight & Yorke, 2003: 8), while work-readiness has been defined more narrowly as the 'extent to which graduates are perceived to possess the attitudes and attributes that make them prepared or ready for success in the work environment' (Caballero, Walker & Fuller-Tyszkiewicz, 2011: 41-42). In other words, employability includes the scientific and technical knowledge required for employment, as well as the personal and interpersonal skills valued by employers, while work-readiness focuses more narrowly on the personal and interpersonal skills, attitudes and dispositions that are valued by employers. Work-readiness can thus be understood as a particular aspect of employability. While there is not full agreement regarding what is meant by work-readiness, the literature tends to focus on the range of personal and interpersonal dimensions, including positive, constructive dispositions, interpersonal skills, a willingness to contribute to a workplace, and professionalism in the way that work is conducted (Caballero et al., 2011: 47). Work-readiness training is often offered to

students in the form of a short pre-employment programme (Cavanagh, Burston, Southcombe and Bartram, 2015: 279; Murman, 2017: viii); while employability needs to be addressed more consistently across the curriculum as a whole (e.g. Knight & Yorke, 2003: 10; Jackson, 2016: 927).

There is a considerable literature on employability in higher education, from broad systematic reviews of the literature on employability (e.g., Williams, Dodd, Steele & Randall, 2016), to more focused studies on particular aspects of employability (e.g. Hasan, Jano, Abdullah, Hussin & Putit, 2016; McDonald, Grant-Smith, Moore & Marston, 2019), the employability requirements of particular industries (e.g., Raftopoulos, Coetzee & Visser, 2009; Nofemela, 2015; Stevens & Norman, 2016) and employability training (e.g., Strachan, 2016).

Work-readiness is a relatively new concept in the literature on employability and the literature on work-readiness is less extensive than the literature on employability. Work-readiness, as pointed out above, is a sub-set of employability that has a particular focus on the qualities that enable an individual to 'obtain employment, maintain it, and progress in it' (Rosenberg, Heimler & Morote, 2012: 2). Personal qualities, problem-solving, decision-making skills, relationships with others, communication skills, task-related skills, maturity, health and safety habits, as well as commitment to the job, are the core competencies of employability (Smith & Krüger, 2008: 134-135; Rosenberg et al., 2012: 8-10). Stone's (2012) systematic review of the literature on work-readiness studies confirms that oral and written communication, self-discipline, time management, interpersonal skills and teamwork, problem-solving skills and a positive work ethic are important generic skills for securing employment (Stone, 2012: 130-131). There are often differences between the skills that employers and students (as jobseekers) consider important. For example, in the banking sector, employers value numeracy skills and motivation, whereas graduate jobseekers tend to believe that confidence and leadership skills are important in securing work (Raftopoulos et al., 2009: 7). Boahin, Eggink and Hofman (2014: 841) propose that industry competency standards should be used as a base-line for employability in particular sectors, rather than generic skills. Brown, Hesketh and Williams (2003: 134) argue that generic skills should include generic IT skills to enable graduate job-seekers to secure work in the knowledge economy. In contexts of socio-economic and cultural diversity, 'affirming diversity' (Chung, 2013: 77) is important, while in the South African context 'hardiness' (Van Dyk, 2015: 80) and 'resilience' (Walker, Yong, Pang, Fullarton, Costa & Dunning, 2013: 117) have been identified as contributing to work-readiness. The literature on work-readiness in a number of different fields – from advertising (Zhu & Bargiela-Chiappini, 2013) to engineering (Jollands et al., 2012) – claims that it is important that

graduates develop a range of interpersonal and generic transferable skills to be able to adapt to changing market circumstances and organisational needs (Ahmad et al., 2012).

According to Cilliers (2000: 259), one of the primary complaints of organisations in the 1990s was that graduates were generally not well prepared for contemporary workplace needs. This has not changed in recent years. Makki, Salleh, Memon and Harun (2015: 1010) found that engineering graduates lacked confidence, positive attitudes and the skills for job-seeking and career exploration. The lack of work-readiness skills is not limited to specific disciplines. Llewellynn and Clarke (2014: 73) refer to a talent shortage in the advertising industry that has arisen as a result of Universities not adequately preparing graduates for the world of work. Nofemela (2015: 95-6) similarly identified that analytical chemistry students from a University of Technology lacked problem solving skills, work-related dispositions, as well as self-management skills.

2.2.1 Work-readiness training

Universities internationally have responded to employability concerns in a number of different ways; through work placements and internships, including industry partnerships in curriculum review and assessment activities, integrating problem-based learning across the curriculum, or offering 'capstone' courses (Kaider, Hains-Wesson & Young, 2017: 158-9). In their overview of the literature on employability training, Lee and Lonton (2019: 135-6) point out that no single approach is sufficient to ensure graduate employability; but rather that each approach has a different purpose. A work placement provides students with opportunities to learn from work experience (Basit, Eardley, Borup, Shah, Slack & Hughes, 2015: 1010), while a service learning project can play a role in producing graduates who are ethical, global citizens, and can strengthen their motivation to use their skills for the greater good (Nell, 2014: 89). Problem-based learning helps students to better apply course content for the world of work (Sill, Harward & Cooper, 2009: 54), while a final year project can enhance work-readiness (Jollands, Jolly & Molyneaux, 2012: 143). Some capstone courses synthesise and apply prior learning, helping students to develop skills and attributes desirable for employability (Van Acker, Bailey, Wilson & French, 2014: 1049). There are also many additional extra-curricular ways to support employability, such as encouraging students to attend networking or industry information events (Kaider et al., 2017: 160), becoming members of professional associations, and attending various short courses, for career advice (Walker and Fongwa, 2017: 162), building self-efficacy

(Hazenberg, Seddo & Denny, 2015: 274), or enrolling in a short course about a specific issue or technical skill in professional practice (Hazelton, Malone & Gardner, 2009: 289).

The role of higher education in the provision of work-readiness training is contested. For example, Keogh, Maguire and O'Donoghue (2015: 385) contend that graduate work-readiness is the responsibility of workplaces and professions, while Cavanagh Burston, Southcombe and Bartram (2015: 278), in the Australian context, feel that concerns about students' employability need to be addressed in higher education through projects such as work-integrated learning and graduate attributes projects. There is some evidence in the literature that shows how a short course that focusses on particular work-related skills can positively impact students' work-readiness (Hazelton, Malone & Gardner, 2009: 290; Pepper & McGrath, 2010: 251). In the South African context, many workplace supervisors believe that Universities have a responsibility to help students develop work-readiness skills through additional training over and above the discipline-specific curriculum (Nofemela, 2015: 92). In their study, from the students' perspective, Walker, Yong, Pang, Fullarton, Costa and Dunning (2013: 120-1) found considerable stress and anxiety evident amongst students who did not consider themselves to be 'work-ready' for the particular roles for which they had been trained.

The multiple purposes and modes of delivery of work-readiness training have implications for Universities that want to support their students' readiness for the world of work. In the following section, the research literature on the potential of *kaizen*-based training to support students' work-readiness is reviewed.

2.3 *Kaizen*-based work readiness training

Kaizen is a Japanese term that describes an approach to continuous improvement (Balzer, Francis, Krehbiel & Shea, 2016: 446-7). *Kaizen* concepts are a fundamental part of lean manufacturing processes internationally, as well as in Japan (Brunet and New, 2003: 1426). Lean manufacturing assists organisations to improve their operations and become competitive by focusing on cost reduction through eliminating non-value adding activities. In a nutshell, it is an approach that promotes teamwork while using problem-solving techniques in order to improve work outputs (Bhasin & Burcher, 2006: 57).

2.3.1 *Kaizen* in management

Sheth, Deshpande and Kardani (2014: 311) trace 'lean' manufacturing to the Japanese automotive industry and the Toyota Motor Corporation in the 1940s. Lean manufacturing was based on the desire to produce in a continuous flow, with shorter production runs for efficiency. Goetsch and Davis (2014: 11) claim that lean manufacturing arose from the realisation that only a fraction of the total time and effort to process a product added value to the end customer. The 'lean' ideal was the opposite of the system used in the Western world where mass production based on computerised systems was developing alongside Henry Ford's philosophies of large high volumes production of standard products with minimal product change-over (Melton, 2005: 662). Until the 1990s, lean processes and production was limited only to the manufacturing sector. However, after 1990, the literature shows a shift to include the service sector (Suárez-Barraza, Smith & Dahlgaard-Park, 2009: 143; Hines, Holweg & Rich, 2004: 994). In line with the broadening of lean approaches, lean thinking evolved in business processes, such as project management and construction (Stone, 2012: 112). Melton (2005: 667) cites the benefits of lean business processes for the speed of operations, for example, the speed of responses creates efficiencies for supply chains and therefore significant financial benefits for the company.

Kaizen-based approaches have developed over the years and are associated with a number of innovations, such as customer and service orientation, Total Quality Management (TQM) and Total Productive Management (TPM), cooperative labour-management relations, team work, Quality Circles and Suggestion Systems, Just-in-Time (JIT) manufacture, robotics and automation and a Zero Defect culture (Stone, 2012: 114-5). In most cases *kaizen* does not seek to implement major changes (Salah, Rahim & Carretero, 2010: 250). The *kaizen* philosophy is based on making small changes on a regular basis: always improving productivity, safety and effectiveness, while reducing waste (Sonobe & Otsuka, 2006: 92). *Kaizen* involves small, step-by-step continuous improvements. The *kaizen* philosophy is that smaller and continuous improvements are more realistic, predictable and controllable than attempting to implement major changes, or follow the latest management fads (Salah et al., 2010: 252). Behavioural, cultural and philosophical changes occur through small steps than through radical improvements. Although improvements under kaizen are small and incremental, the *kaizen* process systematically creates change and increases productivity (Stone, 2012: 130). The *kaizen* concept is based on the assumption that effective companies cannot remain static for long. Joshi and Naik (2012: 2) claim that Western management 'worships' innovation, possibly because innovation is dramatic, while *kaizen*, on the other hand, is often undramatic and subtle. The *kaizen* process is

based on common sense, low-cost and incremental progress that accumulates in the long run. *Kaizen* is a low-risk approach because companies can always return to earlier practices, without having incurred major costs.

Gemba kaizen is an adaptation of kaizen to a range of field-specific applications and methods in production and service businesses (Suárez-Barraza, Ramis-Pujol & Estrada-Robles, 2012: 28). The Japanese word *gemba* signifies that there is a specific work context. Suárez-Barraza, Ramis-Pujol and Estrada-Robles (2012: 32) claim improved results with the implementation of *gemba kaizen* in the context of food manufacture. Berger's (1997: 115-6) research similarly suggests that *kaizen* principles and methods are adaptable to a range of different processes and fields, but that field or disciplinary expertise should be integrated with the *kaizen*-based training in such contexts. Antony (2004: 1012) found a 'Six Sigma' approach to internal audits to be effective. *Kaizen* has been adapted for hospitals (Smith, Nachtmann & Pohl, 2012: 4) and other health care contexts (Bahensky, Roe & Bolton, 2005: 40) with positive outcomes.

There is some evidence that *kaizen* prinicples can be effective in contexts beyond Japan. Ouma, Njeru and Dennis (2014) studied a structured *kaizen* implementation process through *kaizen* events within pharmaceutical companies in Kenya; their findings suggest that the adopting of *kaizen* principles, over a period of time, enabled the companies to manage their cost levels, hence gave those companies that implemented *kaizen* a competitive advantage (Ouma, Njeru & Dennis, 2014: 145). Sonobe and Otsuka (2006) found similar positive outcomes through the implementation of *kaizen* training in the knit-wear industry in Vietnam (Sonobe & Otsuka, 2006: 90). In a study of Mexican companies that implemented *kaizen* principles, García, Rivera and Iniesta (2013: 543-4) found key success factors to be management support for employee development and an organisational culture that embraces the *kaizen* values of service to and respect for others, continuous improvement, the open acknowledgement of problems and the centrality of team-work and self-discipline.

2.3.2 *Kaizen* in 'lean' training

Kaizen-based short work-readiness programmes are referred to in much of the literature as 'lean education' (e.g., Murman et al., 2014: 205; Candido et al., 2007). Lean Education derives from the Toyota Education Model of 'lean production' that is taught in Toyota factories in Japan and abroad, including South Africa (Zondo, 2018: 2). Lean production is based on the *kaizen* principles of respect for others, understanding work flow processes, the elimination of waste, collaboration and team-work as key to productivity, and innovation as the end point of a process of continuous

improvement. Six Sigma is another term associated with *kaizen*-based manufacture; it is the adaptation developed by the Motorola company for the US context (Womack, Jones & Roos, 2003: 16). There are many other variants, such as 'lean coaching', 'lean accounting', 'lean service', 'lean project management', 'lean office', 'lean start-up', and 'green lean' (Alves, Flumerfelt & Kahlen, 2017: 11-12). These applications, rooted in *kaizen* philosophy, were originally adapted for business, and subsequently re-adapted for educational and training contexts (Alves, Flumerfelt & Kahlen, 2017: 12).

The literature on *kaizen* as a training strategy points to both positive and negative aspects of its adoption in different contexts. The purpose in implementing *kaizen* is to influence the way that employees (or potential employees) approach work, since *kaizen* is not just a corporate philosophy but also works on a personal level (Farris, Van Aken, Doolen & Worley, 2009: 47). Sonobe and Otsuka (2006) claim that *kaizen* has the potential to align work-readiness training with national imperatives in order to promote industrial development; *kaizen* could thus have a role to play in the reduction of widespread poverty in developing countrie (Sonobe & Otsuka, 2006: 3-4). Zhu and Bargiela-Chiappini (2013: 380) found that *kaizen*-based training increased learning gains amongst administrative personnel in office environments. Medinilla (2014: 21-5) suggests that transforming a culture is far more about 'emotional growth' than 'technical maturity' and that leveraging the core *kaizen* values and the behaviours they generate, enables transformation in a wide variety of industries.

While the value of *kaizen*-based training is increasingly recognised (Alves, Flumerfelt & Kahlen, 2017: 5). Yokozawa and Steenhuis (2013: 1052-3) show that the transfer of *kaizen* culture is not always successfully accomplished. Successful kaizen training requires organizational or institutional cultures and structures that enable open-communication, teamwork, and trust development (Stone, 2012: 130). *Kaizen* is thus context-dependent and the level of successful transfer is highly dependent on the degree of fit between the *kaizen* principles and the organizational culture into which it is introduced (Pedersen & Huniche, 2011: 553). It has also been suggested that *kaizen* (and its associated forms of 'lean' manufacture) have limited applicability outside high-volume repetitive manufacturing environments and need to be 'localised' in order to be successful (Hines et al., 2004: 1009). In a study of 28 Sino-Japanese joint ventures, Ma, Lin and Lau (2017: 565-6) found that adopting *kaizen* was not easy, and even harder to sustain in the long-term; their results indicate that staffing is the most important factor for *kaizen* implementation, whilst appropriate institutional arrangements (e.g., essential rules, policies, procedures) and physical resources, including infrastructure, were of lesser importance. Brunet and New (2003: 1428) point out that the implementation of *kaizen* is vulnerable to economic conditions, even in

Japan. Fujino and Konno (2016), in a report on Japanese industry, suggest that a number of changes need to be made in *kaizen*-based training in the light of new practices associated with Industry 4.0.

2.3.3 *Kaizen*-based training in higher education

While most *kaizen* training is workplace-based, that is, it is offered to employees as a part of continuous professional development, there is growing body of research on *kaizen*-based training in higher education, whether at the institutional level for quality enhancement (Khayum, 2015: 1223), University programmes that have included *kaizen*-based training as a work-readiness capstone course (Murman, McManus & Weigel (2014: 205), or have integrated *kaizen* principles into undergraduate programmes at different levels (Balzer, Francis, Krehbiel & Shea, 2016: 443). Murman, McManus and Weigel (2014: 205) report on kaizen-based training for work-readiness in engineering contexts, while Odom, Beyerlein, Porter, Gomez and Gallup (2006) studied the use of *kaizen* principles in preparing students for their senior design projects, and Gorman (2010: 432) found positive outcomes in the use of a kaizen-based capstone course in an undergraduate operations management programme. Panthalookaran (2011: 16-18) implemented kaizen-based creativity training over an entire engineering Bachelor programme spanning over four years in the form of an 'Hour of Creativity', from first year to final engineering Design Projects. In the latter example, the *kaizen*-based instruction was well-integrated into the Bachelor programme and found to be effective for enhancing engineering creativity. Estácio, Prikladnicki, Morá, Notari, Caroli and Olchik (2014: 9) developed a training method called 'Software *Kaizen*', which simulated a high-performance software development environment. They reported gains in student learning, including positive attitudes and teamwork, which are expected of high-performance teams. Research done by Allen, Wachter, Blum and Gilchrist (2009: 28-30) on interdisciplinary team internships showed how *kaizen*-based training supported the development of student leadership, teamwork, reinforced connections between theory and practice, and overcome many of the limitations of traditional student projects. Hadidi's (2014) study incorporated *kaizen* principles in the Master of Science in Information Systems (MSIS) model curriculum developed by a joint committee of the Association for Information Systems and the Association for Computing Machinery. The author concludes that the MSIS had the potential to 'fill the gap between business and technical knowledge to meet the global shortage of skilled business and industry professionals' (Hadidi, 2014: 75).

Work-readiness training is often offered to students in the form of a short pre-

employment programme, and while there is an understanding that employability needs to be addressed more consistently in the curriculum as a whole (Jackson 2016; Winberg, Bramhall, Greenfield, Johnson, Rowlett, Lewis, Waldock & Wolff, 2019), there is a growing body of literature that shows that a short course that focuses on particular work-related skills can positively impact students' work readiness (Hazelton, Malone & Gardner, 2009; Pepper & McGrath, 2010).

In the following Sections the specific details of curricula, pedagogies, and spatial affordances of work-readiness short courses, and *kaizen*-based short courses in particular, as reported on in the research literature, are brought into focus.

2.4 Curricula for Short Courses in Work-readiness

Unlike traditional capstone courses that emphasise the integration of previously learned academic knowledge and work-oriented skills (Van Acker et al., 2014: 1051-2), lean work-readiness short courses tend to de-emphasise previously acquired knowledge in order to focus on the acquisition of new social skills, particularly team-work and reflection (Murman et al., 2014: 207; Wharton, 2017: 567). The 'de-emphasising' of disciplinary knowledge has the positive effect of enabling a strong focus on the interpersonal and personal skills to be developed (Mansur, Leite and Bastos, 2017: 27). However, the de-emphasising of disciplinary course content also creates difficulties. Researchers point out that 'the [simulated] task must be sufficiently meaningful and not too trivial' (Thorvald, Bäckstrand & Högberg, 2012: 258) in order to adequately prepare students for the world of work. In Murman's (2017) opinion, academic staff without work experience are not able to train students in work-readiness, as such training 'relies on simulations, active learning, and other techniques different than traditional lectures' (Murman, 2017: vi). In addition, if the course is not credit-bearing, there is no incentive for students to attend, and if there is 'simply no room in an already crowded and constrained curriculum to add yet another course or module or unit' the course would be further marginalised (Murman, 2017: vii). Thus while lean education seeks to prepare students for working life beyond the University, it needs to take into account the knowledge that students already have attained. As Alves, Flumerfelt and Kahlen (2017: 2) explain, it is important to embed 'critical and reflective thinking as real problem solving' in students' learning experiences. The University of Tennessee offers a number of lean short courses in work-readiness at undergraduate and graduate levels (Sawhney & De Anda, 2017: 105). The approach that has evolved at undergraduate level includes both a pre-placement work-readiness short course, and a follow up course after students return from their placements. Sawhney and De Anda (2017: 119) found that providing students with opportunities to share ideas in multicultural

environments engendered changes to 'their way of thinking, by considering a global and systemic perspective to approach problems using Lean'.

The curricula of *kaizen*-based work-readiness short courses contain many standard features that are founded on *kaizen* principles; they are known by mnemonic acronyms, such as '5S' for the Japanese words *Seiri, Seiton, Seiso, Seiketsu* and *Shitsuke* and translated into English as: sort, set in order, keep shiny clean, standardise and sustain. The 5S mnemonic is underpinned by the *kaizen* value of respect for others, which has been translated into keeping one's work environment in order. There are a series of abbreviations that describe work processes, such as QCD for Quality, Cost, Delivery; DMAIC for define-measure-analyse-improve-control, and VSM is for Value Stream Map. In describing the body of knowledge underpinning lean education, Murman, McManus and Weigel (2014: 207) explain that it is derived from best practices that have been identified through field research and practice. Such practices change over time, which means that the underpinning knowledge base of lean education is similarly subject to change (Alves, Flumerfelt & Kahlen, 2017: 8). The current knowledge base of lean education towards work-readiness comprises the teaching of: 1) values (in particular the elimination of waste), 2) the experiential learning cycle (i.e., reflection and action towards improvement) (Wharton, 2017: 578), 3) understanding systems and roles in work organisation, and 4) understanding and managing change and innovation (Murman, 2017: viii).

One of the most influential lean work-readiness short courses was developed by the Lean Aerospace Initiative (LAI) Educational Network, established in 2002 and comprising 32 Universities who shared a common interest in developing a curriculum for teaching lean fundamentals (Murman et al., 2014: 205). Murman, McManus and Weigel's (2014) success with the week-long LAI short course has been reported widely; the short course has been taught many times in many different contexts. Murman claims that students 'learned more in that course than any course they had taken in college' (Murman, 2017: vi). Other researchers similarly claim that lean short courses provide a meaningful framework for work-readiness training across a range of disciplines, including engineering, health sciences, and business, management and accountancy (Carenys & Moya, 2016; Chavan & Carter, 2018). Online lean courses have been developed to include workplace simulations beyond production, such as design and forecasting (Flumerfelt & Green, 2013: 357) and many online courses include 'authentic team-based learning' (Lohmann, Pratt, Benckendorff, Strickland, Reynolds & Whitelaw, 2019: 455).

Lean application requires 'careful translation through contextualization of best practice

from one sector to another' (Flumerfelt & Green, 2013: 360). Translating concepts such as 'customer', 'product', and especially 'value' from the world of business to education implies an equivalence between higher education students and a commercial transaction, and is perhaps one reason why the lean model has not seen much use in higher education. Nevertheless, the underlying principles of lean education and its emphasis on iterative learning, continuous improvement, and worker empowerment are applicable to many of the types of problems faced in education (Bryk, 2017).

Sawhney and De Anda (2017: 110) explain that a work-readiness short course has to be in line with traditions and norms of the culture where the implementation is taking place, as this will determine the success of the initiative. Lean systems, they feel, are unlikely to address local problems 'if applied rigorously by the book' (Sawhney & De Anda, 2017: 110). People often equate lean education with the tools that are used to create efficiencies and standardise processes. However, 'implementing tools represents at most 20 percent of the effort in Lean transformations …the other 80 percent of the effort is expended on changing … practices and behaviours, and ultimately … mindsets' (Mann, 2009: 15).

2.5 Pedagogies for work-readiness

In the literature, the focus of work-readiness training has been on curricular content and arrangements rather than on pedagogies and pedagogical strategies for work-readiness. Pedagogy is generally understood as the method and practice of teaching, in particular the ways in which teaching impacts student learning (Ramsden, 2003: 5). Pedagogies in traditional academic disciplines evolved over time and many have stabilised into 'signature pedagogies' (Shulman, 2005: 53). However, in new and emerging fields, such as work-readiness training, pedagogies are not clearly defined. A recent UNESCO report claims that vocational pedagogy is 'under-researched and under-theorised' (Lucas, 2014: 2). While work-readiness pedagogies are not stable, work-based learning (which pre-dates academic learning) has 'signature pedagogies', such as the induction of apprentices into work practices and the development of their expertise through mentoring and feedback, although most of these pedagogies have not been codified (Barnett, 2006: 145). While much has been codified in terms of the procedural standards and skills expected for both novices and experts, the pedagogies required to attain these standards is in a process of 'evolution' (Viteritti, 2015: 130), and further clarity is needed on the 'epistemological distinctions' that underpin differences in work-oriented pedagogies (Kennedy, Billett, Gherardi & Grealish, 2015: 3). Wenger's classic (1999) study was an early attempt to identify a workplace learning

pedagogy, key features of which were identified as ‘situated learning’, ‘communities of practice’, ‘legitimate peripheral participation’ and the importance of context (Wenger, 1999: 13-15).

2.5.1 Pedagogies in and for the workplace

Billett (2003: 6) has highlighted the need for a more developed ‘pedagogy for the workplace’, that is, a theory of how learning takes place through work. Such a pedagogy would need to provide an explanation of how to support students in developing the capacity to think, question and reflect critically upon workplace practices and processes, including the discourses and cultures that frame that workplace (Kennedy et al., 2015: 8). This pedagogy would also incorporate an explanation of how students can be supported to utilise these skills, not only for their own learning but also to support the learning of those around them (Hungerford & Kentch, 2015: 68). In a study of vocational educators’ conceptions of their own pedagogy, Brennan-Kemmis, and Green (2013: 101) draw on the concept of ‘practice architectures’ (Kemmis & Grootenboer, 2008: 37) and the particular ‘sayings, doings and relatings’ that comprise vocational pedagogies. One ‘practice architecture’ identified in an early study, proposes ‘establishing, accomplishing, and processing’ as ‘signature pedagogies’ of workplace learning (Hughes & Moore, 1999). In their study of fourteen workplaces, Hughes and Moore (1999) found common pedagogical cycles, starting with ‘establishing’, in which the trainees ‘discover the terms of the task: what needs to be done, how the work should be performed, and the criteria by which performance will be judged’ (Hughes & Moore, 1999: 6). There is considerable variation in the ‘establishing phase’, related to who initiates the task, the degree of explicitness, resources available, and so on. In the next phase, ‘accomplishing’, the trainee ‘has to carry out the task, using the information and directions provided earlier, as well as devising new knowledge in the process’. There are several components of this phase: identity of the participants (who takes part? The newcomer alone, or a set of colleagues and/or supervisors); timing (how long the work can take, and whether it is done in one interrupted period or intermittently); the relations among the participants (the distribution of power and status, and the division of labour); and the resources used in the performance of the task. Finally, trainees may get feedback on the performance of the task, and may have an opportunity to ‘process’ the feedback, rethink strategy and tactics. This process helps to determine how well the work was done and how it might be done differently in the future. In addition, there are several variables in ‘the timing of the processing (during the work, intermittently, or in a post-task event); and the form and channel of the feedback, verbally or in writing; formal or informal (Hughes & Moore, 1999: 6-8).

While broad pedagogical cycles, such as those described above, are recognisable as typical of practice-based learning, Billet (2003) explains that one of the key challenges in codifying a pedagogy for the workplace is its situated nature. The demands of work are often highly complex, demanding, and 'far from routine' (Billett, 2003: 7). Expertise in work and the development of such expertise is part of the complexity of human performance. Because workplace learning is contextual, its pedagogy needs to be adaptable and is highly dependent on the teacher's ability to identify 'teachable moments' (Billet, 2003: 10). Consequently, the pedagogic practices need to be directed towards effectively utilising experiences that are often unplanned (Billett & Choy, 2013: 26). In support of such unplanned teaching and learning, work-oriented pedagogies need to include learning episodes that can be planned and provided before, during and after practicums (Billett & Choy, 2013: 28).

2.5.2 *Kaizen*-based pedagogies

Kaizen work-readiness pedagogy takes up the challenge of situated learning largely by simulating workplace learning and the cultures and relationships that contribute to the complexity of learning in a context where the focus is on manufacture rather than education. In doing so, it attempts to codify an approach based on principles and values that are inherent to the practice of work, rather than traditional academia. *Kaizen* pedagogy is more commonly referred to as 'lean teaching' and is the application of *kaizen* principles and practices to teaching (Murman, 2017: vi). Lean principles such as 'Continuous Improvement' and 'Respect for People' are key to the teaching and learning relationship in lean education (Emiliani, 2005). The first principle of lean teaching is 'value', which although 'not easy to specify' in teaching and learning, is usually associated with student feedback and reflection or other 'mechanism of enquiries at the end of every class and at the end of the course' (Alves, Sousa, Dinis-Carvalho & Moreira, 2017: 169). Regular feedback and reflection, promotes 'flow', which is achieved when students have opportunities to engage with new knowledge in multiple ways, such as experiencing it, discussing it, being tested on it, making presentations on it, and reflecting on it (Alves, Sousa, Dinis-Carvalho & Moreira, 2017: 169).

According to Emiliaini (2005), student feedback is key to value and quality in lean teaching. While soliciting feedback from students throughout the education process and responding 'to feedback whenever offered' might have been inspired by lean management strategies (a key feature of which is to 'incorporate the voice of the customer') obtaining and responding to feedback from students translates from

business practices in an educational value (Emiliani, 2005: 184).

Lean teaching has much in common with lean approaches to work, and is particularly pertinent to the management of organisations in the ways in which it attempts to bring value and quality to the learning process and benefits to students, employers, and society at large (Womack et al., 2003). This is achieved, in part, by improving processes through 'eliminating waste, unevenness and unreasonableness' (Emilani, 2005: 186). Studies provide many examples of 'waste' that directly impacts student learning and propose ways in which waste can be eliminated and cycles of continuous improvement can benefit students, their teachers and the industries to which they are preparing to contribute (Holm & Waterbury, 2010; Doman, 2011). Emiliani (2015) claims that for continuous improvement in lean education, teaching must ensure 'that lean does not harm students and other stakeholders' (Emiliani, 2015: 52).

The elimination of waste in lean teaching often translates into a 'just-in-time' pedagogy, examples of which include introducing topics 'just-in-time as they started a summer internship at a company that was aggressively implementing Lean through all its operations' (Murman, 2017: viii). Murman explains the success of the LAI programme to the strong the alignment between the pedagogy used in the short course and 'what they were learning during their internship'.

Elimination of waste is a key *kaizen* principle; as a pedagogical principle it proposes that lectures should be efficient and oriented 'to the resolution of practical cases, preferably real cases to be discussed and resolved using a group of students (Caseiro & Alberto, 2013: 35). Caseiro and Alberto (2013: 35) argue that eliminating 'waste' in teaching and learning stimulates 'cooperation and communication'.

The examples above, show that lean teaching, despite its attempts to codify its pedagogy, is not exempt from the difficulties that beset vocational pedagogy more generally, that is, its situated nature and the need for teachers to be acutely aware of 'teachable moments' that arise in unplanned ways and which are crucial to the quality of learning. Key to 'just-in-time' teaching is 'creativity' and the acceptance of 'uncertainty'; thus both teachers and students 'need strategies to assist them to use uncertainty as a positive force to support creativity rather than uncertainty leading to a sense of uncontrolled chaos and confusion' (Smith et al., 2013: 152). Although there are benefits arising from waste reduction, enhancing flow and preventing errors with lean methods and tools, Alagaraja (2014: 207) warns that a potential limitation is that the approach could lead to unsustainable increased workloads on lean educators.

Sawhney and De Anda (2017: 116) characterise a more 'stable' lean pedagogy as one that provides the student with the knowledge that is valued in workplaces. This requires

the academic staff to be up-to-date about developments in workplaces and to take the responsibility of continuously improving their teaching materials and practices. They argue that university teachers with workplace experience are at an advantage because they can bring in their experience and their industry research into the academic classroom. They further explain the importance of continually showing the relevance and application of the topic that they are teaching and the creating of opportunities for students to apply their knowledge in what they term 'real life laboratories for the students'.

Without a deep understanding of vocational pedagogy, as demonstrated by Sawhney and De Anda (2017) above, there is the danger of reducing the complex relationship between teaching and learning to a simple manufacturing input/output cycle – as Tatikonda (2007: 32) does when he compares grouping machines to reduce cycle time in manufacturing to 'grouping topics with a common underlying theme', and claiming this as an effective pedagogical strategy.

It is important to point out that many authors do not confuse or conflate lean education with lean manufacture. Several of the pedagogies have become 'codified' in *kaizen*-based training, such as the Plan-Do-Check-Act (PDCA) cycle' which students learn to apply, thereby becoming aware that plans (P) are followed by doing (D), checking if the expected results are achieved (C), and planning for improvements and implementing the improvements (action) (A) – and the distinction between work and learning have become blurred. Indeed, educators such as, for an example, Murman et al (2014: 220) and Gomes, Lopes & De Carvallo (2013: 191) have found it necessary to adapt 'standard' *kaizen* pedagogies for different disciplines and fields. What remains constant, however, is the underpinning values and logic of *kaizen* as it is practiced in work contexts, in particular the critical examination and questioning of activities (Goetsch & Davis, 2014: 52), the elimination of 'waste, unevenness, and unreasonableness' (Alagaraja, 2014: 230), and the engagement at all levels of an organisation to promote teamwork (Emiliani, 2005: 41).

Lean pedagogy used in work-readiness training is derived from: '(a) Continuous improvement of an assembly line, (b) design of workstations with the *kaizen* approach, (c) Use of the Heijunka system to drive the information flow, Problem Solving Value Stream Mapping…' (Messaoudene, 2017: 89). The pedagogy is described as following the lean work structure: '(i) identification of value, (ii) mapping of the value stream, (iii) creation of flow, (iv) implementation of pull production and (v) pursuit of perfection' (Alves, Sousa, Dinis-Carvalho & Moreira, 2017: 163).

Roth (2007: 360) constructed a hybrid lean pedagogy based both on *kaizen* principles,

and on the principles of scientific thinking, such as ruling out alternative explanations for findings, demonstrating causality, and so on. It is appropriate, as Paco, Ferreira & Raposo (2016) and Roth (2007)'s studies show, to apply the scientific method to Continuous Improvement in order to understand the source of problems, propose and validate hypotheses, and identify countermeasures. Emiliani (2015: 4) combined lean principles, processes and tools used in day-today management practice with a more critical approach to management studies, encouraging students to ask questions such as:

> 'What is the objective of this reading or assignment?', 'What is it supposed to teach us?', 'How does it link to previous or future materials?', and 'Why are we doing this?' (Emiliani, 2015: 4).

In studies on *kaizen*-based work-readiness pedagogies, there are a number of recurrent themes: 'learner-centric pedagogy' (Murman, 2017: vi), 'active learning' (Alves, Flumerfelt & Kahlen, 2017: 10), 'simulation and serious games' (Stadnicka, 2017:128), 'simulations, active learning, and other techniques different than traditional lectures' (Murman, 2017: viii), 'educational activity is an innovating pedagogy that confronts our students in a realistic situation' (Sawhney & De Anda, 2017: 120). Educators clarify that the pedagogy is inspired by work practice, as in the 'Conceive, Develop, Implement, and Operate' (CDIO) approach that is intended to 'educate engineers who can engineer' (Crawley, Brodeur & Soderholm, 2008: 140). Lean pedagogy is thus oriented towards learning by doing, while its typical pedagogies are characterised 'by real-life situations (in companies)' and 'the determinants for adaptive learning for problem-solving' (Messaoudene, 2017: 88).

Sawhney and De Anda (2017: 116-7) point out that that while academic staff have 'the responsibility to connect the material taught with the rest of the student's curriculum' there also needs to be 'joint responsibility of industry and academia' for the training. The key pedagogies for lean education have developed to facilitate the acquisition of lean knowledge and practice; these include: 1) active learning (usually in the form of game-based learning in a workplace simulation), 2) critical and reflective learning towards improvement, 3) team-based learning, and 4) iterative learning (Candido et al., 2007). The pedagogies are underpinned by the logic of practice: 'more activity-, project- and problem-based learning, just-in-time approaches and hands-on application, and less formulaic approaches that turn students off' (Lucas, 2014: 32).

2.5.3 Physical and Virtual Spaces for Work-Readiness Training

Spatial configurations for *kaizen*-based training are important, because the training is

different from traditional classroom-based learning. The kind of space in which training occurs, as well as how it is configured by furniture or other physical arrangements, literally and symbolically positions the presenter and students in a particular relationship (Savin-Baden, McFarland & Savin-Baden, 2008: 218-9). Students 'read' the space and understand the relationships implied by its arrangements (Kolb & Kolb, 2005: 200). They also understand, in broad terms, what is required of them when the training space is configured in these different ways, such as whether they are expected to take more active roles or more passive roles in the learning process (Gruenewald, 2003: 623). A teaching and learning space thus represents the teaching and learning relationship. The spatial arrangement of chairs facing a podium that has a screen signals that a PowerPoint presentation will take place (Adams, 2006: 390). It also signals that the presenter has information that he or she is going to present to the students. If the students are seated at tables for writing, the space additionally signals that the information to be imparted is important and the students should take note of this information – both by literally taking notes, as well as more symbolically, by paying attention (Bickford, 2002: 47). Workshop-style seating signals to the students that they are expected to undertake tasks or discussion activities, or both. Cabaret-style seating suggests that both input from a facilitator will take place and that some interaction between presenter and student will take place.

In workplace learning, as its name suggests, students move from academic sites of learning to the workplace. Learning in a workplace is challenging for students; this is mainly because in workplaces, work (in the form of manufacture, production or service) is the priority rather than learning, and the facilitation of learning (Walden, 2008: 380). An important part of work-readiness training is to prepare students to learn across different sites. It is for this reason that spatial configurations are particularly important in *kaizen*-based work-readiness training. Work-readiness training is a preparation for work practice and learning from work experiences. For this reason, work-readiness training usually happens in an educational site (Murman, 2017: vi), although in some cases workplaces offer their sites for such training purposes (De Vin & Jacobsson, 2017: 274). In most *kaizen*-based work-readiness short courses the workplace is simulated and the simulation is intended to represent a production process (Alves, Sousa, Dinis-Carvalho & Moreira, 2017: 153; Murman, 2017: viii). Students actively engage with artefacts in this simulated work environment to better understand the production process, including the role of teamwork, team-debriefing and introspective reflection in constantly improving the system (Wharton, 2017). Simulated artefacts and simulation techniques have changed over time and evolved in the implementation of lean work-readiness short courses to meet the needs of different contexts (Gomes et

al., 2013: 191; Silva, Xambre & Lopes, 2013; Murman et al., 2014). There are, however, a number of key issues for spatial arrangements in *kaizen*-based training. The space needs to accommodate 'simulations (also called serious games …), active learning exercises, *gemba* walks, a case study, a team project, and (of course) lectures' (Murman, 2017: viii). Authors note that 'space for the active participation of students is a significant part of the class' (Alves, Sousa, Dinis-Carvalho and Moreira, 2017: 167), as are adaptable workstations (Alves, Sousa, Dinis-Carvalho and Moreira, 2017: 153). Thus the training is not well accommodated in, for example, a laboratory with fixed fittings; the idea is that in the training process students will make many adjustments to their workstations for the purpose of eliminating waste and improving efficiency. According to Murman (2017: vi), lean work-readiness training can be offered in almost any space that meets the basic criteria of accommodating active learning and is reasonably flexible: 'public library, a youth hangout, an adult co-working space'. Navarre in (2017) his study of technology in support of lean education, argues the importance of keeping to the basics and that it is unnecessary 'to make examples and simulations as accurate to real systems as possible' (Navarre, 2017: 56). Navarre (2017) explains that teachers often feel that a classroom experience is not 'real' and therefore try to simulate and actual workplace as realistically as possible, but point out that 'any simulation is always a relaxation of reality'. He argues that educators should rather focus on 'maximizing the teachable moments and design the simulation to reinforce the principle of the course to the greatest degree possible' (Navarre, 2017: 56). Navarre (2017) claims that specialised kits purchased for *kaizen* training activities are not necessary as these are often expensive, require special storage and are difficult to transport to the classroom; replacing missing pieces is costly and could reduce adoption of the simulation. Harris, Harris and Wilson (2003: 6-7) concur; they found that a *'Kanban* simulation' using paper airplanes was cost effective and students could create large volumes of production without concerns about running out of materials. One piece of equipment that most studies agree is important is a video recorder (e.g. Cudney, Corns, Farris, Gent, Grasman & Guardiola, 2011: 26). The 'recording video is not trivial', but is an 'opportunity to remove pure content delivery from the classroom' and has 'great potential for on-campus education' (Navarre, 2017: 63).

Not all studies support the minimalist approach. In their study of *kaizen*-based work-readiness short courses, De Vin and Jacobsson (2017: 268) found that 'it is important that a training environment … more realistically represents the work environment; otherwise training transfer will be limited'. It has been pointed out that the adequacy of the venue has symbolic value as well as practical affordances for *kaizen* training. A well-resourced space can indicate that there is faculty 'buy in' (Alves, Sousa, Dinis-

Carvalho & Moreira 2017: 163); while moving the course off campus to a workplace training facility indicates the value that industry generally, or a particular company, ascribes to the training (De Vin, Jacobsson & Odhe, 2018: 579). There are also studies that take the view, that an 'adequate technological infrastructure in the classrooms' is necessary for *kaizen*-based training (Mansur et al., 2016: 34), including a well-maintained space to be used as the 'inventory facility' in *kaizen* training (Mansur et al. 2016: 36). In a software engineering context, Cudney, Corns, Farris, Gent, Grasman and Guardiola (2011) argue that the specialisation of spaces and tools is necessary for work-readiness. They claim that the absence of appropriate software engineering tools and tasks is likely to result in a 'limited scope for experimentation even though lean methods require the analysis of a working process, as well as the opportunity to test solutions in practice' (Cudney et al., 2011: 26). Cudney et al. (2011: 26) have developed *kaizen*-based on-line virtual training environments that enhance undergraduate engineering education for work-readiness 'through projects based on current real-world challenges, thus improving student learning, motivation, and retention'.

The *kaizen* teaching and learning space is always more than its physical dimensions or digital properties. It includes the manner in which the real or virtual space is designed, the training aids that are used, as well as how the students are seated (and in the case of *kaizen*-based training, when they are not seated). The kind of space in which training occurs, as well as how it is configured by furniture or other physical arrangements, literally and symbolically positions the facilitator and students in a particular relationship. The physical space of an educational programme can both shape and be shaped by the activities that take place in them (McLaren & Giroux, 2018: 24). The size and shape of a venue and its available furniture and other facilities (such as Internet connectivity) affects the nature of the training provided (Jamieson, 2003: 122). For example, a flat floor space, tables and chairs that are arranged in a particular way can enable group work and group discussions. The choice of how to arrange the furniture would not be arbitrary, but would be determined by the facilitator's understanding of teaching and learning, the teaching and learning relationship, and the identities of teacher and student (Edwards & Usher, 2003: 2-3).

2.6 A Critique of the Literature on Work-readiness Training

While Mohamad, Ibrahim, Shibghatullah, Rahman, Sulaiman, Rahman, Abdullah and Salleh (2016: 3401) claim that there is growing support from students, academics and employers for work-readiness training, there is little consensus on the content, specific outcomes, or knowledge-base of work-readiness. In this section, the main issues raised

in the literature review are summarised in terms of the level of consensus across the studies, as well as the level of disagreement amongst researchers in the field.

2.6.1 Areas of consensus on Work-readiness Training

While it is generally agreed in the literature that training needs to include both 'the cognitive and affective domains' (e.g., Bandaranaike & Willison, 2015: 225), as well as bridge the 'theory and practice' divide (Basholli, Baxhaku, Dranidis & Hatziapostolou, 2013), this is not the case in work-readiness training. With regard to work-readiness training, studies support the idea that the focus of work-readiness training is interpersonal and personal, or professional, skills. The development of personal and interpersonal skills requires students to understand the value team-work and professionalism in the workplace (Caballero et al., 2011; Costa et al., 2013; De Vin et al., 2018). With regard to 'capstone' or 'stand-alone' courses intended to promote work-readiness, 'career exploration' (Makki et al. 2015: 1010) and 'career awareness' (Watts, 2006: 12) were found to be important for job-seekers. Shafie and Nayan (2010: 122) confirm that such 'employability awareness' can also contribute significantly to students' sense of their readiness for undertaking work. It is also generally agreed that in capstone training towards work-readiness, students be exposed to the technologies that are commonly used in workplaces, particularly if these technologies were not part of the formal curriculum (Stevens & Norman, 2016: 15). Similarly, it is important in short capstone courses that students become familiar with the vocabulary and discourse of the workplace (Madrigal-Hopes, Villavicencio, Foote & Green, 2014: 47). Recent studies have suggested that capstone training needs to foreground practice (Fejzic & Barker, 2015), practical skills (Gill, 2018: 84) and the contexts of practice (Clarke, 2018: 1925). Chhinzer and Russo (2018: 105) claim that a pedagogy for work-readiness is emerging from successful capstone projects that simulate workplace conditions. Drawing on understandings of 'authentic learning' in appropriate contexts similarly supports work-readiness (Jackson, 2015: 362). Llewellynn and Clarke (2014) explain that in order to transition easily into employment, work-readiness programmes must offer students opportunities to apply the 'best industry knowledge, practice and skills to a range of authentic situations to develop the abilities employers require of them in order to enter the workforce industry-ready' (Llewellynn & Clarke, 2014: 73). Thus there is consensus in the literature with regard to the focus of the training, namely personal and inter-personal skills development, as well as the need to simulate forms of workplace learning in order to develop the desired skills.

2.6.2 Areas of Disagreement on Work-readiness Training

There is a lack of consensus on whether a short course would be able to adequately

prepare students' work-readiness. Sawhney and de Anda (2017: 105-6) and Mansur, Leite, and Bastos (2017: 28-9) call for a longer, as well as a more integrated training approach, and point to the need to embed work-readiness skills across the formal qualification or programme. Alves, Sousa, Dinis-Carvalho and Moreira (2017: 155-6) and Murman, McManus and Weigel (2014: 223-4) make the case for short, focused, 'just-in-time' training. Jollands, Jolly and Molyneaux (2012: 152), in an engineering context, claim that project-based learning, in the form of a focused capstone course, effectively simulates work conditions and thus contributes to students' work-readiness. In nurse education, Walker, Yong, Pang, Fullarton, Costa and Dunning (2013: 121) propose 'critical incident training' to prepare students for clinical work. There is thus a lack of consensus in the literature about the structure and duration of work-readiness training.

2.6.3 Gaps in the Literature on Work-readiness Training

The first gap identified in the literature on work-readiness is its lack of a knowledge base. The absence of a body of underpinning knowledge for work-readiness is evident in the lack of detail in the studies, and the absence of 'codified' curricula and curriculum documents. While *kaizen*-based training has attempted to codify its knowledge base to a certain extent, this codification has largely occurred with reference to *kaizen* management principles, rather than educational knowledge. Work-readiness training could thus be said to be 'knowledge blind' (Maton, 2014: 3-4).

While there is agreement that personal and interpersonal skills are central to work-readiness, there is non-specificity with regard to the exact nature of these skills. This is the second gap identified in the literature. Many studies produce 'wish lists' of generic skills, without identifying the specific attributes of work-readiness. Caballero, Walker, and Fuller-Tyszkiewicz's (2011) 'Work Readiness Scale' identifies a range of factors for the purpose of assessing work readiness amongst graduates. However, the list of work-readiness factors is not clearly categorised into, for example, social factors, psychological factors, and so on. There is also no educational theory to support the work-readiness factors – they are derived from rounds of 'common sense' (rather than theorised) questionnaires.

Related to the above issue, a third gap was identified with regard to the lack of educational principles or theory of work-readiness training. Basing educational training on management principles is contentious: Alves, Sousa, Dinis-Carvalho and Moreira (2017: 149) and Murman, McManus and Weigel (2014: 220) defend the educational value of 'continuous improvement' and 'elimination of waste', while Sears (2003: 2-3) and Vidal (2007: 248-9) point to the potential pitfalls for student learning in conflating

management principles and training principles. The lack of a guiding educational theory can be seen in the descriptive, rather than analytic, nature of many studies. In place of educational principles, the authors tend to draw on definitions, such as UNESCO's definition of vocational education (Chhinzer & Russo, 2018: 106-7), as a substitute for a theorised understanding of work-readiness. Related to the theory gap, is the tendency of many authors to uncritically accept *kaizen*-based approaches, such CDIO (e.g., Crawley, Brodeur, & Soderholm, 2008). Many of the studies are not published in educational journals, but rather in management journals, such as the *International Journal of Lean Six Sigma* (e.g., Emilani, 2015), the *International Journal of Production Economics* (e.g., García, Rivera & Iniesta, 2013), The *International Journal of Advanced Manufacturing Technology* (Doolen & Worley, 2009) or the *International Journal of Operations & Production Management* (e.g., Hines, Holweg & Rich, 2004). There are fewer studies published in interdisciplinary journals, such as *Quality Assurance in Education* (e.g., Burston, Southcombe & Bartram, 2015), the *International Journal of Educational Management* (e.g., Chavan & Carter, 2018), *Accounting Education* (Carenys & Moya, 2016), or the *European Journal of Engineering Education* (Hazelton, Malone & Gardner, 2009). There are very few studies in educational journals such as *Studies in Higher Education* (Clarke, 2018), the *Journal of Science Education and Technology* (Crawley, Brodeur & Soderholm, 2008), or the *International Journal of Education Research* (Hadidi, 2014). A clear gap in the literature is thus the absence of educational theory and guiding educational principles.

A fourth weakness identified is the lack of empirical data in many studies and an absence of empirical research to support claims on the effectiveness of work-readiness training interventions. Many of the studies of *kaizen*-based or lean training are descriptions of interventions that lack a clear research or evaluation process (e.g., Alves, Sousa, Dinis-Carvalho & Moreira, 2017; Murman, 2017).

It is these four notable gaps in the literature on work-readiness, namely: 1) the absence of the knowledge base, 2) the non-specificity of work-readiness dispositions, 3) the lack of educational theory, and 4) the missing empirical data in work-readiness research that this study intends to address.

2.7 A conceptual framework for work-readiness training

In the final section of the literature review, the knowledge base of *kaizen*-based training is defined, and a conceptual framework is synthesised from key concepts in the literature.

2.7.1 The knowledge-base of *kaizen*-based work-readiness training

From the literature on *kaizen*-based work-readiness training (e.g., Melton, 2005: 663; Brunet & New, 2003: 1426), *kaizen*-based work-readiness training is derived from kaizen management and team-work practices that in turn are underpinned by ideas from kaizen philosophy that have been simplified and adapted for workplaces, and the manufacturing industry in particular. *Kaizen* training programmes, globally, have attempted to codify the training curriculum, pedagogy and the utilisation of space. These relationships are shown in Figure 2.1.

Figure 2.1: The knowledge bases of *kaizen*-based training

At the base of the pyramid of *kaizen*-based work-readiness training is *kaizen* philosophy. The key philosophical ideas that emerged in the studies on *kaizen*-based training include: 1) eliminating waste, 2) respecting others in organisations, 3) understanding work in organisations, 4) continuous improvement towards innovation, and 5) providing value and quality. At the next level are *kaizen* management practices, such as Total Quality Management (TQM), Six Sigma, and Lean. *Kaizen*-based work-readiness training draws on the knowledge base of *kaizen* philosophy and *kaizen* management practices to develop *kaizen*-based training practices, such the Conceive,

Design, Implement, Operate (CDIO) process, or the 'sort, set in order, shine, standardize and sustain' (5S) methodology, or the 'plan-do-check-act' (PDCA) cycle

2.7.2 The conceptual framework for work-readiness training

Miles and Huberman (1994) describe the conceptual framework as 'the main things to be studied – the key factors, concepts or variables – and the presumed relationship among them' (Miles & Huberman, 1994: 18). In developing the conceptual framework for the study, the research literature on *kaizen*-based work-readiness training was synthesised for the purpose of explaining its key features in terms of curricular structures, pedagogical approaches and spatial arrangements. The conceptual framework thus represents the current state of knowledge on *kaizen*-based work-readiness training. While the literature on *kaizen*-based training has often conflated lean teaching with lean manufacture (e.g., Womack et al., 2003); the conceptual framework sets out to make clear, that while both lean manufacture and lean pedagogies derive from the same *kaizen* principles, and while there are many synergies between lean manufacture, lean management and lean education, training methods encountered in workplace, they are distinct. Table 2.1 below presents the conceptual framework in terms of how the spatial arrangements, curricular structures and pedagogical approaches connect with one other. Thus, it identifies the variables for the evaluation of the EIP.

Table 2.1: A conceptual framework for *kaizen*-based work-readiness training

***Kaizen* principles**	**Educational adaptations of *kaizen* principles**	**Examples from the literature**
Providing value (quality)	*Curriculum:* Citizenship, contribution; *Pedagogy:* Critically reflective learning; *Space:* Conversation space.	Alves et al., 2017. Emiliana, 2014; Kolb & Kolb, 2005;
Continuous improvement (towards innovation)	*Curriculum:* Project-based learning; *Pedagogy*: Iterative learning, 'teachable moments', 'plan-do-check-act' (PDCA); *Space:* Workplace simulation (with flexibility), online environments;	Farris et al. 2009; Alves et al., 2017; Štefanić et al. 2012; Navarre, 2017; Cudney et al. 2011.
Understanding work in organisations	*Curriculum:* understanding systems, processes and roles in organisations; *Pedagogy*: Interdisciplinary learning and scientific method; *Space:* Debriefing space, *Gemba* walks	Brennan & Dempsey, 2018 Siriban-Manalang, 2016; Allen et al., 2009; Paço et al., 2016 Murman, 2017.
Respect for others in organisations	*Curriculum:*5S, practical exercises. *Pedagogy:* Team leaning, roleplay, serious games; *Space:* Flexibility of workstations	Caballero et al., 2011 Costa et al., 2013 De Vin et al., 2018
Eliminating waste	*Curriculum:* Seven wastes, relevance, just-in-time, ethics, values *Pedagogy*: Active and Reflective learning *Space:* Flexible spaces and appropriate technologies	Kanigolla et al., 2014; Mansur et al., 2014 Candido et al., 2007 Narayanamurthy et al., 2017

Eliminating waste is the first principle of *kaizen*-based training, and is a strong guiding value in *kaizen*-based training (Kanigolla, Cudney, Corns & Samaranayake, 2014); it is the key ethical principle on which *kaizen*-based training rests (Mansur et al., 2014: 28). This elimination of waste is present in the underpinning logic of 'relevance', that is, the idea that training should be short and to-the-point – in other words, the 'just-in-time' principle (Murman, 2017: vi). All students in *kaizen*-based work-readiness training will learn about 'the seven wastes' through an active and reflective pedagogy (Candido et al., 2007). Learning from experience and through reflection, supports students towards internalising professional values and ethics (Kanigolla et al., 2014: 47). Shifting between active and reflective learning modes needs flexible spaces and appropriate technologies (Narayanamurthy, Gurumurthy & Chockalingam, 2017: 620).

Respect for others in organisations is another key underpinning principle of *kaizen*-based work-readiness learning, and is found in the guise of team-work and team-building in much of the work-readiness literature generally as it addresses concerns that graduates entering the workforce lack the preparedness and work readiness that is expected of them by employers, particularly in the areas of relational and personal competencies – skills not directly taught in the classroom (Caballero et al., 2011: 44). In *kaizen*-based training respect for others is represented by the '5S' approach to the workstation – respecting others in the organisation by keeping good order in one's workspace and ordered work practices more generally. As with all *kaizen* concepts, 5S is taught through short exercises and assignments, and particularly through team leaning, role play and serious games (Strachan, 2016: 12; Costa, Bragança, Sousa & Alves, 2013). De Vin, Jacobsson and Odhe (2018) argue that the flexible workspaces, emphasised by *kaizen* trainers, need to adapt into specialised elements in some cases to ensure that the 'serious games' are not trivialized (De Vin et al., 2018: 578).

A range of concepts, from fairly basic work-flow diagrams, to complex visual flow maps (identified by Brennan & Dempsey (2018: 115) as a 'threshold concept' in lean education) are important curricular elements for understanding work in organisations. Understanding work in organisations extends the *kaizen* approach of integrating theory with practice across different areas and teamwork, with new approaches in leadership, professionalism and Interdisciplinary teams (Allen et al., 2009: 22). Leaning about work activities and processes beyond the core team, requires spaces that enable teams and individuals to learn from one another, and conduct '*gemba* walks' (Murman, 2017: xii).

The intention of much *kaizen*-based work-readiness training is to demonstrate how innovation arises from applying the principle of continuous improvement. This is usually achieved through short project-based learning, or what is often referred to in the literature as a '*kaizen* event' (Farris et al., 2009: 42). In order to learn the concept of continuous improvement, there needs to be iterative learning (Alves, Sousa, Dinis-Carvalho & Moreira 2017: 150), 'teachable moments' (Murman, 2017: vii) and implementation of the 'plan-do-check-act' (PDCA) cycle (Štefanić, Tošanović & Hegedić, 2012: 93). The pedagogies associated with continuous improvement follow the scientific method, or in the business context 'agile testing and learning cycles to validate hypotheses in the business idea' (Paço et al., 2016: 39). Spaces that simulate workplaces are necessary for students to undertake these iterative learning processes and understand how changes and innovations emerge as each cycle is completed. Such spaces are usually physical (Navarre, 2017: 53), but are increasingly becoming virtual learning spaces that are able to track how innovation emerges from small improvements (Cudney et al., 2011).

All *kaizen*-based training aspires to contribute value to a company, and beyond the company, value to society, through incremental industry improvements. While 'value' and 'quality' have been strongly critiqued as neo-liberal ideals intended to disempower workers (e.g. Sears, 2003: 2-3; Vidal, 2007: 6-7). Emiliani (2005: 37) disagrees; he argues that the work team is at the heart of *kaizen* management practice, and that the ability of the team to think critically is key to the success of the company; the team's ability to think of its contribution beyond the immediate workplace not only a strong motivation of *kaizen*-based training, but one of its core values that links back to the elimination of waste. Critically reflective teaching and learning is thus a key *kaizen* work-readiness training pedagogy. In order to foster critical thinking 'safe spaces' for critical dialogues are necessary. Human beings naturally make meaning from their experiences through conversations (Kolb & Kolb, 2015: 205), this is similarly the case in *kaizen*-based work readiness training.

2.7.3 The way forward: Conceptual and theoretical alignment

The conceptual framework for the study develops from the underlying values-based framework of *kaizen*-based work readiness training, namely eliminating waste, respecting others in organisations, understanding work in organisations, continuous improvement towards innovation, and providing value and quality. In the next chapter the theoretical framework for the study is developed. Its purpose is to provide logical educational criteria towards the evaluation of the EIP.

3 CHAPTER THREE THEORISING WORK-READINESS TRAINING

3.1 Introduction to Chapter Three

In this section the ontological position and conceptual and theoretical frameworks that guide this study are explained, and their relevance to the study is motivated. A theoretical framework for understanding work-readiness in technical and vocational education is developed, drawing on, and extending, Legitimation Code Theory's (LCT) Specialization dimension. The concept of the 'work-ready' knower and the 'work-ready gaze' are proposed, and the values underpinning work-readiness training in Japan and South Africa are theorised.

3.2 A realist ontological position on work-readiness

The basic premise of ontological realism is that reality exists, but that our understanding of it is partial, imperfect and fallible. Realism thus posits a distinction between ontology and epistemology, or reality and theory. The realist ontological position taken on work-readiness in this study is that that work-readiness is a social phenomenon. Social phenomena, like natural phenomena, exist and have causal powers, regardless of how people understand or theorise these phenomena (Maxwell, 2012). Thus even while any understanding work-readiness can only be partial and imperfect, work-readiness has an independent reality that has causal properties. Simply put, we may not be able to 'see' work-readiness, but we can 'see' its effects on people, particularly on who is deemed to be 'work-ready' and who is not, and we see its effects in the ways in which work-readiness educational programme are structured. A realist ontology is a 'depth ontology' (Bhaskar, 2010) that explains why our understanding of social phenomena, such as work-readiness, can only be partial. Our understanding of work-readiness is, firstly, limited to what we can perceive. Thus the first or 'empirical' layer of a depth ontology comprises that which we perceive or experience. Beyond what we experience, we can collect different forms on data on the social phenomenon. Thus the second or 'actual' layer comprises that which we can substantiate, for example, through documentary or other recorded evidence. Finally, the deepest layer is that of the 'real' that comprises the underlying structures and mechanisms, the slow-to-change deep structures of society and power.

From a realistic perspective, 'work-readiness' is one such social structure, a deeply embedded social mechanism that has causal powers and controls who obtains access to particular kinds of work and particular kinds of remuneration in our society. The status

of reality is only accorded to the social structures that underlie appearances and which can only be understood in terms of their impact on what we can perceive (the empirical) or show to have existed (the actual). Thus 'work- readiness' exists at the level of the real. It has causal properties that strongly impact the nature of the events at the level of the 'actual' (such as the EIP, which is the focus of the study), as well as the experiences and perceptions of its participants. This study therefore understands that reality is stratified, requiring that the levels of the empirical, the actual, and the real are disambiguated, as in Table 3.1 below.

Table 3.1: A depth ontology for the study of work-readiness training

Ontological layers	Examples	Examples related to the study
The level of the empirical	Experiences, perceptions, impressions	Students', facilitators' and employers' experiences and perceptions of the EIP
The level of the actual	Documents, records, media	EIP curriculum documents and media (e.g., power point slides), video-recordings of EIP training.
The level of the real	Social structures and mechanisms	Work-readiness in South Africa (who is considered to work-ready? Who attains work? What kinds of work? Which work-ready attributes are most desired by employers?)

(Adapted from Bhaskar, 2011:103)

In line with a realist ontology, this study understands that work-readiness exists at the level of the real and has causal powers and tendencies, and that work-readiness can only be studied by its effects; studying its effects can elucidate its properties as an underlying causal mechanism. As a generative mechanism work-readiness cannot be directly accessed, its properties must be inferred from its effects. At the level of the actual we will find evidence of the effects of work-readiness, for example, in the EIP curriculum documents and assessment tasks. At the level of the empirical we can discover participants' perceptions about the work-readiness training that they experienced through observations and interviews.

From this realist ontological position on work-readiness, this study critiques the limited conception of work-readiness as a set of narrow personal skills. This is the dominant view of work-readiness that emerges from the literature which emphasises the 'extent to which graduates are perceived to possess the attitudes and attributes that make them prepared or ready for success in the work environment' (Caballero et al., 2011). This view places the burden of work-readiness on the students' achievement of the necessary 'attitudes and attributes' for successful employment. If work-readiness is understood as the students' 'problem', it has implications for work-readiness training and how it might be neglected or under-valued by academics whose concern is mainly for the discipline and its field (Higgs, Barnett, Billett, Hutchings & Trede, 2013). While the student is at the centre of his/her own work-readiness, a realist position understands

that work-readiness is likely to be influenced, amongst other factors, by socio-economic status, race and gender. Viewing work-readiness in isolation from its context would make issues of inequality invisible (Moreau & Leathwood, 2006), shifting the burden of employment success away from the generative mechanisms of society and onto the individual. What is needed in order to research work-readiness, is a theory that could address the generative powers and properties of work- readiness a social phenomenon.

Because the realist ontological position distinguishes between ontology and epistemology, and because it understands the process of knowing as fallible, it accepts a wide range of theoretical positions. Maxwell, for example, describes his own position as the 'combination of ontological realism and epistemological constructivism' (Maxwell, 2012: 1). Using a theory that is more clearly aligned with a realist ontological position, such as Legitimation Code Theory (LCT), to shape the research study, can potentially make more visible the causal powers and tendencies of work-readiness as a generative and causal mechanism through its affordances and effects – as well as why perceptions of work-readiness might 'lend themselves more to certain forms of pedagogy, evaluation, identity, change over time, and so forth, than others' (Maton, 2009: 55).

3.3 A Theoretical Framework: Work-readiness in Technical Vocational Education

While the capacity for employability in technical and vocational fields is primarily dependent on the applicants acquiring the core knowledge related to their occupation, the literature on work-readiness emphasised desirable affective and attitudinal dispositions. The literature suggests that there are many ways to attain work-ready dispositions, for example, through integrating soft skills into the technical curriculum. The literature also concedes that there is a place for short courses to enhance both technical skills, for example, updating technicians on new technologies (Smith & Louwagie, 2017), as well as developing 'soft skills' through interpersonal and intra-personal training (Stevens & Norman, 2016.). Several of the studies surveyed in the review of the literature in the previous chapter identified desirable characteristics and attitudes for work-readiness, such as team-work, a service orientation and a positive attitude, and provided examples and evaluations of exemplary short courses; but they did not explain the underpinning principles or theoretical foundations of programmes that purport to achieve these desirable characteristics. What is therefore absent from the literature is an understanding of the knowledge structures and practices that

underpin successful work-readiness training, and how such training might enable or foster the emergence of capable and work-ready subjects.

3.3.1 Why Legitimation Code Theory?

Because this study seeks to understand the underlying principles of a short course that offers work-readiness training, and to build an understanding of work-ready knowers, it draws on LCT concepts to theorise issues in work-readiness. LCT is a sociological framework for analysing practices and their underpinning principles. Thus LCT is a framework that 'enables knowledge practices to be seen, their organising principles to be conceptualised and their effects to be explored' (Maton, 2014: 45). LCT has been used to study all levels of education, from school to University and beyond, and is thus an appropriate framework for understand practices intended to enhance work-readiness. LCT offers an explanation of the underlying structures of different knowledge forms and of the ways in which knowers orientate themselves to knowledge in a particular field.

In this study, LCT is used to make visible the principles that underpin work-readiness training in the field of technical and vocational education more generally, as well as in a specific short course that is the focus of this thesis, the EIP. LCT addresses the gaps and weaknesses in the literature (see Section 2.6) with regard to theoretical underpinning as well as making visible the specifics of the work-readiness factors. It is of benefit for both students and academics to understand the underpinning principles of the forms of training offered to enhance students' successful transfer from academic classroom to industry. The intention to reveal the underpinning principles in work-readiness training is to improve such training, both from students' perspectives and from the perspective of industry expectations.

LCT is a multidimensional framework that offers a wide range of 'tools' that researchers can use to analyse educational (and other) practices. LCT thus provides both a conceptual toolkit and analytical methodology. In terms of its ontological positioning, LCT understands knowledge as incorporating both social and real qualities. LCT offers a 'sociology of possibility' (Maton, 2014: 3) that embraces the 'both/and' perspective of Social Realism, considering relations to and relations within knowledge. In this sense, it provides a realistic way of thinking while at the same time upholding the social nature of knowledge and knowledge practices. LCT incorporates and builds on the work of Bernstein's code theory and Bourdieu's field theory, amongst others. It is multidimensional, comprising five different dimensions: Specialization, Semantics,

Autonomy, Temporality and Density. Each dimension explores one set of organising principles of dispositions, practices and fields, conceptualised in LCT as legitimation codes. An analysis of legitimation codes explores 'what is possible for whom, when, where and how, and who is able to define these possibilities, when, where and how' (Maton, 2014: 18). Embracing Bourdieu's relational way of thinking and extending Bernstein's code theory, these concepts are seen in relational terms, on a continuum rather than as typologies. For this reason, LCT's concepts are represented in terms of relative strengths and weaknesses on a Cartesian plane.

3.3.2 LCT in vocational and technical education research

LCT has been adopted in a number of studies to investigate a range of educational concerns, particularly in South Africa where the social justice imperative of opening access to higher education for candidates from disadvantaged educational backgrounds is a higher education priority. Research drawing on LCT in technical and vocational education to date has largely focused on issues of disciplinary curricula (Shay, 2013), learning in the disciplines (e.g. Wolmarans, 2016), and disciplinary learning (e.g., Shay & Steyn, 2015). LCT has also been applied to studies focused on curriculum reform (e.g. Luckett, 2019) as pressure mounts to increase students' access to South African Universities, and to 'decolonise' their curricula and knowledge practices. The wide application of LCT in South African educational research (and particularly in technical and vocational education) demonstrates its usefulness and effectiveness in opening up knowledge and knowledge practices and dispositions to increasing numbers of teachers and students. While LCT has not been applied to a study of work-readiness training, its general propensity to make the 'rules of the game' visible is central to this research study. The examples cited above provide evidence of the suitability and appropriateness of a framework such as LCT to explore concerns related to graduates' work-readiness. The substantive concerns of opening access to technical and vocational education is not isolated to the South African context alone. LCT has been, and continues to be, used extensively internationally. For example, it has been used to interrogate teaching and learning practices in design education in Australia (Carvalho, Dong & Maton, 2009), strategic issues in vocational education (Locke & Maton, 2018), and teacher education (Macnaught, Maton, Martin & Matruglio, 2013). It has also been used to look at issues of meaning-making in higher education contexts in the United Kingdom (e.g., Clegg, 2016). LCT is also being used to explore knowledge issues in technical workplaces (e.g., Wolff & Hoffman, 2014). LCT's Specialisation Dimension has been used effectively to understand inter-cultural

education (Chen & Bennett, 2012), which has particular relevance to the current study in understanding Japanese-developed EIP offered to South African students as an example of inter- cultural education.

Each unique research problem requires different theoretical requirements, meaning that an exhaustive LCT analysis using all five dimensions is not necessarily beneficial or appropriate. The nature of the empirical problem at hand – work-readiness training – calls for the close analysis of knowledge enacted in curricular documents to reveal the types of knowledge that is valued and why, as well as how it is experienced by participants enrolled in the programme to analyse these features, the dimension of Specialization, and the social plane in particular, was deemed the most suitable – as the remainder of this chapter will demonstrate. Specialization affords a focus on both epistemic relations to practices and their object, as well as social relations between practices and their subject. This enables insights to be gained about what kinds of knowledge are valued in work-readiness training and what kinds of knowers are considered legitimate. This affords insights into the nature of work-readiness as understood by the EIP. Because the EIP is a short course concerned with social relations to work-readiness practices, the social plane (a sub-plane of the Specialization plane) is particularly appropriate to the study. In order to demonstrate the appropriateness of the Specialization dimension, the social plane and axiological condensation as used in this study, each of these theoretical concepts is discussed in more detail below.

3.3.3 The Specialization Dimension: Knower-building in Vocational Education

The Specialization dimension explores practices in terms of knowledge-knower structures whose organising principles are given specialisation codes that comprise relative strengths traced over time on specialization profiles. This study draws on the Specialization dimension of LCT to analyse the specialist knowledge structures and knower dispositions in work-readiness training.

Specialization explains what makes a programme and its participants worthy of distinction, and is based on the premise that ‘practices and beliefs are about or oriented to something and made by someone’ (Maton, 2014: 29). Thus Specialization enables an analytic distinction between ‘epistemic relations between practices and their objects of focus’ and ‘social relations between practices and their subjects’. (Maton, 2014: 29). A key premise of LCT is that ‘actors and discourses are not only positioned in both structures of knowledge and structures of knowers but also establish different forms of relations to these structures’ (Maton, 2014: 72). In some fields (such as in technical

vocational education) epistemic relations are stronger; while in other vocational fields (such as marketing or management) social relations may be more dominant. However, both epistemic relations and social relations will be present in all fields; what is important is the relative strengths of their emphases. Thus a claim to legitimacy can be viewed as specialised by its epistemic relations, by its social relations, by both, or by neither. Emphasis on the epistemic relation suggests that the possession of specialised knowledge, skills or procedures are important as the basis of achievement, while the dispositions of the subjects, although not unimportant, are not central. On the other hand, an emphasis on social relations implies that specialist knowledge or skills are less significant and instead it is the dispositions of the subject as a knower that is the measure of achievement. In some fields (in vocational education these would be typified by the health sciences), possessing both specialist knowledge (e.g., Anatomy and Pharmacology) and being the right kind of subject (e.g., a caring practitioner) is important. Finally, there are fields (and these would typically be new or emerging fields, such as fashion design or web design), where neither specialist knowledge nor specific dispositions have been found to characterise the programme.

The Specialization Dimension of LCT can be represented as a Cartesian plane in which the Y-axis represents a continuum of stronger (+) and weaker (-) epistemic relations (ER) to practices and objects; while the X-axis represents a continuum of stronger (+) and weaker (-) social relations (SR) to practices and their subjects. (See Figure 3.1). Together, the relative strengths of the epistemic relations and social relations give rise to a series of Specialization codes, which encapsulate the basis of legitimation and achievement in a particular field. Technical programmes that are based on the STEM disciplines and fields are typified by 'knowledge codes' (ER+, SR-) where the object and method of study are strongly underpinned by scientific knowledge and the scientific method. The Humanities and Social Sciences are typified by 'knower codes' (ER-,SR+), where legitimacy is derived from the unique attributes and dispositions of the knower. An elite code (ER+SR+) implies that both possessing specialist knowledge and being the right kind of knower is important. ('Elite' does not mean 'socially exclusive' but rather highlights the necessity of possessing both legitimate knowledge and legitimate dispositions). Finally, a relativist code (ER-, SR-) suggests that neither specialist knowledge nor specific dispositions characterise the programme.

Different disciplines and fields can be plotted on the Specialization plane, dependent on the relative strengths and weakness of the epistemic relations to practices and objects and the social relations to practices and subjects.

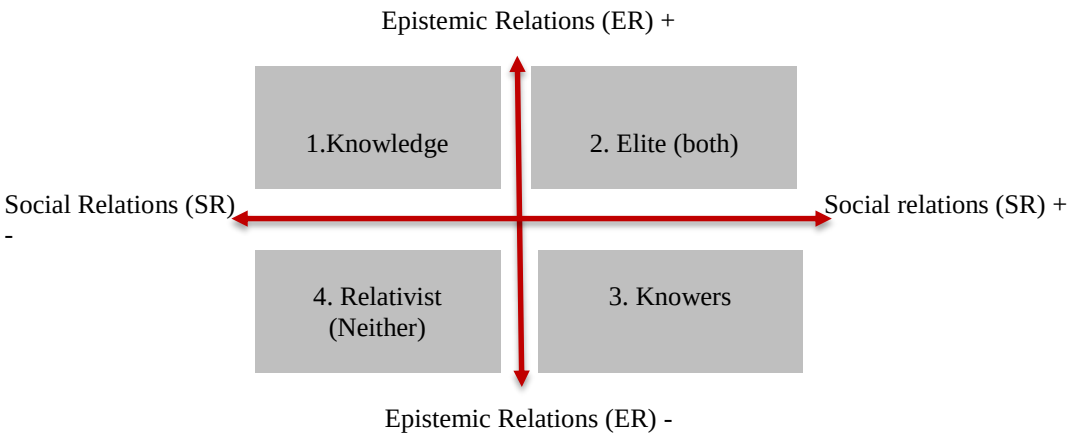

Figure 3.1: The Specialization Plane (adapted from Maton, 2014: 30).

Specialization has been commonly used to distinguish the particular characteristics of different disciplines and fields, but the lens of Specialization can also be focused on a specific field – in this case technical and vocational education. The focus on technical and vocational fields is for the purpose of uncovering both epistemic relations and social relations in these fields. The particular configurations of the epistemic relations, and social relations in technical and vocational disciplines and fields will vary along a continuum, with many possible combinations and hybrids. The Specialization dimension renders visible a range of positions that academics and practitioners might see as legitimate forms of training in the field. Instead of forcing false dichotomies such as a technical field having only a 'knowledge code' and not having a 'knower code', Specialization makes visible the presence of both. Maton explains: 'The codes are not ideal types – they conceptualise organising principles rather than gather empirical characteristics' (2014: 33). Most of the programmes offered by Universities of Technology would tend to cluster in the 'knowledge' quadrant of the Specialization plane (Quadrant 1 of Figure 3.1). Thus they would be distinguished by stronger epistemic relations (ER+) and weaker social relations (SR-) – always with exceptions to this general rule. Many of the business courses, such as Marketing, Public Management, and Public Relations would have weaker epistemic relations (ER-) and stronger social relations (SR+). A University of Technology does however tend to be typified by its strong technical programmes, such as the wide variety of engineering technician courses, courses in the applied sciences, and business courses with a stronger epistemic relation, such as Accountancy and Internal Auditing.

The Specialization plane shows that 'there are always knowledges and always knowers' and all fields have 'knowledge-knower structures' (Maton, 2014: 96). What distinguishes different fields is 'how knowledge and knowers are articulated' (Maton,

2014: 96). For knowledge code fields 'the principle basis of legitimacy is developing nowledge, and training specialized knowers is a means to this end' (Maton, 2014: 96). This poses the question of what the weaker social relations might comprise, understanding that some fields 'are more capable of sociality' than others (Maton, 2014: 105). To address the issue of what kind of knowers typify technical fields, it is necessary to expand the 'knower' quadrant (quadrant 3 in Figure. 3.2).

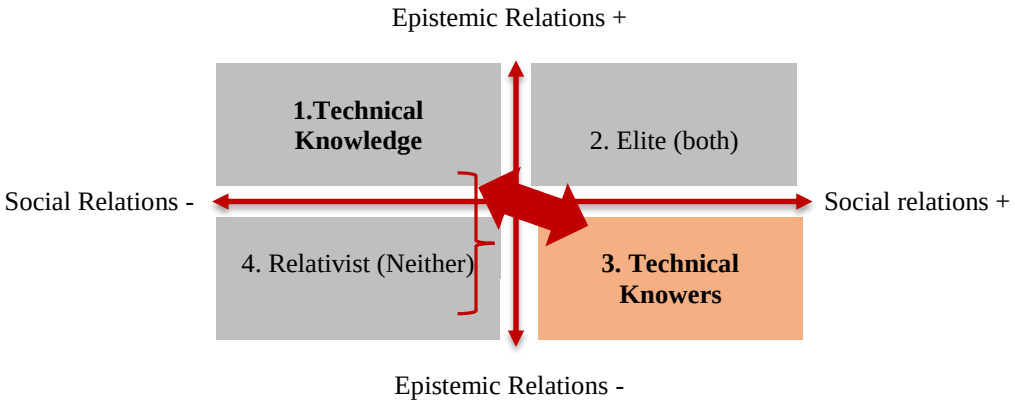

Figure 3.2: The specialization plane in this study (adapted from Maton, 2014: 30).

3.3.4 The social plane: the work-ready knower in technical vocational education

The 'knower' quadrant of the Specialization plane can be expanded to form its own Cartesian plane, the social plane (Figure 3.3). The Y-axis on the social plane represents subjective relations; these are the relations between practices and the kinds of people who engage in these practices (more simply put, subjective relations have to do with who the knowers are). The X-axis represents the interactional relations, these are the relations between practices and the methods of enacting them (or what knowers do, and how they perform their actions). The two continua, subjective relations and interactive relations, create four quadrants to represent four different types of 'gaze'. The social gaze is shaped by social class, race, gender or sexuality; the born gaze is determined by innate abilities, the trained gaze is acquired through training in a specific field, while the cultivated gaze is educationally inculcated (Maton, 2014: 95). Gazes are created by interactions between subjective relations and interactional relations (Maton, 2014). This study is particularly concerned with the kind of gaze that might position technical students and graduates of technical programmes as the kinds of knowers who are both technically competent and work-ready.

Every field involves a specialised gaze, the question is of what kind. For example, understanding specialised knowledge is the basis of legitimacy in a trained gaze

(Maton, 2014: 141). Maton (2014) suggests that anyone, regardless of their social background can be successful in any field, provided they can develop the knowledge, skills, and the appropriate gaze. This raises the question as to whether students in South Africa, and elsewhere, might be able to acquire the kind of gaze that is associated with work- readiness. Could everyone also be successful in transferring technical knowledge acquired at the university to the workplace? This study provides some insight into this issue by examining the kinds of knowers who are legitimated in the EIP.

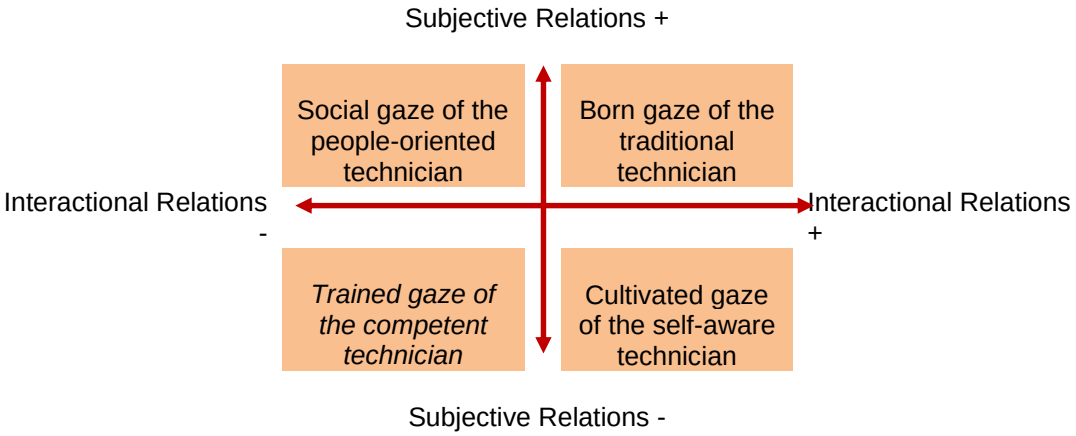

Figure 3.3: The Social plane of work-readiness (adapted from Maton 2014: 186).

3.3.5 The Trained Gaze in Technical Vocational Education

The trained gaze is acquired through 'training in specialized principles or procedures' (Maton, 2014: 95). In technical and vocational education, the trained gaze is privileged and is a consequence of the stronger epistemic relations and weaker social relations that are dominant in technical fields. The basis for legitimacy in the field of technical education is students' and practitioners' mastery of specialised knowledge, rather than their acquisition of specialised dispositions, qualities or attributes. The trained gaze of the engineering technician, the internal auditor or the IT practitioner involves a focus on the technical problem to be solved. Much of the educational provision in technical programmes focuses on ensuring that students have the scientific and technical knowledge to enable them to identify and solve technical problems in structures, machines, manufacturing processes, computers, software, audit statements, etc. (See Figure 3.4 below). The ideal knower in technical education has the necessary dispositions for technical problem-solving in the field of practice. Lecturers in technical and vocational programmes thus value particular dispositions, such as 'having a feel for numbers' (Sellar, 2015), 'thinking like an engineer' (Stephan, Bowman, Park, Sill & Ohland, 2015), or 'systems thinking' (Frank, 2006).

Within these constraints, and enabled by them, engineering technicians and other technical practitioners develop a capacity for expert judgement with regard to identifying a technical problem and deciding on the best way to address it. Attaining a trained gaze is an important part of becoming a competent practitioner and is strongly bound to a technical identity.

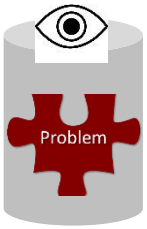

Figure 3.4: The trained gaze

3.3.6 Social and Cultivated gazes in the Work-ready Technician/Practitioner

While the acquisition of a focused technical gaze (the components of which are described above) is key to the work of technicians, and thus their work-readiness, there is increasing recognition that expanded social dispositions are necessary to ensure their work-readiness. For example, there has been increasing pressure from governments and professional bodies to include more soft skills or, in LCT terms, more knower dispositions, into technical programmes. Thus the focus of the trained gaze on technical problems has been considered to be inadequate in addressing graduates' work-readiness. In engineering, for example, key professional skills have been identified in a number of governmental agency and professional council reports internationally. Six of the Engineering Council of South Africa (ECSA)'s eleven required outcomes are well beyond the problem-solving competencies associated with an expanded trained gaze, including: effective communication, understanding social and environmental impact, management skills, life-long learning, professional ethics, and work experience (ECSA, 2015).

There are a number of studies that have listed the dispositions and attributes that enhance work-readiness in technical and vocational contexts – and provide clues to how the trained gaze of the technician might be expanded in the transition from higher education to workplaces (see Section 2.6.1). Boam and Sparrow (1992) find that work-ready technicians are: 1) results oriented, 2) able to analyse and make informed technical decisions, and 3) able to work with people. While being able to make technical decisions is accommodated by a trained gaze, being results oriented suggests a social

gaze that is focused on the industry or company and its needs, while the ability to work with people similarly implies an expansion of the trained gaze towards a more social gaze. Limsila and Ogunlana (2008) proposed additional categories of specialised dispositions for work-ready graduates, namely: 1) achievement and action, 2) helping and human service, 3) impact and influence, 4) managerial, 5) cognitive, and 6) personal effectiveness. Achievement and action, and cognitive abilities would be in the focus of the trained gaze, while service, impact, influence, and management would require a social gaze. Personal effectiveness (like professional ethics) requires the focus of a cultivated gaze that looks inward and reflects on the self and personal growth and development. Sneed and Heiman (1995) in the vocational field of tourism and hospitality proposed five categories of competence that blend aspects of trained and social gazes: 1) handle resources, 2) handle information, 3) interpersonal, 4) handle system, and 5) handle technology. There is a cross section of dispositions related to trained, social and cultivated gazes in Jackson's (2016) proposed six categories of 'industry-relevant' graduate competencies, namely: 1) communication competence, 2) planning and administration competence, 3) teamwork competence, 4) strategic competence, 5) global awareness competence, and 6) self-management competency. Figure 3.5 shows how the narrow focus of the technician's trained gaze on the specific technical problem to be solved needs to be expanded in order to accommodate a wider focus on team-work, planning, management, leadership, global awareness – as well as a cultivated and introspective focus on self-management, personal effectiveness and professional ethics.

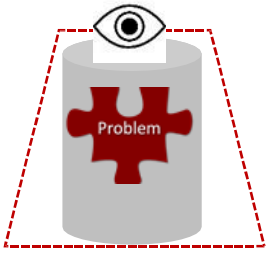

Figure 3.5: the work-ready trained gaze

The expansion of the gaze can be plotted on the social plane to show the bi- directional shifts suggested by the literature summarised above: an epistemic upward shift to enable a social gaze that can accommodate wider social issues related to work-readiness, such as: managing and working with people, caring for and respecting the environment, understanding the needs of companies to be cost- effective, understanding management issues, long term strategy and so on – as well as the more introspective, cultivated gaze at oneself, cultivating professional ethics, personal

effectiveness, accountability and responsibility. It should be noted, that because of the strong scientific base of their training, that many technicians will have ‘an aversion’ to what the literature calls ‘soft skills’ (Aleksandrov, Zakharova & Nikolaev, 2015). Thus with regard to a short course in work-readiness training it is unlikely that there would be major shifts towards a social or cultivated gaze. Achieving a social gaze or a cultivated gaze would entail considerable dedication and time (Ellery, 2017). However, one would expect to find content, contexts, and activities in the EIP that stretch the technicians’ gaze in the direction of both of these quadrants. This expansion of the technician’s gaze is illustrated in Figure 3.6.

By examining the organising principles of the EIP with a particular focus on its arrangements for building work-ready knowers, it will be possible to make more explicit the knowledge that the programme understands to underpin successful work-preparedness, and the orientations towards this knowledge that are productive for graduate job-seekers.

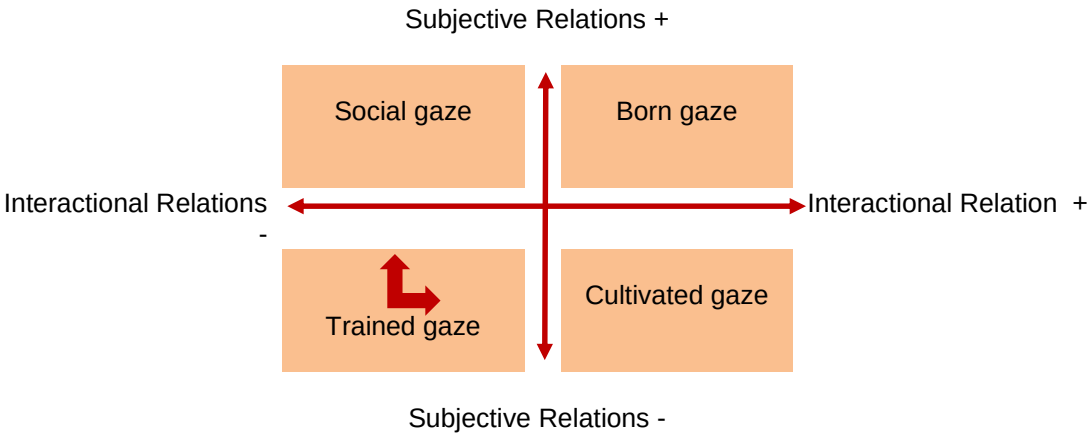

Figure 3.6: Extending the trained gaze (adapted from Maton 2014).

3.3.7 The way forward: Aligning theory and methodology

In the next chapter, the research methodology, that draws on both the theoretical framework developed in this chapter, as well as the conceptual framework developed in Chapter Two, is explained and motivated.

4 CHAPTER FOUR: RESEARCH DESIGN AND METHODS FOR RESEARCHING WORK-READINESS TRAINING

4.1 Overview of Chapter Four

This chapter explains the research methodology that guided the research activities in the evaluation of the EIP. In Section 4.2 a motivation for the macro-level research design, namely a realist educational evaluation, is presented. In Section 4.3, the research aims, objectives, research questions and sub-questions are stated. The 'translation devices' are explained in Section 4.4, including how these were constructed from the theoretical and conceptual frameworks and 'translated' into criteria for the evaluation of the EIP. Section 4.5 explains the evaluation research data collection methods, including examples of the instruments used for the observations and interviews. The methods used for data analysis are explained in Section 4.6. In Section 4.7 an assessment of the trustworthiness of the research methodology is presented and the Chapter is conclusion in Section 4.8 with the ethical framework for the study, and the arrangements for ethics clearance and permissions.

4.1 Research design for educational evaluation

Evaluation research is important for the improvement of educational provision. The use of evaluation research findings can support meaningful change in curriculum and pedagogy towards improved outcomes for institutions, educators and students. At its core, evaluation research is about helping educators and educational mangers to improve educational provision. Evaluation research can have a formative role (Nieveen & Folmer, 2013), identifying areas for improvement, or a summative role (Cashin & Downey, 1992), judging the effectiveness of an educational intervention. Educational evaluation can also include both formative and summative elements (Cavanagh, 1996). This thesis uses a formative approach, with a view to improving the EIP, taking into account Dunn and Mulvenon's (2009) caveat that there are no simple answers to the typical formative evaluative questions of: What is working? What is not working? In which contexts? With which groups? And how can it be improved? Defining the merit of an educational intervention, separating out the parts played by the various its components, such as the curriculum, the pedagogy, and the affordances of physical and virtual training spaces, while appraising their value and making recommendations towards improvements, are complex concepts in educational evaluation. There are always confounding and complicating effects of each stage in the implementation of an

educational intervention. Yet despite the many complexities in the formative evaluation of educational programmes, there is a strong need to evaluate educational provision and its actual or potential outcomes in order improve both new and existing educational interventions.

4.1.1 A realist position on evaluation research

In their seminal study titled Realistic Evaluation, Pawson and Tilley (1997) explain the underpinning principles of a realistic position on programme evaluation. The word 'realistic' contains the components of realism, that is 'real – realist – realistic'. In their view, 'these terms mark the key domains of evaluation' (Pawson & Tilley, 1997: xii).

4.1.1.1. The Real

In realist understanding, the 'real' exists at the level of social phenomena that have causal powers and tendencies. Evaluation deals with the 'real', in this case the social phenomenon of work-readiness (Pawson & Tilley, 1997: xiii). that is understood in this study to have causal powers and tendencies; work-readiness means that qualified students are ready to undertake work in their chosen fields.

Understanding work-readiness as 'real' does not discount disagreements in the literature about what constitutes the knowledge, skills and attitudes that comprise work-readiness, or the 'different interests to be served in an evaluation' (House, 1993: 11). This is particularly the case when evaluating a programme such as the EIP that involves institutional, national and international collaborators and their different interests and commitments to the programme. To address this issue, House and Howe (2003) propose a 'deliberative democratic evaluation' approach that involves the systematic and unbiased collection of data, as well as the processing and analysis of the data through stakeholder perspectives, thus 'making those perspectives part of the process of arriving at evaluative conclusions' (House & Howe, 2003: 79). In the deliberative democratic approach the evaluator directs the evaluation study and is responsible for the findings, but stakeholder perspectives, values, and interests are an integral part of the study. House and Howe (2003) argue that the inclusion of differing perspectives improve the validity of the conclusions and increase the legitimacy of the evaluation. While there are differing understandings of the phenomenon under evaluation, a realist approach understands that the social phenomenon, in this case work-readiness, has powers and properties that are independent of how people understand them, or would wish them to be. In a realist evaluation, it is the emergent properties and powers that the evaluation research seeks understand for the purpose of making effective changes to a programme or intervention.

4.1.1.2. Realist

Realist evaluation should follow a realist methodology. In this regard, Pawson and Tilly (1997) explain that realist programme evaluation 'rests on a view of explanation which is not simply driven by 'method' and 'measurement', but which suggests a more extensive role for 'theory' (Pawson & Tilly, 1997: xiii). In educational evaluation, in particular, it is important to draw on the theories, methods and tools that are used in general educational research in support of research findings and analyses that are trustworthy in educational contexts. In their classic study, Chen and Rossi (1980) point out that a major problem in programme evaluation is the adoption of 'conventional, common sense understandings of social problems and their treatments, without considering the appropriate social science theory' (Chen & Rossi,1980: 67). Coryn, Noakes, Westine, and Schröter (2011), in their meta-analysis of theory-driven evaluation research, show that theoretical approaches are key to designing rigorous evaluation projects. Hazenberg, Seddo and Denny (2015) argue that a theoretical approach to evaluating an work-readiness enhancement programme is crucial if the evaluation is to provide meaningful data on its success. The research design for this study drew on the theoretical framework of LCT's Specialization dimension in order to fulfil the requirements of a 'theory-driven evaluation' (Coryn, Lindsay, Noakes, Westine & Schröter, 2011; Chen & Rossi, 1980).

4.1.1.3. Realistic

Realist evaluation needs to be realistic, by which Pawson and Tilly (1997) means that its theory and methods need to be accessible and implementable for those who are likely to use the evaluation findings. They argue that evaluation is form of applied research that has the aim 'to inform the thinking of policy makers, practitioners, program participants and public' (Pawley & Tilly, 1997: xiii). An evaluation 'should extend the knowledge of such stake-holders' but should not hide 'behind those secret, scientific languages in delivering their verdicts' (Pawley & Tilly, 1997: xiii).

In evaluating the EIP curriculum, House and Howe's (2003) recommendation to follow a 'deliberative democratic evaluation' approach was taken up. Thus multiple perspectives and participant voices were included in the research process and findings. At the same time, both conceptual and theoretical frameworks were developed to assess the extent to which the EIP was able to strengthen students' work-readiness and transition to the world of work. Following, Pauley and Tilly's (1997) advice, it is expected that this thesis provides accessible and logical theoretical and methodological frameworks for understanding work-readiness, as well as implementable recommendations that are founded on the findings of the study.

4.2 Research aims, objectives and research questions

The research aim of the study is to contribute a theorised understanding of work-readiness, with a particular focus on the implementation of effective work-readiness training. In this regard this evaluation study has following objectives:

- To conceptualise effective work-readiness curricula;
- To identify and/or develop appropriate work-readiness pedagogies;
- To identify the physical and virtual spaces needed to support work-readiness training.

The overarching research question guiding this study is:

> How could a short international short course contribute to South African students' work-readiness?

This guiding research question was addressed using a research-based evaluation methodology that focused on three iterations (2016 – 2018) of the EIP at two sites. In further focussing the research, the research sub-questions posed were:

1. How did the EIP curriculum conceptualise work-readiness?
2. How did the EIP pedagogy develop students' work-readiness?
3. How did the EIP's spatial affordances support work-readiness?

The guiding research question 'How could a short international short course contribute to South African students' work-readiness?' was addressed using a research-based evaluation methodology that focused on three iterations (2016 – 2018) of the EIP at two sites.

4.3 A theoretically-based evaluation

This section sets out to make more explicit the EIP's basis of legitimation; in other words, how one might explore the organising principles constituting legitimate knowledge in work-readiness training as understood by the developers and facilitators of the EIP, the student participants, and the employers who supervise the students who have undergone EIP training. The starting point is that the enhancement of work-readiness through a short course requires an understanding not only of who the students are, their levels of academic preparedness and the pedagogical interventions that facilitate

learning, but also knowledge of South African industries and workplaces and the ability to re-contextualise this knowledge into a short training programme. Of particular concern, is the context of South Africa's high unemployment figures, the often difficult relationships between workers and management, and the external demands of vocational, technical and professional practice. If students are to 'crack the code' of work-readiness, programme designers and facilitators will need to know what that code is. What makes work-readiness special? What is its basis of insight, status and identity? How might the EIP represent the starting point of what has been termed a 'trajectory of professional knowledge formation'? (Reid, Dahlgren, Petocz & Dahlgren, 2011: 3). In the next section the 'translation devices' (Maton & Chen, 2016) that adapt high level LCT concepts to the research problem and research context is explained. The intention in the design of research instruments and protocols is to expose the principles and values that underpin the knowledge selection, sequence and pace of the EIP to ensure that its practices in socialising students into a work-ready gaze are appropriate and effective.

4.3.1 'Translation devices' for understanding work-readiness

While the conceptual framework identifies indicators from the literature on best practices in *kaizen*-based short courses, we need to 'see the system' (Bryk, 2017: 15) that underpins these success indicators. A gap that was pointed out in the literature reviewed (see Chapter 2, Section 2.6.3), is that much of the literature does not explicitly address a theory that underpins work-readiness training or explain how it might enable or foster the emergence of capable and employable subjects. For this reason, LCT's Specialization (Maton, 2014) was used to identify the specialist dispositions of the people who engage in them. In this study of a *kaizen*-based short course, training is largely located in the social relation to knowledge, that is, it is training to cultivate work-ready dispositions, rather than training involving disciplinary or field knowledge. In the world of work students need technical knowledge and skills, and they need to be particular kinds of 'knowers'.

It is to be expected that work-readiness training would therefore largely focus on strengthening social relations and building students as 'knowers', in this case building personal and interpersonal skills. Social relations to knowledge involve a re-orientation to the world of practice. In this world, epistemic relations to knowledge matter less than social relations. In terms of work-readiness, social relations are exemplified by 'ideal knower's attributes, which serve as a basis for professional identity within a field' (Maton, 2014: 32). The ideal, work-ready knower would have constructive social relations

towards the self (SR1), to others (SR2), to the workplace (company and/or industry) (SR3), to the profession (SR4) and to the broader society (SR5). Social relations are thus multiple, operate at different levels, are interconnected, and develop cumulatively over time. Social relations could be identified along a continuum, as in Table 4.1:

Table 4.1: Work-readiness gaze: the social relation in vocational education

Code	Description	Codes	Stronger (SR+)/ weaker (SR-) social relations
SR5	Social relations to broader society	SR5+	Stronger contribution to society.
		SR5-	Little/no societal contribution.
SR4	Social relations to a field or profession	SR4+	Stronger professional conduct and identity.
		SR4-	No/little attention to conduct, etc.
SR3	Social relations to a company/industry	SR3+	Stronger contribution to the workplace.
		SR3-	Little/no contribution to a workplace.
SR2	Social relations to others	SR2+	Stronger relationships with others.
		SR2-	Little/no attention relationships with other.
SR1	Social relations to the self	SR1+	Stronger values and ethics.
		SR1-	Little/no attention to values or ethics.

Social relations might be similar or different across disciplines. For example, many practitioners may have similar aspirations to make broader social contributions (SR5), such as improving the quality of life in developing countries, but would have developed different understandings of how these might be achieved in their different disciplinary areas. Building a professional identity would involve a social relation to the field or profession (SR4). While respect for others (SR3) would cut across many practices, the specifics of social relations to others in a workplace would be different, some might focus on managing others' work (e.g., in corporate environment), others might focus on patient care (e.g., in a clinical environment), while others might be part of a technical team (e.g., in an engineering company). A more generic version of social relations to others (SR2) would be the ability to get along with co-workers, to contribute to team-work and to be supportive. Finally, there is a social relation to the self (SR1) that involves building one's own values and ethical position.

4.3.1.1. A 'translation device' for evaluating work-readiness curricula

There was a need to further specialise the translation device when evaluating the EIP curriculum. The literature on lean education and training, in particular, was drawn on (see

Chapter 2, section 2.3) for the literature on *kaizen*-based curricula. It would be expected that a work-readiness curriculum would include components related to the broader meaning of the EIP, for example, its contribution to societal needs or economic imperatives (SR5), that it would include some specialisation with regard to the profession, professional identity or professional conduct (SR4), that the curriculum would include information and discussion on labour relations (in the light of South Africa's poor record in this regard), appropriate ways of responding to managers' requests, and ways in which co-workers and managers might work constructively (SR3); it would also be expected that the curriculum would include team-building (SR2) as well as values development (SR1).

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Table 4.2: Criteria for the evaluation of the EIP curriculum

***Kaizen* principles**	**Key theoretical constructs from LCT**		**Key curricular concepts in 'lean' work-readiness training**
	Social relations to the world of work	**Codes**	
Providing value (quality)	Social relations to broader society	SR5+	Contribution to broader society.
		SR5-	Little attention to contribution.
Continuous improvement (towards innovation)	Social relations to a field or profession	SR4+	Professional development, conduct, identity.
		SR4-	No/little attention to conduct, etc.
Understanding work in organisations	Social relations to a company/ industry	SR3+	Understanding contribution to the workplace.
		SR3-	Little/no attention to contribution to a workplace.
Respect for others in organisations	Social relations to others	SR2+	Working with/for others
		SR2-	Little/no attention to team work, etc.
Eliminating waste	Social relations to the self	SR1+	Inclusion of values development in the curriculum.
		SR1-	Little/no attention to values.

Table 4.2 represents the evaluation criteria for the assessment of the EIP curriculum that was applied in the study of curriculum documents. The curriculum documents were studied with a view to understanding the extent to which they supported participants in the

construction of their work-related values (SR1), the extent to which they addressed social relations to others, for example, in preparation for team-work exercises (SR2), the extent to which they addressed participants' understanding of social relations in workplaces (SR3), the extent to which they addressed issues of professional conduct and identity (SR4), and finally the extent to which they address the potential of productive work to contribute to large societal issues (SR5).

4.3.1.2. A 'translation device' for evaluating pedagogies for work-readiness

A second translation device was developed from the literature (see Chapter 2, section 2.5), and conceptual and theoretical frameworks to evaluate the pedagogical approaches and methods used in the implementation of the EIP (see Table 4.3 below). It would be expected that a pedagogy for work-readiness would include critical dialogues on the social contribution of work (SR5), professional identity building (SR4), problem-, project-based learning or other forms of work-place simulated learning (SR3), participatory and active forms of learning (SR2) and reflective learning (SR1).

Table 4.3: Criteria for the evaluation of the EIP pedagogy

***Kaizen* principles**	**Key theoretical constructs from LCT**		**Key pedagogical concepts in 'lean' work-readiness training**
	Social relations	**Codes**	
Providing value (quality)	Social relations to broader society	SR5+	Critically reflective learning activities about broader social contribution through work
		SR5-	Little/no critically reflective learning activities
Continuous improvement (towards innovation)	Social relations to a field or profession	SR4+	Identity building and iterative learning within professional/ disciplinary contexts
		SR4-	Little or no identity building or iterative learning within professional/disciplinary contexts
Understanding work in organisations	Social relations to a company/ industry	SR3+	Problem-based learning within and across groups.
		SR3-	Little/no problem-based learning within and across groups.
Respect for others in organisations	Social relations to others	SR2+	Participatory and engaged team-based learning
		SR2-	Little/no participatory or engaged team-based learning
Eliminating waste	Social relations to the self	SR1+	Reflective learning activities towards self-efficacy
		SR1-	Little/no reflective learning activities

The pedagogy evaluation criteria were used to evaluate the extent to which reflective learning was used to support participants' values development (SR1), the extent to which engaged and active forms of learning were used in support of team building and

an appreciation for the role of team-work in workplaces (SR2), the extent to which problem-based learning, project-based or case studies simulated workplaces and supported participants in understanding and developing their social relations to a workplace (SR3), the extent which pedagogical forms (e.g., iterative learning) were used to build professional identities and support students in striving towards high professional standards (SR4), and the extent to which critical pedagogies where drawn on in support of understanding potential societal contributions (SR5)

4.3.1.3. A 'translation device' for evaluating work-readiness spaces

In simulated forms of training the physical or virtual space has particular importance, because practice-based learning is not possible without physical or virtual spaces (Kennedy et al., 2015), or the artefacts that represent the 'tools of the trade' (Navarre, 2016). For this reason, a matrix was developed the theoretical frameworks (comprising the five levels of social relations) and the literature on learning spaces (see Chapter 2, section 2.6). The evaluation criteria developed in Table 4.4 were used to evaluate the spatial configurations and affordances of the EIP, with a view to understanding the extent to which the various modifications to a standard classroom venue were, or were not adequate, for accommodating the range of social relations identified as being important in work-readiness training.

Table 4.4: Criteria for the evaluation of the EIP's spatial affordances

***Kaizen* principles**	**Key theoretical constructs from LCT**		**Key spatial concepts in 'lean' work-readiness training**
	Social relations	**Codes**	
Providing value (quality)	Social relations to broader society	SR5+	Physical/virtual spaces to discuss societal contribution.
		SR5-	No/inadequate physical/virtual spaces to discuss societal contribution.
Continuous improvement (towards innovation)	Social relations to a field or profession	SR4+	Physical/virtual space approximate to related industry profession
		SR4-	No/little attention to spatial needs of the discipline/field
Understanding work in organisations	Social relations to a company/ industry	SR3+	Physical/virtual space for social relations across a workspace
		SR3-	No/inadequate physical/virtual space for social relations across a workspace
Respect for others in organisations	Social relations to others	SR2+	Physical/virtual space for working with/for others
		SR2-	No/inadequate physical/virtual spatial provision for team work
Eliminating waste	Social relations to the self	SR1+	Physical/virtual space for reflection on practice and discussion against theory
		SR1-	Little/no physical/virtual space for reflection in/on practice or discussion

Drawing together the findings of the literature review on physical and virtual spaces (Chapter 2, Section 2.5) with the high level theoretical framework, there would be a need

for physical/virtual spaces to discuss issues around how the training might contribute to broader social or national needs (SR5), there would also be a need for the space to approximate to, or symbolically represent, the relevant industry or profession for which the students are being prepared (SR4), the space would need to enable role-play, for example, between colleagues and managers (SR3), the space would also need to support team-work (SR2), and finally the space would need to accommodation reflection towards self-improvement or self-efficacy beliefs (SR1).

4.4 **Research methodology and methods**

In evaluating the EIP curriculum, the evaluation framework, developed from both the conceptual and theoretical frameworks, was used to assess the extent to which the EIP was able to strengthen social relations to the world of work. The research design comprised a 'theory-driven evaluation' (Chen & Rossi, 1980; Coryn, Lindsay, Noakes, Westine & Schröter, 2011). In their classic study, Chen and Rossi (1980) point out that a major problem in programme evaluation is the adoption of 'conventional, common sense understandings of social problems and their treatments, without considering the appropriate social science theory' (1980, 67). Coryn, Lindsay, Noakes, Westine & Schröter, 2011point out in their meta-analysis of theory-driven research that theoretical approaches are key to designing rigorous evaluation projects (2011). Hazenberg, Seddo & Denny (2015) argue that a theoretical approach to evaluating a work-readiness enhancement programme is crucial if the evaluation is to provide meaningful data on its success.

In order to understand the impact of the *kaizen*-based training on work-readiness enhancement, a qualitative approach of document study, observation, video ethnography and interviews were followed. This approach was based on a social realist paradigm since the purpose of the study was to establish the generative potential of *kaizen*-based training, drawing on data at the level of the empirical (e.g., participants views and experiences of the training programme) and the level of the actual (e.g., curriculum documents and the video record) in order to infer the generative mechanisms (i.e., the social relations of work-readiness) at the level of the real.

It would be expected that EIP would include a range of practices that are strongly underpinned by principles of social interaction; this evaluation research study seeks to reveal how and why social relations were foregrounded or back-grounded, which codes tend to dominate in the EIP, and what this might mean for the enhancement of students'

work-readiness.

The research methodology follows ethnographic principles and practices, in particular those related to participant observation (Miles & Huberman, 1994). The researcher's position includes the management of, and training of facilitators for, the EIP. The researcher also conducted training in the first years of implementation (2012 – 2015). The researcher thus has prior knowledge of the programme and its strengths and weaknesses. No video-data, or other data used in the study, includes the researcher's own training interventions. This declaration of the researcher's positionality is important for the transferability and trustworthiness of ethnographic methods, and the researcher thus declares the intention to improve the EIP, and not to defend it.

4.4.1 Research sites

The research sites included two higher educational institutions that offered EIP training, and ten workplace sites, each of which accepted five (or more) interns, some of whom had completed the EIP training and some of whom had not. The two higher educational sites that were selected for this study were two Universities of Technology that implemented the EIP during the period 2016 to 2018. The two participating institutions are based in two different provinces of South Africa, have different 'profiles', but draw their students from similar socio-economic backgrounds, and make use of similar workplaces for the training of their students. Ten workplace sites were selected as they were sites where the students who had completed the EIP were placed as interns, as well as students who had not attended the EIP. Only workplace sites with a minimum of five interns were included in the study.

4.4.2 Research Participants

The study population comprised three groups: 1) EIP students, 2) interns (both those who had completed the EIP training and those who had not attended the EIP), 3) EIP facilitators, and 4) workplace supervisors. The first group comprised students that enrolled for EIP training between 2016 and 2018. The rationale for this group was to capture their more immediate perceptions of, and responses to, the EIP. The second group, the interns, were students who had been placed in workplaces by the Institution's Cooperative Education department (or equivalent unit). The rationale for choosing interns who had undergone the training was to find out the extent to which they were able to transfer the skills that were taught in the training to a workplace. The rationale for inclusion of interns who had not attended the EIP was to compare their responses

and attitudes to the workplace. The third group of study participants comprised facilitators who conducted the training across the whole period in which the EIP was offered (2016-2018). This group included four South African facilitators and one Japanese facilitator. The rationale for their inclusion was to obtain both the South African and Japanese perspectives on the training. The fourth group of participants comprise the workplace supervisors that supervised and mentored interns over the period 2017-2018. The rationale for the selection of the supervisors was to include those who had the opportunity to supervise a minimum of five interns, and compare the behaviours and attitudes of the EIP students against behaviours and attitudes of past student cohorts who had not had the same training. Purposive sampling (Miles & Huberman, 1994) was used to ensure that the participants had experienced the programme either as students, interns, workplace supervisors of student interns, or facilitators in order to obtain first-hand information about the programme and its impact. The study sample included approximately 200 EIP students, 50 interns, four facilitators and ten workplace supervisors.

4.4.3 Data collection

Following ethnographic practices, the main data collection methods were observations and video-recordings of the EIP training sessions. Individual and focus-group interviews were conducted with the participants to canvass their opinions and insights. A study of the curriculum documents and media used in the training was also done.

4.4.3.1. The EIP training sessions

The EIP was launched amongst the South African Universities of Technology in 2011 and continues to be offered in 2019. It is offered to students in the 2nd year of study, prior to their work placement. It is a 3-day training programme that includes a half-day theoretical component and hands-on practical sessions. The practical sessions entailed a simulated workplace with students assuming various roles as ‘workers’ in a truck assembly plant. Through the work in this simulated plant, the students learn the implications of poor planning, inadequate problem- solving skills, poor inventory management, waste in the workplace as well as poor supervision. Video recording of the simulated production is an inherent feature of the EIP. The programme also allows the students to reflect on and improve their practice through repeated runs of the simulated production. During the pilot phase (2016-2018), full training sessions (that is, including the theoretical sessions) of the chemical, electrical and mechanical engineering, information technology, office management and technology as well as public management sessions were video graphed for reporting purposes to the DHET

as well as JICA. These videos as well as the reflective reports served as key data sources.

4.4.3.2. Observation

The EIP training sessions were studied over the period 2016 – 2018, using an observation schedule to ensure consistency. Hill, Charalambous & Kraft (2012) argue that the effectiveness of observation rests largely upon the design of the observational instrument as well as the number of items on an instrument, as validity is affected when the number of items to be rated is excessive (Pianta & Hamre, 2009). In examining classroom video data, teacher-student interactions are a central driver for student learning (Smith, Jones, Gilbert & Wieman, 2013), consequently it is recommended that teacher-student interactions should be the organising principle of the schedule. Smith et al (2013)'s work was drawn on in the construction of the observation schedule (see Table 4.6). The observation schedule enabled the researcher to observe the frequency of items such as students talking vs facilitator taking, as well as whether the students were making notes or writing down keywords (using the in-vivo section of the observation schedule). These notes were later adjusted, following viewing of the video recording (see below). They were then analysed using the translation devices. In order to draw opinions regarding the interactions in the EIP, video data of six EIP training sessions, selected from video data of sixty training sessions that took place over the period 2016 – 2018 were observed. These video recordings were selected such that they would represent the different disciplines across the three faculties of site A. Observations were documented on the observation schedule (see Table 4.6 below). In developing the observation schedule, the work from various pieces of literature was used as a basis. Hill et al (2012) argue that the effectiveness of observation rests largely upon the design of the observational instrument as well as the number of items on an instrument, as validity is affected when the number of items to be rated is excessive (Pianta & Hamre, 2009). Thus care was taken to carefully limit the items to be considered for observation. With respect to examining the classroom video data, Smith et al (2013) recommend that teacher-student interactions should be the organising principles as they are a central driver for student learning. The observation schedule enabled the researcher to observe the frequency of items such as students talking vs facilitator taking, as well as to make notes or write down keywords (using the in-vivo section of the observation schedule). These notes were analysed using the translation devices.

Table 4.6: Observation schedule

EMPLOYABILTY IMPROVEMENT PROGRAMMEPROGRAMMEME VIDEO No. …..
Date:……

Site:…….Venue:……Time:……

Notes: ……...

Description of context			**SR codes**
~~IIII~~	**The student is doing:**	***In vivo* codes**	**SR codes**
	Listening		
	Note-taking		
	Asking		
	Discussing in groups		
	Work activity		
	Presenting		
	Plenary discussion		
	Writing		
	Waiting		
	Other		
	The facilitator is doing:		
	Lecturing/presenting content		
	Writing		
	Posing questions		
	Giving feedback		
	Listening		
	Observing		
	Giving a demo		
	Administrative tasks/input		
	Other		

Adapted from Smith et al., 2013

4.4.3.3. Video ethnography

The potential of video as a research tool to study teaching and learning has been well-documented (e.g., Fitzgerald, Hackling & Dawson, 2013; Ho & Kane, 2013). Video ethnography refers to 'any video footage that is of ethnographic interest or is used to represent ethnographic knowledge' (Pink, 2007: 169). Video ethnography has the capacity to capture the complexities of a classroom and enable detailed examination of teaching and learning from multiple perspectives, for example, when participants engage in a video-based interview (Hollingsworth & Clarke, 2017). Video recording can capture complexities inherent in teaching and learning and thus\produces rich data. Rich video data has the ability to convey a strong sense of direct classroom experience (Fitzgerald et al., 2013) and allows for detailed and numerous examinations of teaching

and learning to occur from multiple perspectives (Hollingsworth & Clarke, 2017). The primary data collection method for this study was video recordings of EIP training sessions. All EIP practical training sessions were video-recorded (see Section 4.5.3.1). The EIP pedagogy, therefore, includes a video record of the practical sessions that were used for student reflections. Additionally, theoretical sessions were video recorded in the pilot phase (2016-2018) for reporting purpose. There is thus an extensive video-record of all the EIP training between 2016 – 2018. Approximately 60 training sessions were video-recorded, and six video-recordings were selected for detailed study, as purposive samples of the full video record, following Ho and Kane's (2013) criteria for reliability of video data. Care was taken to ensure that the videos represented all the disciplines in the study.

4.4.3.4. EIP Student Participant Reflections

Student participants were required to produce reflective reports immediately after the training. There are approximately 200 EIP student reflective reports that express students' reflections on how they experienced the EIP during the period 2016 – 2018.

4.4.3.4. Participant interviews

Understanding the reality of any situation or experience has to go beyond the captured video footage. More information is required to make sense of the video images. Focus group and individual interviews were thus included as research methods in support of the video ethnography. Discussions and negotiations between participant and researcher can develop a more holistic understanding of the observed facts (Carey & Asbury, 2016; Powney & Watts, 2018). Focus group interviews were conducted with approximately 50 interns across ten workplace sites. The interview schedules were based on the translation devices (Tables 4.7 – 4.9) and were intended to probe more deeply into participants' understanding of the intra- and interpersonal skills that they had developed on the EIP. Individual interviews were conducted with four facilitators at the two sites, and a telephonic interview was conducted with the Japanese facilitator. Three focus group interviews were conducted with workplace supervisor at three worksites. One telephonic interview was conducted with a workplace supervisor (who was unable to attend a focus group meeting). The students' reflective reports, the focus group interviews, and individual interviews provided a way of triangulating the video data.

4.4.3.5. Documents

In ethnographic research a range of artefacts and documents are typically drawn upon, such as photographs, field notes, teaching and learning materials, assessment

exercises and work samples, to assist in making sense of what has happened and to provide an in-depth and multi-faceted depiction of what has been captured on video (Angrosino & Rosenberg, 2011). In this study, the study of curriculum and syllabus documents, and teaching and learning materials were used as documents in support of deepening the understanding of the EIP training, and as additional ways of triangulating the video data. Data for the evaluation included curriculum documents and teaching and learning media. The study of the EIP curriculum documents enabled an understanding of the curricular knowledge base and curricular practices; while the media, such as Power Point slides were used to understand and analyse the EIP pedagogies. The media used was attributed according to the slide number and date used (e.g., EIP Slide 35, 2016).

Table 4.7: Interview schedule for student participants

EMPLOYABILTY IMPROVEMENT PROGRAMME/INTERVIEW SCHEDULE/ STUDENTS		
No. …..Date:……		
Interviewer:……		
Interviewee(s):……		
Site:…….Venue:…….Time:……		
Notes:		
1.	**Social relations to the self**	**SR codes**
Question	*Before I ask about the more specific aspects of the E IP, what are some of the really basic things that you leaned on the EIP? Did you personally benefit from the course – particular in terms of personal growth?*	*SR1*
Notes		
Prompts	Basic social skills, honesty and integrity, basic personal presentation, reliability, willingness to work, understanding of actions and consequences, positive attitude to work, responsibility, self-discipline	
2.	**Social relations to others**	
Question	*What did you learn about teamwork?*	*SR2*
Notes		
Prompts	Proactivity, diligence, self-motivation, judgement, initiative, assertiveness, confidence, acting autonomously	
3.	**Social relations to a workplace**	
Question	*Did you develop other skills that will prepare you for other kinds of work in a workplace [can name field]*	*SR3*
Notes		
Prompts	Reading, writing, numeracy, presentation skills	
4.	**Social relations to a profession**	
Question	*Did you learn anything that you think will be very important in your future work? Or in finding a job in your field? [can name field]*	*SR4*
Notes		
Prompts	Reasoning, problem solving, adaptability, work-process management, teamwork, personal task and time management, functional mobility, basic ICT skills, basic interpersonal and communication skills, emotional and aesthetic awareness, customer service skills.	
5.	**Social relations to society**	
Question	*What did you learn on the EIP that you think will make you highly desirable as a future employee and contribute in your field? [can name field]*	*SR5*
Notes		
Prompts	Teamwork, business thinking, commercial awareness, continuous learning, vision, job-specific skills, enterprise skills	
6.	**Other**	
Question	*Is there anything else that you would like to tell me about the EIP?*	
Notes		
Prompt	Thank participants, inform them of process of member-checking	

Table 4.8: Interview schedule for workplace supervisors

EIP INTERVIEW SCHEDULE: WORKPLACE SUPERVISORS AND FACILITATORS No. …..Date:…… Interviewer:…… Interviewee(s):…… Site:……Venue:……Time:…… Notes:		
1.	Social relations to the self	ER/SR codes
Question	*How did you think students personally benefited from the course – particular in terms of personal growth and intra-personal competencies?*	*SR1*
Notes		
Prompts	Prompts: basic social skills; honesty and integrity; basic personal presentation; reliability; willingness to work; understanding of actions and consequences; positive attitude to work; responsibility; self-discipline	
2.	Social relations to others	
Question	*What do you think students learned about working with others/teamwork?*	*SR2*
Notes		
Prompts	Proactivity; diligence; self-motivation; judgement; initiative; assertiveness; confidence; acting autonomously	
3.	Social relations to a workplace	
Question	*What basic skills do you think students developed on the EIP about understanding work processes?*	*SR3*
Notes		
Prompts	Prompts: reading, writing; numeracy, presentation skills	
4.	Social relations to a profession	
Question	*Do you think the students learned or acquired key skills that would be important in their future work? Or in finding a job in [name field]?*	*SR4*
Notes		
Prompts	Reasoning; problem solving; adaptability; work-process management; personal task and time management; basic ICT skills; basic interpersonal and communication skills; emotional and aesthetic awareness, customer service	
5.	Social relations to society	*SR5*
Question	*Are there high- level skills that the students learned on the EIP that could make them highly desirable as future employees in [name fields]?*	
Notes		
Prompts	team working; business thinking; commercial awareness; continuous learning; vision; job-specific skills; enterprise skills	
6.	Other	
Question	*Is the anything else that you would like to tell me about the EIP?*	
Notes		
Prompt	Thank participants, inform them of process of member checking	

4.5 Data analysis

4.5.1 Coding and analysing verbal data (video, document and interview data)

The video record was not transcribed; however the video record was watched several times and the observation schedules (Table 4.6) were used to capture key issues and were revised after repeated viewings. All interviews were transcribed, using standard transcribing methods (e.g., Edwards & Lampert, 2014). Member checks (Guba & Lincoln, 1989) were undertaken and the transcriptions were revised, prior to their analysis. A two-step process of coding the data was undertaken following the verification of the transcripts by both interviewers and interviewees. The process used was to initially code data with in-vivo coding, following Saldaña's 'first cycle' coding methods, which entails the extracting of key-words from field notes/and or participants' actual words (Saldaña's, 2015: 58 – 60). With regard to both reflective reports and interview data, coding involved a process of clustering and grouping the interview data using the interviewees' own terms and frameworks.

The second cycle of coding applied the translation device for social relations across the EIP enabled a theory-based interpretation and analysis of the document and text data. A second cycle of coding reframed the in vivo keywords in terms of social relations (codes SR1 – SR5), and more fully explained the data with reference to the conceptual and theoretical frameworks.

These analysis techniques enabled a deep understanding of the data through the process of re-naming the categories in the chosen language of description, in this case social relations to work-readiness training.

4.5.2 Multi-modal analysis (video and visual curriculum data)

Multimodal analysis includes the analysis of communication in all its forms, but is particularly concerned with texts that integrate two or more semiotic resources, such as words and images in a textbook, or talk and movement in a video (Kress & Van Leeuwen, 2001). Such resources include aspects of speech such as intonation and other vocal characteristics, the semiotic action of other bodily resources such as gesture (face, hand and body) and proxemics, as well as products of human technology such as drawing, writing, architecture, image and sound recording, and interactive digital resources. Different semiotic resources bring with them their own affordances and constraints, both individually and in combination, as well as analytical challenges in terms of the natures of the media, the detail and scope of analysis, and the complexities

arising from the integration of semiotic resources across media (O'Halloran, 2008). The inclusion of a multi-modal analysis of the video and visual data provided further depth and detail in the analysis. O'Halloran's (2008) 'Systemic functional-multimodal discourse analysis' methods are particularly well-aligned with LCT (Freebody, Maton & Martin, 2008), and thus provided appropriate methods and tools for the analysis of multimodal data in alignment with the conceptual and theoretical frameworks. The methodology involves detailed descriptions of the visual resources, as a form of running annotation, and usually adapting and 'applying an established theoretical and descriptive framework but deriving descriptive generalisations out of such text analysis and modifying theory as a result' (O'Halloran, 2008: 445). The translation devices offered a powerful and flexible tool for the study of multimodal data, and is aligned with the research design as it explicitly works primarily from the text itself, while including perspectives outside of the text, such as historical or contextual interpretations. Table 4.9 provides a schematic representation of the data collection and data analysis described so far:\

Table 4.9: Data collection and analysis

Research sub-questions	Sites/Sources of data	Data collection methods	Data analysis methods
How did the EIP curriculum conceptualise work-readiness?	Curriculum documents, syllabus guides, and teaching and learning media.	Document collection (e.g., curriculum documents)	Thematic analysis of documents and multi-modal analysis of images
How did the EIP pedagogy develop students' work-readiness?	Classroom sites of theoretical learning and practical exercises and projects.	Video-recordings and completed observation schedules	*In vivo* and thematic analysis of observation schedules and field-notes; multi-modal analysis of video images
	Students undergoing training	Reflective reports	*In vivo* and theoretical coding of focus group interview transcripts.
	Interns	Focus group interviews	*In vivo* and theoretical coding of interview transcripts.
	Facilitators	Individual interviews (including telephonic)	*In vivo* and theoretical coding of interview transcripts.
	Workplace supervisors	Focus group interviews (and one individual telephonic)	*In vivo* and theoretical coding of interview transcripts.
How did the EIP's spatial affordances support work-readiness?	Classroom sites of theoretical learning and practical exercises and projects.	Video-recording and completed observation schedules	*In vivo* and thematic analysis of observation schedules and field-notes; multi-modal analysis of video images

4.6 Trustworthiness

Validating frameworks are important for understanding the ways in which training can contribute to student learning and development, as well as important to advance the scientific study of work-integrated learning. While reliability and validity are essential criteria for quality in quantitative research; in qualitative paradigms the credibility, confirmability, dependability and transferability are the essential criteria for research quality (Guba & Lincoln, 1989). Credibility in this study is addressed by two issues: 1) the techniques and methods used to ensure the integrity and accuracy of the findings, and 2) the theoretical and conceptual frameworks that undergird the study. Confirmability refers to the degree to which the research findings can be confirmed or corroborated by others. Strategies for enhancing confirmability in this study include: 1) a declaration of the researcher's 'positionality'; 2) the careful documentation of all procedures for checking (and rechecking) the data throughout the study; 3) an active search for and description of 'negative instances' (Denzin, 2012); 4) member checks (Savin-Baden & Major, 2013), and 5) a data audit (Miles & Huberman, 1994) that examines the data collection and analysis procedures and makes judgements about the potential for bias or distortion. Dependability requires the researcher to: 1) account for the context (sites) within which research occurs (see site selection criteria in Section 4.5.1 above), and 2) research participants (see sampling criteria in Section 4.5.2 above). Transferability refers to the degree to which the results of qualitative research can be generalised or transferred to other contexts or settings. In this study transferability was enhanced by 1) describing the research context and 2) making visible the assumptions that were central to the research.

Triangulation is essential for the trustworthiness of qualitative research and refers to the techniques for gathering and/or handling data within a single study (Savin-Baden & Major, 2013). The original purpose of triangulation was to seek confirmation of research findings (Denzin, 2012), but the second purpose, to ensure completeness of the data (Denzin, 2012), is equally important. Denzin (2012) proposes three types of triangulation: 1) space (i.e., the inclusion of different sites in the study to ensure site consistency of the data), 2) time (i.e., observations and interviews at different times to validate the congruence of the research object across time), and 3) the use of different persons as sources of data (to ensure different perspectives). This study triangulated place, time and persons to provide a trustworthy and complete picture of the EIP (see Table 4.10).

Following the transcripts of focus group or individual interviews, there were 'member checks' (Lincoln & Guba, 1985) in which the participants and interviewer were able to

review and correct the transcripts. Following data analysis, participants were invited to discuss and verify interpretations.

Table 4.10: Triangulating the research data

Research questions	Data sources	Sites	Time
How did the EIP curriculum conceptualise work-readiness?	Curriculum documents Syllabus outlines Media Video-record	Site A Site B	2016 - 2018
How did the EIP pedagogy develop students' work-readiness?	Video-record	Site A	2016 - 2018
	Students' reflective reports	Site A	2016 - 2018
	Intern focus group interviews	10 Workplaces	2017 - 2018
	Facilitator interviews	Site A Site B	2016 - 2018
	Workplace supervisor focus group interviews	Workplaces	2018
How did the EIP's spatial affordances support work-readiness?	Video-record	Site A	2016 - 2018

4.7 The ethical framework

Ethnographic observation-based research design understands the learning environment as a complex system and as the totality of relationships between the developing person and the surrounding world, and of learning as the result of meaningful activity in an accessible environment (Leslie, Paradis, Gropper, Reeves & Kitto, 2014). A major ethical consideration in inter-cultural research (such as the import of *kaizen* principles into the South African learning context) is the balance of what ethnographers call emic and etic relations (Zhu & Bargiela-Chiappini, 2013). An emic account is a description of behaviour or a belief in terms meaningful to the research participants. An etic account is a description of a behaviour or belief in theoretical terms by the researcher. When these two approaches are combined, the richest view of a culture or society can be understood (Savin-Baden & Major, 2013). The emic approach (e.g., the use of in vivo coding) enables the researcher to investigate how students and facilitators perceive and categorise the *kaizen*-based training, including their rules for behaviour, what has meaning for them, and how they imagine and explain things. The etic approach shifts the focus from local observations, categories, explanations, and interpretations to those of the researcher and her knowledge base. The etic approach understands that members of a culture often are too involved in what they are doing to interpret their cultures impartially (Whitaker, 2017). When using the etic approach, the

researcher emphasises what she considers important. On its own, an emic approach would struggle with applying overarching values to a single culture, a combined approach is helpful in enabling researchers to see more than one aspect of one culture, and in applying observations to cultures around the world (Howe, 2005).

Within this larger ethical framework, in conducting this study, research practices that respected participants' and institutions' rights, confidentiality, privacy and dignity were followed. Informed consent was obtained from all participants. Permission for the use of the video-record of the training sessions and the interview of participants was obtained from the participating institutions and workplace sites. Students were informed that their interviews and video footage taken during the training would be used as part of the study. Further, the confidentiality of all participants and institutions was protected. To this end, all video footage used in this thesis has obscured the identity of the participants. All information identifying specific individuals and their institutions was removed at the stage of cleaning transcriptions and storage of data. The study obtained ethical clearance from the Cape Peninsula University of Technology, and subsequently permission to conduct the research was given from the other participating institution and organisation. Please see Appendix B for the ethics clearance documents.

4.8 The way forward: Application of the research findings

In the next Chapter the findings with regard to the evaluation study of the curricular elements, pedagogy and spatial affordances are presented. Chapter Five presents the findings of the evaluation of the EIP curriculum against the translation device intended to show the extent to which the curricular knowledge base was able to inculcate a work-readiness gaze. In Chapter Six the teaching and learning materials, the interactions between the facilitators and students, as well as the reflections of the work-place supervisors are studied in order to evaluate the EIP pedagogy, using the work-readiness evaluation criteria developed for pedagogical evaluation. In Chapter Seven, the video data was used to evaluate the spatial affordances of the EIP against the work-readiness criteria.

5 CHAPTER FIVE: EVALUATING THE EMPLOYABILITY IMPROVEMENT TRAINING CURRICULUM

5.1 Overview of Chapter Five

The focus of this chapter is the EIP curriculum, for the purpose of evaluating the extent to which it has the potential to enhance University of Technology students' work-readiness. The research approach comprised a theory-driven evaluation of the extent to which the EIP curriculum prepared students for the world of work, against the key curricular indicators for effective work-readiness training that were developed in the conceptual framework for the study. The data for the evaluation comprised curriculum documents and teaching and learning media, as well as video-recordings of the training sessions. The EIP curriculum was evaluated against the theoretical constructs in Legitimation Code Theory's Specialization dimension (Maton, 2014) that were developed in translating *kaizen* principles into five levels of social relations, as well as key curricular concepts in 'lean' work- readiness training (Chapter 2, Section 2.7, Table 2.1). Table 4.3 shows the criteria developed for the curricular evaluation, that range from social relations to the self (e.g., how values and ethics are integrated into curricular materials), social to others (e.g., how teamwork is included), social relations to a workplace (e.g., how concepts in work and work processes are included), social relations to a profession or field of practice (e.g., the extent to which professional content has been included), to social relations to broader society (e.g., how the curriculum incorporates a sense of contribution or wider societal benefit).

It would not be realistic to expect a short course such as the EIP to address all aspects of work-readiness in the complex context of South African workplaces. There is however, a number of best practices with regard to curriculum content and implementation that emerge from the research literature and from theories that explain the relationship between theoretical and practical knowledge. It would be expected that the curriculum shows evidence of the key indicators shown in the literature to support work-readiness. The research sub-question that the study of curricular documents therefore addresses is: How does the EIP curriculum conceptualise work-readiness? In the sections that follow, the content of the EIP modules is described, the sequencing and pacing of the EIP is explained and the EIP is evaluated against the work-readiness curricular criteria.

5.2 The Employability Improvement Programme Curriculum

The EIP is a three-day training programme that includes an introductory theoretical element and hands-on practical sessions (with several iterations between the theory and practice, such as drawing on *kaizen* concepts to reflect on practice). The hands-on practical sessions are the main focus of the training and require students to assume various roles as 'workers' in a simulated truck assembly plant. Through the work in this simulated plant, the students learn the implications of poor planning, inadequate problem-solving skills, poor inventory management, how to eliminate or waste in the workplace, and the consequences of poor teamwork and supervision. The concepts are taken from a world of work that has a focus on manufacture and production. The simulated production process is reduced and simplified to reduce the cognitive load (or in LCT terms to weaken the epistemic relation) and enable a focus on the social relation. The tasks allow the students to reflect on and improve their practice through repeated runs of the simulated production line with each run is preceded by planning (drawing on the kaizen tools) and ends with reflection towards improvement and innovation (drawing on kaizen concepts). The theoretical content of the EIP is designed to enable students to develop and demonstrate their understanding through a series of short exercises. The theoretical content is presented in the form of Power Point slides on the first day of the programme, but these media resources are drawn on throughout the three-day programme for reflection and planning. The students initially engage with the *kaizen* concepts through exercises that are either scenarios given to students for group work or video clips of work activities that students analyse. Once the practical training starts, the kaizen concepts become more fully integrated into practice. The intended outcomes of the EIP are: 1) to understand lean manufacturing principles and how they can impact daily work; 2) to understand organisational roles, 3) to plan and organise work; 4) to identify and solve problems; 5) to manage time; 6) to work in teams; and 7) to identify and avoid waste. These outcomes can be broadly clustered into social relations to the self (SR1), such as the development of values and dispositions (e.g., lean principles, time management, eliminating waste) and social relations to others (SR2), team work, as well as social relations to a company (SR3), such as appreciating organisational roles.

The core learning activities, intended to meet these outcomes, are clustered into four modules. Basic concepts are introduced and then applied in a production simulation game in which student teams are given materials to build simple model trucks over several iterations, each time attempting to improve on their processes and outputs. Lean terms and concepts, such as eliminating waste, are emphasised throughout the module

and the teaching is supported by active learning exercises that help the students to grasp these concepts. The modules have some theoretical content, but emphasise application and synthesis, always integrating previous concepts and actions.

5.2.1 Module 1: Productivity

Module 1 introduces basic kaizen concepts and principles, such as continuous improvement, the importance of teamwork, innovation, and the elimination of waste. These concepts are initially introduced in an abstract way (e.g., with diagrams on Power Point slides) and simply explained through mnemonic devices such as 'The 3 i's' to help students remember 'Implementation, Improvement and Innovation', or 'The 7 Wastes' (Figure 6.1) to help them reconceptualise 'waste' in an industry context. Examples of concepts are provided through video clips of Japanese factory production. In the following modules, students try to apply these concepts in the practical training sessions. The first module provides the underpinning logic of the social relations to the self, to other and to the workplace, which are strongly present in kaizen principles and practice, although the first module has a focus on individual learning towards an understanding of the basic kaizen concepts, with some support from peers and the facilitator.

Figure 5.1: The 7 wastes (EIP PowerPoint slide)

5.2.2 Module 2: Implementation

Module 2 delves more deeply into work processes: inputs, outputs, workflow, project cycles, productivity calculations, work breakdown structures, and so on. The module also introduces some of the tools that students will use in the simulation. For example,

students learn problem identification and solving using

the ‘logic tree’ as a tool. This module introduces the importance of working in teams and uses video clips to demonstrate the extent to which goals are achieved when individuals work together. The first production run begins in Module 2. The simulated assembly plant and the tools and equipment that students will be using in the practical training are introduced. Teams and roles are allocated, and students start to assemble the ‘trucks’. Planning and organising work is introduced in a contextualised way, as students initially start working without a clear plan. Learning the importance of planning and organising happens as they reflect on their actions.

Figure 5.2(a): Concepts into Practice: Power point slide depicting work done and team work (EIP Slide 8, 2016)

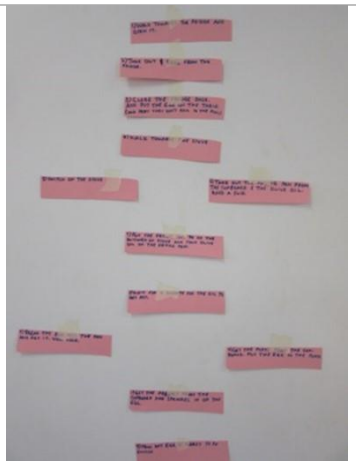

Figure 5.2(b): Concepts into Practice: students’ activity on workflow

Figure 5.2: Applying *kaizen* principles

Figure 5.2(a) shows how workflow was initially presented by the facilitator in a PowerPoint slide, and the Figure 5.2(b) shows how the students worked through the information to demonstrate their own understanding of workflow.

5.2.3 Module 3: Improvement

The focus of Module 3 is the application of the concepts that were presented in the previous modules. It attempts to achieve this through the second run of vehicle assembly as students implement improvements following their first, unplanned run. The students become acutely aware that planning and organising their work and working together as a team to execute the plan, is critical to achieving their goal. Students discover new ways of learning as they reflect on their own actions and critique one another constructively. Module 3 starts at the end of the first day and continues across

all other days, in alignment with the underpinning kaizen principle of continuous improvement. In the EIP, improvement involves students reflecting on their performance in each of the production runs and working together to identify and solve problems. Students learn to reflect on their actions and learning through watching the video footage of each production run. Through such reflection, discussion and planning for the next run, the students begin to hone their skills in the use of the tools and equipment.

5.2.4 Module 4: Innovation

In Module 4 students are introduced to the idea of innovation, in particular the kaizen understanding of innovation as evolving through continuous improvement. The fourth module defines innovation for the students, and provides examples of innovation. It also shows archived videos of previous training sessions to illustrate how creativity can be brought into vehicle assembly. Innovation, in alignment with the kaizen idea, emerges from practices that follow kaizen principles. Central to innovation in the EIP are the 'jigs' that are introduced for the purpose of improving work practices. Students are given the freedom to use whatever is in the room to improve their efficiency. The module encourages that the students work together to conceptualise and test the 'jigs'. Following each run, and following reflection towards improvement, students actively engage with one another to create and test the 'jig' (Figure 5.3). In the EIP, innovation is expected to emerge from teamwork, openness around the identification of errors, planning for improvement, working as a stronger team that is more aware of its own strengths and weakness, and then innovating – seeing opportunities for potential and change. Innovation is not restricted to Module 4, it can arrive whenever the teams make improvements, but is more activity encouraged towards the end of the programme.

Messy workspace	Improving workspace	Neat workspace

Figure 5.3: Improving the workspace

5.3 Sequencing and pacing of the EIP

The curricular elements of the EIP are sequenced both from the general to the particular, that is, from the broad, guiding principles of kaizen to their specific application in exercises and the production runs towards improvement and innovation; but key curricular elements are also but also sequenced from the particular to the general, such as exercises and practical tasks from which general concepts are extracted. This is achieved through iteration, for example, through three production runs over the three days (Table 5.1), and through allocation of time for reflection towards improvement and active problem-solving towards innovation. This sequencing enables the building up of knowledge from understanding work, workplaces, and the terms that apply in the workplace, to application through the simulated environment.

Table 5.1: Sequencing and pacing of the EIP

MODULES	**DAY 1**	**DAY 2**	**DAY 3**
INTRODUCTION	Module 1		
IMPLEMENTATION		Module 2	
IMPROVEMENT		Module 3	
INNOVATION			Module 4

5.4 Evaluating the EIP against the work-readiness curricular criteria

The focus of the EIP is on social relations to the self (SR1) and to others (SR2) – and to lesser extent, social relations to a workplace (SR3). Despite being such a short course, the EIP has made curricular space for considerable teamwork, for several iterations of the production runs, and for reflective practice in the forms of reflective debriefings after each production run. In the video clips of the practical training (from Module 2 – 4) one can see the impact that these curricular elements and the iterative pedagogy has on how students organise their workplaces more effectively (Figure 5.3). Like short courses generally, the EIP cannot be expected to meet multiple demands and requirements (see e.g., Hazelton et al., 2009). But while it might be unrealistic to expect the EIP to have achieved more that the strengthening of social relations to the self (SR1) and to others (SR2), there are notable gaps in the more macro-level social relations (SR3, SR4, and SR5), as well as very little attempt to contextualise the training in the South African context. The images and video clips that support the theoretical presentations are mainly of Japanese factories and Japanese workers – despite there

being many examples of Japanese factories with a South African workforce in South Africa (Zondo, 2018).

The most obviously missing curricular element of the EIP – and which is strongly present in most examples of lean education towards work-readiness (e.g., Candido et al. 2007; Chavan & Carter, 2018; Mansur et al. 2016) – is a sense of the broader contribution that students will be able to make to their workplaces, their professions, or even the national economy through the training (SR5). In other words, lean education needs a clear sense of purpose. The translation of production value into education value, as Bryk (2017) and Sawhney and De Anda (2017), have pointed out, is key in lean education. Educational value has to do with the purpose and meaning of the training, what it is for. Sawhney and De Anda (2017) explain that although conceived within the manufacturing domain, lean philosophy and principles can transcend to other contexts; for example, there are opportunities in lean education to contribute to the improvement of society, such as the translation of the millennium goals for engineers, compiled by the National Academy of Engineering. National needs, they argue, should be the 'framework to transcend the conventional applications of Lean' (Sawhney & De Anda, 2017: 111). Indeed, a strong part of students' motivation, across a wide range of disciplines, is that their education will allow them to improve the lives of others (LaMeres, Burns, Thoman & Smith, 2019; McGee & Bentley, 2017). This is particularly the case for South African students, many of whom are strongly driven by the need to 'make a difference' through their education (Nell, 2014). Thus the EIP, although intended for the South African University of Technology sector has not been adapted for this sector, where the majority of students are from economically disadvantaged backgrounds, and where the qualifications offered by this sector are key to South Africa's development (Wedekind & Mutereko, 2016). While going into depth on the particular contribution of University of Technology education to the national economy would be beyond the scope of a short course, it is an oversight of the EIP not to make some attempt to contextualise work-readiness and the kaizen concepts of respect for others, increased productivity and the elimination of waste in relation to larger national and local needs.

A second missing curricular element in the EIP are social relations to the field or profession (SR4). A social relation to the field, in the forming of an emerging professional identity, is difficult to achieve when the programme is as generic as the EIP. In many of the work-readiness programme described in the literature, there is a clear adaption of the simulated production 'game', which tends to have a natural 'fit' with engineering disciplines (Alves et al., 2017), to other disciplines and fields, such as avionics (Murman

et al., 2014), health sciences (Sawhney & de Anda 2017), or business sciences (Carenys & Moya, 2016). Key to the success of a lean short course for work-readiness is the alignment of its values with those of professional practice in different fields. Sawhney and De Anda (2017) explain that a work-readiness short course 'has to be in line with traditions and norms of the culture where the implementation is taking place' … because that 'environment (with its cultural values) determine[s] the success of the initiative' (2017: 103). It is also important that the artefacts that are produced in the production runs (or other simulation) are meaningful to the professional context, although simplified (Murman et al., 2014). In the Aerospace short course, aeroplane parts are assembled (Murman et al., 2014), in the University of Tennessee's health sciences work-readiness short course, a hospital emergency reception ward is simulated (Sawhney & De Anda, 2017), in an online business work-readiness course, there are virtual artefacts associated with office environments (Carenys & Moya, 2016). The reduction of high-level complex artefacts or machines (in the language of LCT, the reduction of the epistemic relations) is a key feature of lean work-readiness short courses; this is done to enable a focus on the multiple social relations in practice. However, the weakening of the epistemic relation should not involve complete de-contextualisation, as this defeats the purpose of work-readiness training by making the social concepts and practices learned considerably more difficult to transfer to relevant workplaces (De Vin et al., 2018).

The use of vehicle simulation in the South African EIP derives directly from the origins of lean production in the Toyota manufacturing plant. Motor manufacture has an extremely positive symbolic meaning in Japan, related to national pride in manufacture (Fujino & Konno 2016). This is not the case in South Africa, where motor assembly has different symbolic meanings. The South African automotive industry includes a range of practitioners 'from very low-skilled manual labour to high-skilled engineering and management' (Wedekind & Mutereko, 2016: 22-23), with difficult employer relationships, and low levels of trust typifying work in the industry. The point is that vehicle parts are not neutral artefacts, but are highly symbolically charged; in the South African context this needs to be a consideration.

While there were several topics on organisational structures and work process, as well as how these can be made more efficient, there was missing curricular component related social relations to practices in organisations and companies (SR3). In the South African context where labour relations are complex and difficult, concepts in work relation are notably absent. In their report on South African industries, Wedekind and

Mutereko (2016) found a recurring theme across case studies to be the issue of trust between parties and within the organisation. There is thus a lost opportunity in the EIP to use the kaizen tools in order to make a contribution towards improved workplace relations. Simulations have proven to be beneficial in enabling participants from various backgrounds to meaningfully engage in learning from experience, and interactive simulations can play a role in improving relationships in a multi-stakeholder setting (Proches & Bodhanya, 2012). Despite the EIP's stated outcome 'to understand organisational roles', this is only addressed in the theoretical training and not extended into the practical training – at least not to the same extent of, for example, team-work in the production process. Thus in terms of the social relations to organisations or companies there is insufficient strengthening of the social relations.

Table 5.2 summarises the curriculum evaluation findings. The EIP curriculum has the potential to strengthen social relations to the self (SR1) in the form of values development, and to others (SR2) in the form of teamwork. However the programme only addresses the nature of work and work process, thus did not adequately address social relations to companies (SR3), social relations to the field (SR4), or social relations to the broader society.

Table 5.2: Evaluation of the EIP against criteria for workplace learning curricula

***Kaizen* principles**	**Key theoretical constructs from LCT**		**Key curricular concepts in 'lean' work-readiness training**	**EIP curricular outcomes**
	Social relations	**Codes**		
Providing value (quality)	Social relations to broader society	SR5+	Contribution to broader society.	-
		SR5-	Little attention to contribution.	There was no topic on broader contribution of productive work to society.
Continuous improvement (towards innovation)	Social relations to a field or profession	SR4+	Professional development, conduct, identity.	-
		SR4-	No/little attention to conduct, etc.	There were no topics that addressed professionalism in a disciplinary context.
Understanding work in organisations	Social relations to a company/ industry	SR3+	Understanding contribution to the workplace.	Topics in organisational structures and work process were present.
		SR3-	Little/no attention to contribution to a workplace.	
Respect for others in organisations	Social relations to others	SR2+	Curricular space for working with/for others	The role of teamwork in planning, organising, identifying and solving problems was present.
		SR2-	Little/no attention to team work, etc.	-
Eliminating waste	Social relations to the self	SR1+	Inclusion of values development in the curriculum.	Waste elimination, time management and lean manufacturing principles were present as embedded values.
		SR1-	Little/no attention to values.	-

5.5 Reflections on the Employability Improvement Programme Curriculum

This chapter addressed extent to which the EIP curriculum prepared students in technical and vocational programme for work-readiness. The EIP devoted considerable curricular space to enhancing social relations to the self (SR1), in the form of building values, particularly with regard to the elimination of waste, and social relations to others (SR2), in the form of team learning towards continuous improvement. There were shortcomings and missed opportunities in the EIP to address social relations more broadly in the workplace (SR3), to the field or profession (SR4), and to the broader society (SR5).

The main intention of the EIP is to introduce students to lean manufacturing principles

and to help them understand how applying these principles can impact work. Measured against its own outcomes the EIP address issues with regard to planning and organising work, identifying and solving work problems, identifying and avoiding waste, time management and teamwork. The short course met these outcomes in generic ways with regard to both the theoretical components and the simulated production runs. Students attending the programme come from many different vocational and technical fields and their work contexts are unlikely to be similar to the vehicle assembly production example used in the training, thus transfer of the personal and interpersonal skills development might be limited. The EIP's stated outcome that students should understand organisational roles was only partially met. The kaizen work-flow diagrams and complex visual flow maps have been identified by as a 'threshold concept' in lean education (Brennan & Dempsey, 2018), which suggests that these are important curricular elements for understanding work in organisations. More curricular space could have been given to these elements, particularly in the light of labour relations in South African workplaces.

The achievement of work-readiness is extremely complex, and the EIP cannot address all aspects of students' transfer from higher education to work. What was, however, clear from the analysis of the curriculum documents and video recordings of the training, is that the EIP offers a very different from of training from most forms of work-readiness offered to students at Universities nationally and internationally. Much of the current support offered to students and graduates at Universities is available through a career guidance centre or student counselling services – with a focus on how to search for appropriate employment, how to apply for the employment, preparing for a job interview, drawing up of CVs, and writing cover letters (Walker & Fongwa, 2016). This support is largely offered through one-to-one counselling, or through short presentations to a group or class. These interventions have been criticised as inadequate for the purpose of guiding students through an important stage of preparing to transition in their life course from academic study to productive work (Jackson, 2016). In contrast, the EIP curriculum has a strong focus on basic intrapersonal skills (SR1), such as time management, respect, honesty, tidiness, etc. that are framed within kaizen concepts that are introduced and applied in practical training across many iterations. The interpersonal competence that is the focus of the EIP curriculum comprise both the practical aspects of teamwork and the underpinning kaizen approach to the role of teamwork in problem-solving towards continuous improvement and innovation (SR2). The EIP thus takes an in-depth approach to teamwork and the improvements and innovations that are possible at through collaboration. The training programme has

potential in developing a work-ready gaze, with regard to industry-relevant intrapersonal and interpersonal skills. The approach used in the EIP, however, has too narrow a focus and therefore cannot address the complexity of work-readiness in the challenging context of South African workplaces.

5.5.1 The way forward: From curriculum to pedagogy

The curriculum evaluation assessed the potential of participants to achieve a work-ready gaze, based on a study of curriculum documents and video- recordings of the EIP training; in the next chapter the pedagogy is evaluated and the new interns are followed into their workplaces with a view to assessing the longer-term impact of the programme, as well as interviewing facilitators and workplace supervisors in order to establish their views on EIP training and participants' development.

6 CHAPTER SIX: EVALUATING THE EMPLOYABILITY IMPROVEMENT PROGRAMME PEDAGOGY

6.1 Overview of Chapter Six

In this chapter the focus is on the pedagogies across the four modules of the EIP. Pedagogy is understood as the teaching and learning relationship, including the interactions between facilitator and students, and students' communication with their peers in the educational context (Ramsden, 2003). It is these educational interactions that are the focus of the chapter. The chapter gives a description of the context, presents and analyses the findings, drawing on the evaluation criteria for pedagogies of work-readiness in both the theoretical and practical modules of the EIP. Interactions between the facilitator and the students were studied and impact on teaching and learning are explained. The focus of the chapter is on how the EIP pedagogy aligns/does not align with the pedagogy of work-readiness criteria (Table 4.3), that is, the extent to which the pedagogies used enhance the development of social relations to the self (SR1), to others (SR2), to the company or workplace (SR3), to the profession (SR4) and to the broader society (SR5).

It should be noted that between 2016 and 2018, in preparation for the handover of the EIP training to the South African institutions, South African EIP facilitators were appointed in each institution. The newly appointed practitioners took over the training of students from 2017, while the Japanese experts served as consultants. The description and analysis of the EIP pedagogy takes into account changes in the pedagogy of the EIP when different facilitators conducted the training.

6.2 The Employability Improvement Programme Pedagogy

The data for the study of the EIP pedagogy comprise video data across the training period as well as EIP student reflective reports, intern focus group interviews, individual interviews with facilitators, and focus group interviews with workplace supervisors. In the sections below the different pedagogies towards work-readiness that are used in the EIP are discussed and analysed, the differences between the pedagogical approaches of the Japanese facilitators and the South African facilitators are discussed, and the EIP pedagogy is evaluated against the conceptual and theoretical framework.

6.2.1 Motivating students

At the start of the EIP, facilitators explained how the activities they would engage in on EIP could assist them in becoming workready. The strong value that employers place on 'soft skills' was emphasised. The role of the EIP with regard to the potential success of their work placements was explained. The strategy was thus to start the training by motivating the participants. A potential shortcoming of the strategy was facilitators' assumption that students had no prior experience to contribute to what employers might require, thus the pedagogy did not draw on the potential of peer-to- peer sharing that has been shown to be important for engaged learning (Stigmar, 2016). In the South African context, many students would have had some form of job- seeking experience, and drawing on these experiences would strengthen the relevance of the EIP.

6.2.2 Pedagogies for developing key concepts in the local context

The dominant approach used to build students' understanding of the *kaizen* principles and concepts related to work processes, consisted of PowerPoint presentations, followed by group exercises. The slides were clear and legible, with good graphics. Although mainly graphic, the slides provided definitions and some elaboration of concepts in the form of keywords and short descriptions, thus following good practice for PowerPoint presentations (see e.g., Adams, 2006). In addition to the still images on the slides, short video clips were included in the presentation to clarify concepts, to reinforce students' understanding of concepts, and to test understanding.

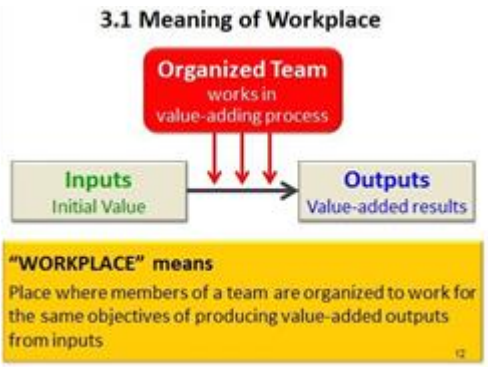

Figure 6.1: Power point slide in the theoretical module of the EIP (EIP Slide 12, 2016)

The PowerPoint presentations and video-clips introduced new concepts as well as background information on the EIP (Figure 6.1).

In the second section of unit one, concepts about the fundamental nature of work were introduced. There was an attempt to contextualise this using South African rock art to illustrate work in ancient times and Illustrations of modern day South African workers (Figure 6.2). Students were prompted to discuss the similarities and difference of work in ancient versus modern times. Most of the other slides used by both Japanese and South African facilitators to explain concepts related to the workplace, inputs, outputs, productivity and organisational structures, were presented through PowerPoint slides and video clips of Japanese factories.

Figure 6.2: Slides to depict work, inputs and outputs (EIP Slide 9, 2016

To encourage the students to think about innovation in the context of solving everyday life problems, the case of the Q-Drum was introduced to them. The Q-Drum was developed by a South African as an innovation designed to help rural women who carry water on their heads. The Q-Drum can be filled with water and then be pulled, instead of being carried on the head. The students are taken through the process of innovation from problem, conceptualisation, research and development, market research and finished product (Figure 6.3). As a group exercise, the students were encouraged to discuss possible further improvements to the Q-Drum.

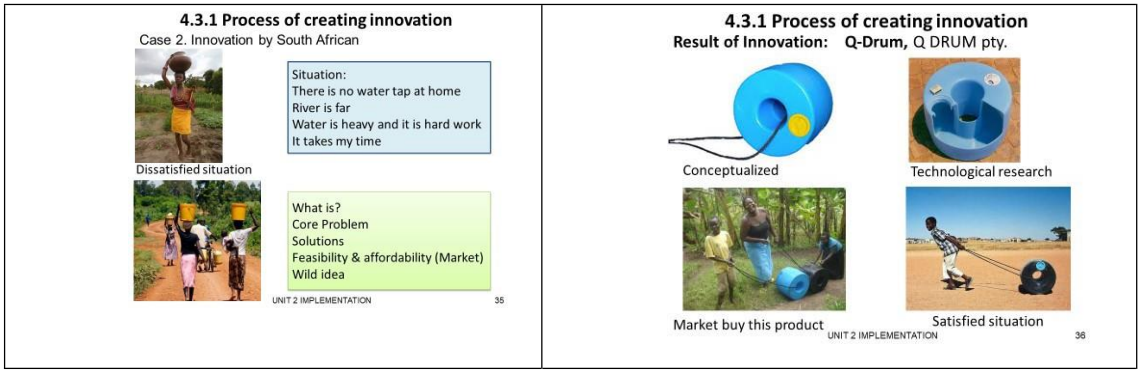

Figure 6.3: Process of creating innovation: Q-Drum (EIP slides 35 & 36, 2016)

The South African context did not feature strongly in the EIP. There was thus a missed opportunity to show how work leading to innovations, such as the Q-Drum, could benefit society beyond its benefit to the company that produced this product.

6.2.3 Concept building, using the Japanese context

There were many more examples taken from the Japanese context, particularly with regard to manufacture. For example, to test students' understanding of the different types of waste, a video of workers in a Japanese banana chip factory was shown and students were prompted to identify the different types of waste as well as to suggest improvements to the workflow in order to eliminate motion waste (energy spent moving from one space to another), transportation waste (time spent while moving items to the next person), waiting waste (time spent waiting while the items were being carried to the next person in the chain), and so on. According a Japanese EIP facilitator (Facilitator 1), the purpose of the videos was to assist students in transferring their understanding from text- and still image-based theory, towards being able to identify waste in work activities.

Figure 6.4 is taken from a video clip of work in a Japanese pineapple canning factory that demonstrates that workers have different tasks in the workplace. There was no attempt to contextualise the PowerPoint presentation by replacing images from Japanese factories with South African equivalents.

Figure 6.4: A Japanese Pineapple canning factory (EIP slide 13, 2016)

The PowerPoint slides explained the portfolios, functions and tasks of individuals in an organisation; examples of organograms were used to demonstrate the nature of the workplace as well as relationships between units. The feedback from the workplace supervisors in their focus group interviews was that students did not seem to grasp the concept of organisational structures or understand the idea of line management and following workplace procedures:

> It is as though students do not understand that they cannot, for an example, write directly to the General Manager instead of their immediate supervisor… (Workplace Supervisor 1).

It might have been more effective to use more active forms of learning, such as locating the students in a particular unit and finding out how they might communicate with another unit, in order to develop their understanding of communication protocols in an organisation.

Figure 6.5: Students listening attentively during presentation of the theoretical module

During the input-based presentation, the video data shows students paying attention as the facilitator explains organisational structure. The lack of interaction between the students and the facilitator is a warning sign that the students are not fully engaged in learning (Figure 6.5). It was generally observed that during the presentations the facilitator did most of the talking, while students paid attention and took notes. The slides provided a visual summary of the concepts that were being taught, while the video-clips connected theory and practice, and encouraged active participation.

There was some provision for group work in enhancing students' understanding of some of the new concepts. For example, in order to develop students' understanding of inputs, outputs and productivity in the workplace, participants were given short exercises to calculate productivity using a simple mathematical formula. Facilitator 2 explained that the calculation was designed to help the students understand that their activities in the workplace had a direct impact on the output of the organisation. Although students interacted amongst themselves, the activity during this section was directed by the facilitator who prompted interaction with students in a question and answer format.

6.2.4 From the specific to the general: teaching inductive reasoning

Module 1 focused on facilitators' inputs towards concept building (with some active learning through short exercises), but as additional concepts were introduced in Module 2, the facilitators made use of a more active, group-based approach and inductive reasoning to facilitate students' learning about problem identification and solving, sequences in work processes and work breakdown structures. The inductive reasoning approach entailed the facilitator giving the students a task, and then extracting general principles about work processes from the students' responses. Module 2 was

structured to take students from practice to concepts and frameworks, which they would draw on during the workplace simulation to plan their activities and identify problems in the workplace. The initial strategy in introducing the work breakdown structure was to ask students to tackle a practical task as follows:

> The sales dept. has been suffering from a lot of delivery complaints from customers. Break down the whole ordering process in the warehouse to find out its bottleneck (from EIP Slide 33, 2017).

The topic above was introduced without providing any further information to students.This task was confusing and too advanced for the students; they were in their second year of study and (with the possible exception of business management students) encountering concepts such as ordering processes, 'bottlenecks' and 'operator's motion' for the first time.

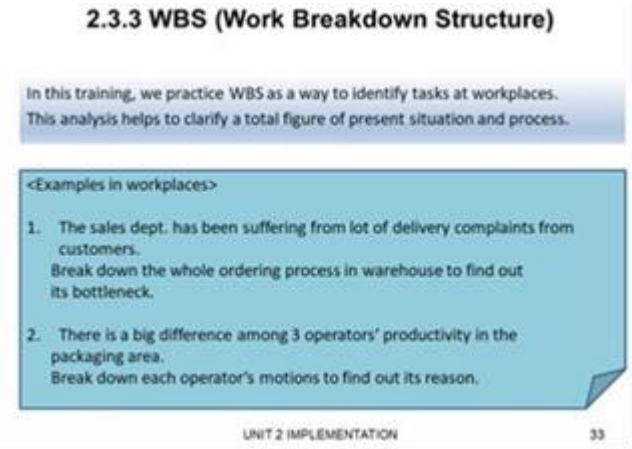

Figure 6.6 EIP: Slide with instructions (EIP Slide 33, 2016).

The task in Figure 6.6, above was not successful in helping the students to understand work breakdown structures. When the task is complex as in Figure 6.6 there is a need for prior conceptual development to enable transfer of a theoretical understanding to a practical application. However, when the task is simple, an inductive approach that extracts the concepts from the practice is more appropriate. A more successful example of teaching work structures with inductive reasoning is illustrated in Figure 6.7. Instead of the facilitator making a presentation on work breakdown structures, the students were given a practical exercise that required them to think inductively. Students had to list the activities that they would embark on when making an egg and toast breakfast. This activity was done in the form of a group work exercise and students used flash cards to organise their thoughts and then arrange the cards in sequence to demonstrate the

activities (see Figure 6.8). The use of such exercises enhance students' awareness and comprehension of concepts (Shay & Steyn, 2015).

Figure 6.7: Teaching work-breakdown structures inductively (EIP Slide 34, 2016)

Facilitator 1 tried to incorporate examples that were relevant to the context, as well as topical. For example, one of the groups was given an exercise that required them to think about activities that they, as 'consultants to the South African Football Association', would engage in to ensure that the South African Soccer team qualified to play in the World Cup in four years' time.

Figure 6.8: Students working together on a group activity

In summarising the unit, the facilitator explained to the students that in fact what they had accomplished was a Work Breakdown Structure (WBS), a project management tool that organised work into manageable sections. The facilitator finished off by drawing a parallel between the activity and the workplace and explained to the students that the work breakdown activity was applicable to all activities in the workplace. The students' reflections showed that they had enjoyed the teaching and learning method that was used in this unit. An Engineering student reflected that it was 'an interesting way of teaching' and that 'the class was not boring at all' (Student 1 reflection). Another

felt that ‘it was a nice lecture to attend, you learn a lot of new things and it was not time wasting at all’ (Student 2 Reflection).

In analysing the way in which information was presented on the slides, no linking of the information across the slides was evident. Thus students might thus not fullyunderstand how concepts were related and how their interrelatedness might impact their workplace activities. For example, the first few slides of Module 2 contain information on the organisation and how it works. After these, the module tackles situational analysis without providing adequate information on how this links to the previous work on the organisational information. Subsequent slides provide information on various frameworks that can be used to analyse a situation and solve a problem but fail to provide the student with information that relates these frameworks or shows how they link with the previous work. Examples that linked the frameworks would have further developed students understanding. There might therefore be a need to re-arrange the input slides, include slides that link the concepts and framework, and include more practical and contextualised exercises to enhance students’ comprehension of *kaizen* concepts.

6.2.5 Project-based pedagogies in a simulated workplace

The pedagogical strategy used in the practical training (that started towards the end of Module 2 and continued with iterations to Module 4) continued to emphasise learning by doing. This project-based learning took place in a simulated workplace. The students engaged in an extended role-play as a team of workers who had to achieve productivity goals; the role play of provided opportunities for them to implement what they had learned on the EIP, and each simulated run (over the 2 ½ days) ended with a reflective session that enabled the students to critique their own actions and those of the other teams, and internalise what they had learned. The facilitator provided input only during the reflective sessions.

The project given to students was the efficient assembling of miniature trucks. All the necessary truck specifications (see Figure 6.9) as well as tools and basic instructions, mainly through diagrams, (see Figure 6.10) were provided for the assembly. The provision of the drawing specifications and parts lists was intended to support students in how to plan and organise their work.

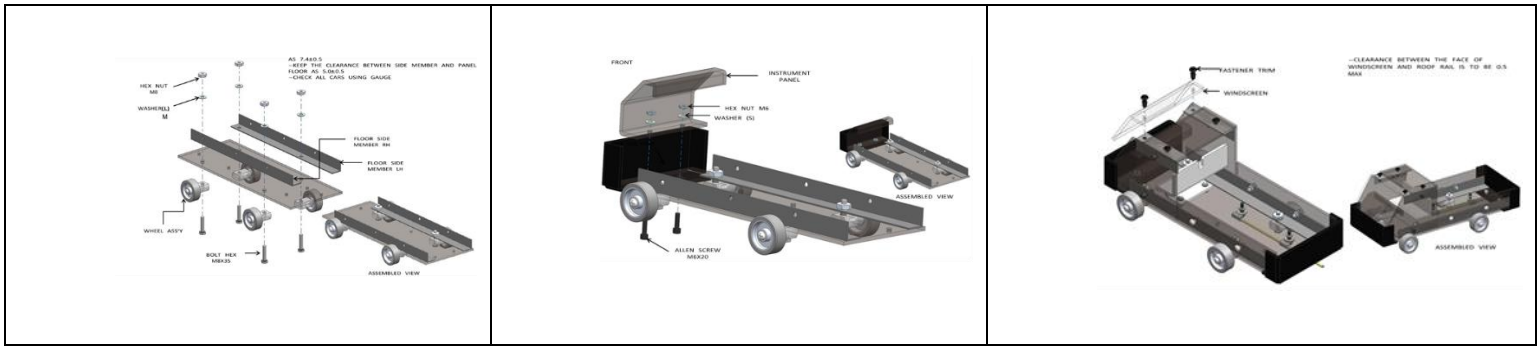

Figure 6.9: Samples of truck specifications (EIP curriculum document

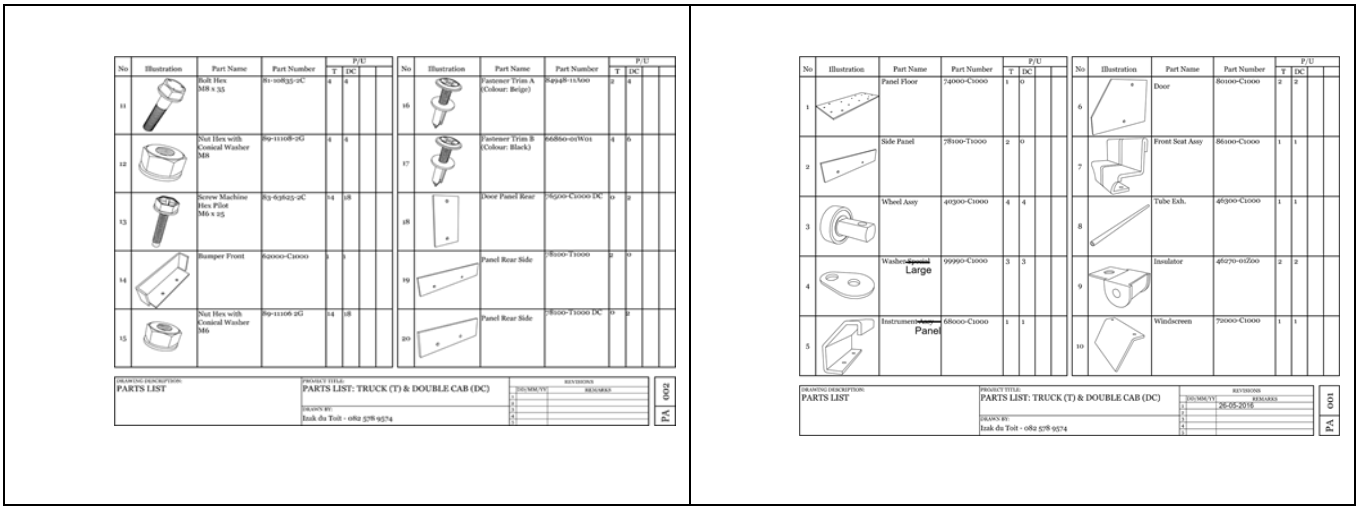

Figure 6.10: Parts lists (EIP curriculum document)

The literature on lean education suggests that artefacts that are produced in the production runs (or other simulation) should be meaningful to the professional context (Murman et al., 2014). Given this assertion, it would be expected that the non-engineering students who had undergone the EIP would have found the use of the miniature trucks in the EIP problematic, particularly at the beginning of the training as they would find it difficult to make the connection between truck assembly and their own disciplines and fields. For example, an Electrical Engineering student felt that the truck was a mechanical engineering tool and as such was not suited to his discipline:

> Although I learned to work in teams, I feel that this training is for Mechanical Engineering students and has no link with Electrical Engineering (Student 3 Reflection).

Similarly, during the interviews, a Public Management intern commented:

> When we were given the instructions to work on the truck

> I could not understand how this relates to my qualification (Intern 1).

A Chemical Engineering intern commented:

> [The EIP] does not do much for me in industry as the environment is different. It might help to adapt it to other industries (Intern 2).

Despite these views, for the majority of the interns from Chemistry, Office Management and Technology, Public Management and even most of the students from Chemical Engineering, the use of the trucks and related tools in the EIP had not been found difficult to link to workplaces generally. For example, the majority of the Chemical Engineering interns indicated that they could link elements of the EIP such as continuous improvement, housekeeping, and so on, to plant optimisation in which they were required to improve processes in order to achieve the best result with less inputs. The management interns, in their focus group interviews also said that they understood that the truck was merely a tool and what was of importance were the learning outcomes that prepared them for workplaces. They added that, perhaps the use of an artefact that was unrelated to the field, was exactly what is needed to create adaptability skills. A similar view was held by other facilitators. An EIP facilitator in the health sciences suggested that while the use of cadavers might prepare a medical student for real life in the medical field, limiting a student's work- readiness training to their own field would not enhance the student's readiness for life. Other EIP facilitators agreed, indicating that in their experience, the use of the truck had not negatively affected students' learning, but suggested a need for the facilitator to provide a 'rounding-off' of the training by providing space for the students to apply the concepts in their own field of study. An EIP facilitator claimed that while there is no need to use tools other than the trucks, she believed that the facilitator had to ensure that the students understood the purpose of the training at the beginning. She commented on her experience with offering the EIP training to non- engineering students:

> [Non engineering students] have this belief that engineering students are smarter and are therefore apprehensive of the use of trucks in the beginning, but once, as the facilitator, I lay the foundation by explaining that the truck is merely a teaching and learning tool and I explain the expected outcomes of the training, they loosen up and achieve excellent learning (Facilitator 3).

The facilitators felt that, while there was no need to change the miniature truck as a teaching tool, the simulated environment could become more authentic by including different portfolios such as training and development as an element of human resources

management, cost analysis as an element of finance, ergonomics as an element of environmental health, and so on:

> All these different elements would give the student something close to a comprehensive picture of the workplace (Facilitator 4)

The facilitators suggested that the use of the trucks for non-engineering students could orientate the students towards being adaptable. Adaptability is key work- readiness key indicator: 'open to change (flexibility), acceptance of diversity, able to adapt behaviour' (Caballero et al., 2011: 45).

6.2.6 A pedagogy for planning

The pedagogical strategy to facilitate planning competencies was to allocate time at the start of each assembly run to planning. Organising themselves entailed having a team meeting (see Figure 6.11) and nominating a supervisor who, together with the team allocated various portfolios to the team members. It also entailed forming sub-teams within the project team to work on specific components of the truck. For example, there would be a sub-team to work on assembling the head of the truck while another would work on assembling and fitting the exhaust pipe, etc. This planning meeting was intended to prepare students for the standard workplace practice of morning briefings at the start of the working day (be it in manufacturing, retail stores, or hospitals). Planning entailed studying the instructions for the assembling of the miniature trucks, which were the standard operating procedures. This required the sub-team members to calculate the exact numbers of components and tools that they needed for their station (Figure 6.12) and to order these from the 'runners' who would then collect them from the 'stock room'. The teams could do a practice assembly run, if they so wished. The video data showed that the planning and organising phase generally took thirty to forty-five minutes, and when compared to the actual time allocated for the entire production run, this phase accounted for almost fifty percent of the time. This is a typical example of implementing the *kaizen* philosophy which prioritises planning for successful implementation of any activity. A further observation from the video data was that the facilitators allowed the teams to work without their input and to gauge their own state of readiness for the production run, even if that meant not utilising the entire time allocated for this phase. At the end of the production run, the teams watched the video of their performance. By watching video recording and engaging in reflective discussion, students identified waste and were able to eliminate waste and improve production by planning and organising themselves better. In the first run one could see parts strewn all over the workspace as evidence of inventory waste resulting from

oversupply of parts (Figure 6.13). As a result of repeated runs and reflection after the run, the teams continued to improve their performance. The learning in the planning and organising phase was, thus, achieved through the experience of failure as a result of poor or lack of planning. Through reflection, planning improved, followed by better results in subsequent runs. Thus the students learned the importance of taking time to plan one's work. As one student put it:

> I learned that Planning is the key for any goal that you want to achieve (Student 4 Reflection).

Another student said he learned that for any project he needed to know where to start. The students seemed to have transferred their understanding of the importance of planning to their workplaces. In all the focus group interviews, the interns who had completed the EIP referred to how they could link what was happening in the workplace to the concepts that they had learned on the EIP. A Public Management intern explained that she was able to relate the planning and organising as taught in the EIP to her work:

> It taught me that when given a task, I should first understand what it is about, what is needed in order to accomplish the task and what activities do I need to follow. Failure to do this could result in me running out of time (Intern 3).

An Office Management intern, working as a departmental secretary at a Finance department during her work placement said*:*

> The EIP had taught me that if there is a departmental meeting, I cannot just go to the meeting, I needed to plan for it, for example, book venues, print minutes and agendas and prepare myself to take minutes by checking if my recording devices are working as well as having a pen and paper (Intern 4).

Figure 6.11a Team meeting to plan operations.

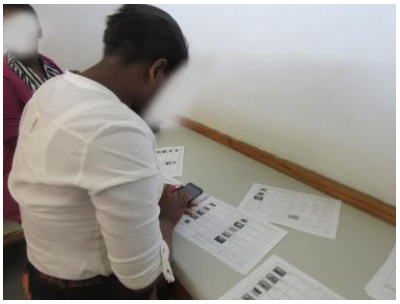

Figure 6.11b students planning for the number of components they need to assemble the truck

Figure 6.11c Inventory waste due to oversupply of truck components

Figure 6.11: Planning the truck assembly

6.2.7 Teaching problem solving and decision-making

The intention of the problem-based strategy was to guide students in the process of diagnosing a problem and implementing a solution. Through reflective practice and to diagnose problems in their operation, the students applied the logic tree methodology (5Ws and H) as introduced to them in the theoretical module, to check **W**hat (seemed to have been the problem), **W**here (the problem had occurred) and **W**hy (it occurred), **W**ho (had the problem), **W**hen (did the problem seem to occur) and **H**ow (can the problem be solved) (see EIP Slide 35 in Figure 6.14).

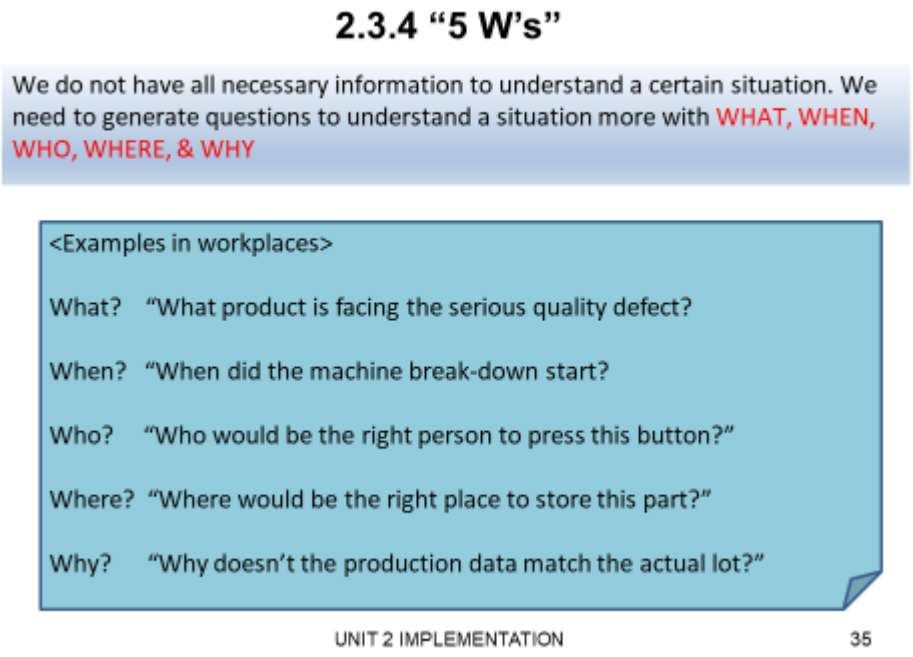

Figure 6.12: Teaching Problem Solving through reflection (EIP Slide 35, 2016)

This reflection helped them to develop improvement plans for subsequent runs of operation. Reflecting about problem solving, an electrical engineering student wrote that 'I have learned that in the workplace, I must try to solve a problem and not call the supervisor all the time' (Student 5 Reflection) while another wrote: 'I learned to take initiative and attempt to solve a problem' (Student 6 Reflection). A workplace supervisor of an office management intern commented:

> I noticed that the intern was able to attend to smaller issues without referring them to a senior … for an example she would pick up why a claim would potentially not be payable and immediately contact the claimant … this has helped us to reduce our turn-around times (Workplace Supervisor 2).

Sometimes, however, Workplace Supervisor 6's intern was not able to distinguish between what he could attend to and what he should refer to the supervisor:

> In the training … perhaps there needs to be some emphasis on proactivity and decision making to be able to discern between what the intern can handle and what needs to be referred (Workplace Supervisor 3).

From the perspective of the interns, it seemed as though the application of the '5Ws and H' depended on the readiness of the work environment to allow the intern space to act autonomously. This seemed to have been the case for a Public Management intern who was placed at a clinic and found that she sometimes did not have the confidence to identify and suggest solutions to a problem as junior intern. Another intern explained that although the reception had been good at his place of work, he had found in the first year that a 'platform was not made available to make suggestions' *(*Intern 5). Although not addressing the issue of whether or not an intern had been granted a platform, a supervisor indicated that workplaces also need to be prepared for students and made to understand that interns are there to 'add value and somehow reduce one's workload while learning' (Workplace Supervisor 5). Another workplace supervisor agreed:

> Sometimes the mentors do not give the intern opportunity to grow… they are somehow scared to give them responsibility and tend to treat them as if they are incapable of making decisions or they will make mistakes (Workplace Supervisor 8).

Workplace Supervisor 9 concurred, explaining that had he known about the EIP and what it teaches the student, he would have created more opportunities for the interns to demonstrate their capabilities. He suggested that host employers be given an orientation of the training programme as well.

6.2.8 A pedagogy for time management

The EIP practical module teaches time management by allocating teams a specified amount of time during which to assemble a specified number of trucks. The time allocation and the specified goal is intended to help students understand the importance of time and deadlines in the workplace. Time management in the EIP in underpinned by the *kaizen* principle of the elimination of waste. During the reflective session, while viewing the video footage of their operation, the students were prompted to identify areas where time was wasted during their operation. Many students were able to identify the different timewasting activities in their production, and how these impacted their ability to deliver the required number of trucks within the allocated time. The students were able to brainstorm improvements to ensure that time wasting was reduced in subsequent runs. During the focus group interviews, many interns attributed their improved time management to their learning in the EIP. A chemical engineering intern, showing that he had internalised the 5S *kaizen* principle, linked time wasting to bad housekeeping habits in the workplace:

> I always keep in mind that if tools are not placed in their designated places, a lot of time will be wasted looking for it. If you save time in the workplace, you can produce work within a limited time (Intern 6).

For the chemical engineering students, the avoidance of waste in the EIP linked with plant optimisation in their discipline:

> In our company, we deal with optimisation a lot, meaning that I must establish what I could do to achieve the same result using less (Intern 7).

Interestingly, the student refers to the company where he was placed as ‘our’ company, suggesting that he experienced a sense of belonging or identification with the company.

6.2.9 Team-based learning

The project-based pedagogy included a strong team-based learning component. The teams in the simulated workspace were allocated a certain number of trucks to assemble within a specific time period, along with the specifications and parts lists. The

intention was that students would learn from one another in their teams, and learn the value of cooperation and good communication in teamwork. Teamwork is embedded throughout the truck assembly operation and is intended that the students find out from their own experience of working in teams how good teamwork enhances productivity in the workplace. The teams were required to work together as they planned their operation and throughout the assembling of the trucks. Through reflection and constructive criticism of one another's actions, the students identify how working or not working as a team affects productivity. Learning the skill of working in teams in the EIP, results from the identification of how their own poor or good teamwork affected the delivery and quality of the production. Students appreciated practicing teamwork and a number, in their reflections, appreciated how the EIP had taught them 'to work with different people and to always be in one's best behaviour in the working environment' *(*Student 7 Reflection). An Engineering student reflected, immediately after the EIP that he had 'learned to work together with others in order to achieve a desired a goal' *(*Student 8 Reflection*).* Another saw the benefit of the teamwork practice on his listening skills and wrote on his reflection form that 'Listening to other people's opinions is critical to achieving a goal' (Student 9 Reflection). One of the engineering students linked the benefit directly to the engineering field:

> In Engineering they need a person that can work in a team and this course gives us practice in that regard (Student 10 Reflection).

From the focus groups interviews with interns and workplace supervisors, it seemed that the team-work skills that they learned on the EIP was, at least in some cases, transferred to the workplace. Through working in teams in the EIP, students were prepared for work environments that had different kinds of people and that they would need to be able to communicate with them as well as listen to their views. Chemical Engineering interns at a water utility in Pietermaritzburg felt that the practice of working in teams on the EIP had helped them to 'adjust in the workplace and to work with different personalities' (Intern 8). An Office Management intern working at service department shared how her experience on the EIP had helped her to deal with a peer, who had been made her feel unworthy of her internship:

> I eventually had realised that it was her personality and nothing wrong with me, and that just as we had learned in the EIP, there will always be different personalities in the work environment, mine is to find a way to work effectively with them (Intern 9).

In a focus group interview, a Chemical Engineering student felt that the team work on the EIP had taught her that 'everybody in a team has an opinion and that communication was key' (Intern 10*).* A mechanical engineering intern who was placed at a company in Richards Bay said that the EIP had helped him to develop the confidence to work in different teams:

> I work with five people in my team but we also work with other teams. So I am interacting with various teams and the EIP had helped me with the confidence to deal with these teams *(*Intern 11*).*

A workplace supervisor at the same company, compared this student to one who had not undergone the EIP and said:

> I usually pair students with others from different institutions … [name of student that had done the training] is quite forthcoming and manages team dynamics … in contrast … the other one from the same institution will wait to be coerced and struggles to work with the team *(*Workplace Supervisor 7).

It also seemed, from the interviews that the fact that the students in a team are further grouped into sub-teams to work on different areas on the truck assembly, had had an unexpected outcome in that it had taught the students about benchmarking:

> When we did the training, we worked in small teams and when you were having a problem with a certain part assembly … we identified a team that was not having a problem and studied what they were doing right … this is the same here at work … when we find that we are having a problem with a certain part we go to another department and use the information we get there to improve our work *(*Intern 12*).*

Generally, there was agreement that the EIP had prepared the students for working with different people and, in contrast to their peers who had not undergone the EIP training, they had come into the workplace with a level of confidence. It does seem, from the interviews, that the students who had undergone the EIP training understood the importance of teamwork.

6.2.10 Iteration: a pedagogy towards innovation

The *kaizen* concept of innovation is founded on the idea of continuous improvement and is embedded in repeating the truck assembly runs and reflecting on the improvemen over time. The concept of continuous improvement is evident in the

pedagogical strategy of repeating the assembly runs, and implementing small improvements to each run. Students were encouraged to seek ways of improving their operations by implementing one of the frameworks that they were introduced to, uch as the '5W and H' whenever a problem was identified. Through repeated runs, questioning, and reflections, the teams found better ways to assemble the required number of trucks. The video data shows that innovation was achieved when students used different types of jigs to improve the operations, resulting in an improved workspace (see Figure 6.13). In their reflective reports, none of the students could identify a particular moment when the jig improved – it was a part of the continuous improvement process of fine-tuning the jig after each production run.

Figure 6.13: An improved workspace achieved through small improvements

6.1.1 Housekeeping: teaching respect for others

Housekeeping in the EIP is practised throughout the practical module but its application is generally evident in the second and third runs of truck assembling, following reflections on the first run. As a general practice of showing respect for subsequent training groups, students are not allowed to leave the training room untidy, thus a general housekeeping of the training room takes place at the end of each training day.

6.1.2 Reflecting on/for practice

Each of the simulated production runs culminated in reflection sessions where students observed their actions on video and reflected on these. The reflection sessions were guided by the facilitator and hence interaction was both between facilitator and students

as well as between student and student. Through reflection, the teams identified their own shortcomings and improved on these in subsequent runs. In their reflections after each truck assembling run, the students applied the logic tree methodology (5Ws and H) to their process to find the root causes of problems in their operations. This reflection helped them to develop improvement plans for subsequent runs of operation. Reflecting about problem solving, an electrical engineering student wrote: 'I have learned that in the workplace, I must try to solve a problem and not call the supervisor all the time' (Student 11 Reflection); while another one wrote: 'I learned to take initiative and attempt to solve a problem' (Student 12 Reflection).

6.2 Reflections on pedagogical differences in the 2017 and 2018 cohorts

The video data of the 2016 cohort's training show that the Japanese facilitator was very formal in his interaction with the students. During the presentation of the theory, the facilitator stood mostly at the front of the class and did most of the talking, except in the sections where the students were engaging in an activity. The video data shows students apparently concentrating on the presentation, while a few students were seen to be taking notes. At one stage, when the egg and toast breakfast was introduced, it seemed as though the students struggled to understand the facilitator's instruction. This made it necessary for an observing South African lecturer to step in and explain the activity to the students. Although the students did not request the facilitator to repeat the instruction, they did not start to work on the exercise, instead, they sat and looked at the facilitator and then at each other. It seemed that they were struggling to make the connection between the instruction and its relevance to the training; an Electrical Engineering student explained that 'when the Japanese facilitator asked us to make an egg and toast breakfast, I could not understand why…' (Student 13 Reflection). Once the observing South African lecturer had explained the instruction in *isiZulu*, the students started to work and actively share ideas.

In contrast, the 2017-2018 cohort did not seem to experience the same difficulty in making sense of the facilitator's instructions. These facilitators were South African and able to by switch into the vernacular where necessary. For example, when

Facilitator 2 gave an instruction to develop a work breakdown structure for the egg and toast breakfast exercise, she code-switched into *isiZulu*:

> Have you ever made an egg and toast at home? That is what I am talking about (Facilitator 2) (translated from *isiZulu*).

Facilitator 2 indicated that she understood that the students were struggling to make the connection between the instruction and the training context, and that the exercise was intended to link the familiar (egg and toast) with the new (work breakdown structure). Local facilitators understood the students' background context. For example, Facilitator 3 understood that the students at a particular site came from a culture that values seniority and authority. Students from this site tended to be reserved and might have appeared unengaged. During the focus group interviews an intern indicated that she was able to overcome her reserve because of the talk that Facilitator 3 had had with them at the start of their training:

> When we first arrived for the course, the facilitator sat us down and made us understand that confidence is important in a new space. That made me to realise that I need to work on my confidence (Intern 13).

In contrast, an intern that had not undergone the EIP training had felt very intimidated on her first day at work. She commented:

> I was so scared, I thought that I would be judged according to my marks. I do not know what I would have done had it not been for the mentor's warm welcome (Intern 14).

Facilitator 3 was able to draw on local idioms and proverbs. For example, in teaching housekeeping issues she would say things like, 'When you pack things, keep Zulu with Zulu and Xaba with Xaba' (Facilitator 3). Zulu and Xaba are clan names in the Zulu nation, and using this example helped students to understand that she meant that they needed to pack similar things together. In addition to linking the familiar with the new, code-switching is able to 'make links for the students between their social and linguistic domains' (Creese & Blackledge, 2010). Code-switching and local examples were appreciated by the students, who found this easier to understand: 'it was good that the facilitator can explain things in a way we understand' (Student 18 Reflection). A class representative, at the end of one of the training sessions, thanked the facilitator:

> Thank you for making an effort to ensure that we understand … while we know that we must learn in English we appreciate that you also speak to us in a language that we understand (Student 19, video data).

The 2017-2018 video data showed that the interactions in the class during the first two modules in which the *kaizen* concepts were explained were very lively. Although the

facilitators made presentations using PowerPoint slides to explain new terms and concepts, they also tended to walk around amongst the students and stimulate interactions. A student reflected that 'the facilitator was very engaging and motivational' (Student 14 Reflection) when she was teaching. Facilitators also seemed to take note of those students who were not interacting and would engage them by asking them directly for input. This seemed to also make the students feel included, as one of the students expressed it:

> The facilitator makes us feel comfortable to be free and confident to speak in class (Student 15 Reflection).

An Engineering student elaborated:

> Before I came to this course I could not speak to people who are not my friends, but the trainer made me talk. Now I can even present to the group with confidence. (Student 16 Reflection).

Another student said, 'She motivates us to speak up' (Student 17 Reflection) while one student felt that she drew him out of his shell, saying:

> Since I am a shy person, I benefitted because I was given a chance to share my ideas with everyone (Student 18 Reflection).

Because Facilitator 3 was familiar with the clan names that are associated with the surnames of the students, she developed rapport with the students by addressing a student with his or her clan name and in this way prompted the student to respond or at least think about the question. It seems as though the students appreciated this gesture and immediately felt that they could speak in class. One student captured his appreciation of this gesture:

> When she calls out your clan name, she creates a certain level of closeness to you and therefore a safe space for you to raise your ideas (Student 19 Reflection).

Student 26 said 'she displays love and makes the class enjoyable' (Student 20 Reflection), and 'she motivates us to speak' (Student 21 Reflection) and 'she encourages us to interact with others' (Student 22 Reflection).

Another difference in the pedagogical approaches, was that the 2017-2018 video- data

showed that there had been no hand-outs provided for the students, who were expected to listen and take notes as the facilitator did the presentation and facilitated the group work. In groups that were trained in 2017-2018, the students were given a workbook in which the PowerPoint slides that were used by the facilitator were included; thus they did not take as many notes as in 2016. In addition, the workbook included brief explanations to help students work on their own. The workbook had spaces for the students to make notes on appropriate pages for better understanding of the content. A closer look at the handbook shows that it is very brief, to the extent that if students did not take notes in class, they may not have a full explanation of the concepts. Although the students took notes during the presentation, the researcher could not ascertain whether the students had used these notes for self-study.

The comparison in interactions between the 2016 and the 2017-2018 cohorts shows the importance of taking into consideration the students' context in the implementation of the EIP. The differences between the Japanese expert (Facilitator 1) and the local facilitators, for example, presenting from the front as opposed to walking amongst and taking to the students, being able to code-switch between English and the vernacular as well as using local examples, highlights the main difference between the formal Japanese training style and the less formal South African context. The 2017-2018 students' reflections illustrate that they resonated with the facilitators who brought the *kaizen* principles closer to what they already knew and understood.

While there were significant differences in the Japanese and South African facilitators' teaching styles in the sections of the EIP where concept building was foregrounded this was less important in the truck assembly simulation. The focus of the EIP was practice-based learning in the simulated truck assembly. Because the facilitator's role was back-grounded in these sessions, the facilitator's style was less noticeable, particularly by the students.

6.3 Evaluating the EIP against the criteria for work-readiness pedagogy

This section focuses on establishing the extent to which the EIP pedagogy contributed to social relations to the self (SR1), to others (SR2), to a company (SR3), to the profession or field in general (SR4) and to external clients and the broader society (SR5). It would be expected that pedagogical strategies in support of students' work-readiness would include critically reflective learning activities about broader social contributions through work that would include critical reflection on the larger contribution of work in contexts of development (SR5), learning activities that built

students' identification with the profession or field of practice (SR4), supported problem-based/project-based learning within and across groups (SR3), participatory and engaged team-based learning, and reflective learning activities towards values-building and self-efficacy (See Table 6.1).

The EIP's pedagogical approach was intended to help students to understand work, the workplace and organisational structures, to plan and organise work, analyse and solve problems collaboratively as well as implement improvements in a simulated workplace towards innovation. With regard to social relations to the self (SR1), the key value taught was the elimination of waste, which was evident in the teaching of inductive reasoning that allowed students to try and solve a problem and then reflect on the results and how to improve. This was particularly evident in the way in which planning and time-management were taught. Less successful was the way in which students were motivated to understand the role of the EIP in supporting them to become work-ready, in which it was assumed that the students had no prior experience in job-seeking.

Social relations to others (SR2) in the form of teamwork was apparent in both the theoretical and practical sessions of the EIP. Many of the exercises in the theoretical modules created opportunities for the students to work together on group exercises. The focus was on the role teamwork in productive work as a key pedagogy in the workplace simulation. In addition to pedagogies in support of team-based learning, 'housekeeping' taught respect for others and planning showed the importance of including all team members' ideas and insights.

The theoretical modules introduced the students to ways of understanding work in workplaces (SR3), such as organisational structures and work breakdown structure. Where the inductive reasoning approach entailed an appropriate selection of tasks this worked well in building students' understanding, when the task too challenging or there was insufficient preparation for the task, this impacted negatively on students' understanding. Students were expected to apply concepts such as work breakdown structures and the '5W and H' to their production runs, particularly in the reflective sessions in which they analysed the ways in which they could have improved the run and started to plan the next run. In some of the interns' reflections there was an emergent sense of identification with and contribution to the site of practice.

Continuous improvement is a core concept in *kaizen* work-readiness. This concept was apparent in the iteration of three production runs for the purpose of continuous improvement towards innovation (SR4). Repeating and reflecting on the production runs was effectively used to help students to understand how small changes can lead

to significant improvements. There was potential in building professional identities, but the generic nature of the training did not fully support the emergence of students' social relation with the wider field. It could also be argued that because the EIP is focused on the company (SR3), it neglects the profession or field, thus the continuous improvements in the EIP pedagogy weakened social relations to the profession (SR).

There was a missed opportunity to explore social relations to the wider community (SR5), particularly when South African examples, such as the Q-Drum were included. Despite the discussion on possible improvements on the Q-Drum, the students were not asked to consider the impact of this (and potentially other innovations) on the improvement of lives. Thus the EIP did not develop a social relation to broader society (SR5). The inclusion of more examples and innovations from the South African context, and opportunities to discuss the contribution that productive work can made might have extended students' understanding of work beyond the workplace and into its impact on communities and the economy. A summary of the evaluation of the EIP pedagogy is presented in Table 6.1.

The table and discussion above clustered the pedagogies under the sections where they are most relevant, but the pedagogies are strongly interlinked. For example, use of inductive reasoning is used to strengthen social relations to the self (SR1) and for understanding work in organisations (SR 3), but also has an impact on social relations to others (SR2) and to the profession (SR4). Similarly, teaching the elimination of waste in the simulated space, the EIP is effective in teaching students the value of planning and organising (SR1). The EIP practice places emphasis on the continuous improvement through the application of PDCA on productivity improvement and the provision of quality products and services at cost. The iterative pedagogy therefore foregrounds social relations to the company (SR3), rather than the profession. While making students aware of keeping their spaces neat and tidy teaches respect for others (SR2), it also translates into saving time and resources for a company (SR3).

Table 6.1: Summary of the evaluation of EIP pedagogy

Kaizen principles	Key theoretical constructs from LCT		Key pedagogical concepts in 'lean' work-readiness training
	Social relations to the world of work	Codes	
Providing value (quality)	Social relations to broader society	SR5+	-
		SR5-	The limited use of local examples did not support students' understanding of social contribution through productive work.
Continuous improvement (towards innovation)	Social relations to a field or profession	SR4+	-
		SR4-	The potential of the use of iteration towards innovation, including reflection on/for practice did not include identification with a profession.
Understanding work in organisations	Social relations to a company/ industry	SR3+	The simulated workplace, as well as concept building in the local context, problem solving and decision-making through inductive reasoning supported potential contributions to a workplace.
		SR3-	Concept building, using the Japanese context and forms of inductive reasoning that were too challenging did not contribute to workplace productivity.
Respect for others in organisations	Social relations to others	SR2+	Pedagogies in support of team-based learning, showing respect for others by practising housekeep and pedagogies for planning were oriented to good team work.
		SR2-	-
Eliminating waste	Social relations to the self	SR1+	Teaching inductive reasoning, time management and planning built values.
		SR1-	Attempts to motivate students did not take into account students' prior experience.

6.4 Reflections on the Employability Improvement Programme Pedagogy

There is considerable effort in the EIP practical module to simulate activities that take place in the workplace through the team meetings, Standard Operating Procedures (SOPs), and so on. There is a strong orientation towards the provision of quality products and services (or QCD Quality, Cost and Delivery) throughout the modules of the EIP and the pedagogies used reflect this central focus. The EIP orientates students to deliver a high quality of products and services. The simulation remains tightly bound to the workplace itself; it does not explicitly address the needs or roles of the customer, professional communities or communities in need beyond the workplace. Thus the EIP simulates only the assembly plant, creating the impression that an assembly plant exists in isolation and is not linked to other functions in an organisation or to life beyond

the company. In this way, the EIP practical modules misses an opportunity to introduce the students to the relationships between different portfolios in a workplace and beyond, thus limiting the contribution of the EIP training to the workplace (SR3).

The *kaizen* principles of continuous improvement are very evident through-out the EIP practical modules with students applying the PDCA cycle to identify inefficiencies in their operations and improving to 'increase efficiency' (Goetsch & Davis, 2014). The strong culture of reflecting on one's actions as well as giving constructive feedback to others forms the basis of improvements in the students' operations and enhances social relations to the self (SR1) and to the others (SR2). This also facilitates the application of situational analysis frameworks to diagnose a problem. Indirectly it teaches students to implement solutions that are well thought-out with the intention that students will understand the impact that this has in saving time. In this respect, the EIP has the potential to contribute positively to the company (SR3). While the activities of the EIP provide for contribution to the company through focus on productivity improvement (SR3), the EIP does not support an emerging professional identity (SR4) or provide for a consideration of how productive work might benefit society in general (SR5).

6.4.1 The way forward: From pedagogy to spatial affordances

The EIP video-recordings and interviews with the research participants enabled a detailed description and analysis of the pedagogical strategies used to support students' work-readiness. It was found that a wide range of pedagogical approaches was drawn on across the short source. The chapter evaluated these pedagogical strategies and approaches against the work-readiness pedagogy criteria that were developed from the conceptual and theoretical frameworks. In the next chapter the focus is on spatial affordances of the EIP and the role of the changing EIP spaces in supporting students' work-readiness.

7 CHAPTER SEVEN: EVALUATING THE SPATIAL AFFORDANCES OF THE EMPLOYABILITY IMPROVEMENT PROGRAMME

7.1 Overview of Chapter Seven

This chapter analyses the spatial configurations of the EIP in terms of their affordances for building skills and dispositions towards work-readiness. The chapter draws on LCT, in particular the Specialization dimension, to explain the social principles that underpin practices in order to analyse how different spatial arrangements facilitate particular practices. Through the analysis of video data and observation schedules, the extent to which the EIP spaces gives access to the development of students' work-readiness is explained. A significant element of the EIP involves spatial configurations to represent work environments in non-specialised teaching spaces symbolically. The spatial affordance evaluation criteria (see Table 4.4) were used to address the extent to which the spatial configurations of the EIP training spaces facilitated the building of personal and social dispositions for work-readiness. In order to facilitate the EIP training, a number of spatial changes needed to occur to transform the classroom into a factory assembly line. The focus of this chapter is the extent to which these spatial configurations facilitated the building of intrapersonal and interpersonal dispositions for work-readiness.

7.2 Spatial configurations in the Employability Improvement Programme

Spatial configurations change over the course of the EIP, and the evaluation studied what happened when the training venue was reconfigured very differently from more common training arrangements. The evaluation of the spatial affordances studied which learning tasks were enabled and what was constrained when, for example, the chairs were removed from a training venue and it was reconfigured to simulate an assembly line. The evaluation drew on the evaluation framework (Table 4.4) to understand what the spatial and material changes signalled about what was expected of the students. The change from the more familiar to less familiar spatial configurations and their social affordances is the focus of this chapter. In the next section, we briefly describe how this classroom space underwent a number of transformations over the three -day *kaizen*-based work-readiness training programme.

7.2.1 The classroom space

The venues for the EIP were not specialised spaces; venues were dependent on what

was available, which in most cases was a flat-floor venue with flexible cabaret- style furniture arrangements that were suitable for both listening to presentations and for student interaction, group tasks and discussion. The class sizes ranged from fifteen to sixty students across the iterations of the EIP (2016 – 2018). A white board was available for use by the facilitator and there were screens and projection facilities for PowerPoint presentations. In the half-day in which this form of training was used, there was a 30-minute presentation by facilitators on *kaizen* principles as they related to workplaces, followed by a range of tasks for the students to undertake. The classroom walls provided space for students to pin up their worksheets and flip chart presentations (Figure 7.1) for the plenary discussions that followed group work tasks.

Figure 7.1: Students pin their task (a work breakdown structure) on the walls

7.2.2 The briefing space

After the lunch break on the first day, the students returned to their classroom – to find that it had become a very different place. The classroom had been changed to resemble a vehicle assembly plant with three assembly lines. The tables that students had used for notetaking, group tasks and discussions had been transformed into an assembly line, covered in thick plastic to protect the surface. Most chairs had been

removed and no clear meeting or discussion spaces were provided. All discussions were intended to take place at the workstations. The teams were asked to gather at their workstations to plan their production process (Figure 7.2). The adapted venue was a more specialised one than the generic classroom space and thus afforded a more detailed and focused understanding of the work to be done.

Figure 7.2: The briefing space

7.2.3 The assembly line

The students' task was to assemble model trucks from components provided for the training. Following the briefing, the students got to work on the assembly of model vehicles. They worked in teams and sub-reams, trying to assemble as many vehicles as possible in the time allocated. All the sub-teams worked alongside one another on the assembly line (see Figure 7.3 below). This was done so that components that had been assembled could be passed along the line to the next sub-team.

Figure 7.3: The assembly line and sub-teams

7.2.4 The inventory space

For practical purposes, and also as part of the training, a space was designated as an ‘inventory room’. The inventory room (see Figure 7.4) was located within the training room, but was set aside from the assembly space.

Figure 7.4: The inventory space

This separate space represented the ‘stock room’ with equipment, such as the model vehicle parts and hand tools. The ‘stock controllers’ had the list of parts that the students needed for the assembly. The contents of the inventory room included equipment, disassembled model vehicle parts, wooden blocks as well as a selection of hand tools. The inventory room was manned by two inventory controllers. Each team appointed a ‘runner’ who was responsible for obtaining the necessary vehicle parts and tools from the inventory controllers (see Figure 7.5). The inventory room was set up so that it could accommodate carefully arranged tools and equipment. This was designed to teach students good housekeeping as well as to simulate a real inventory room in the workplace.

Figure 7.5: Stock Controllers supplying parts to 'runners'

7.2.5 The competitive space

During the practical training the three assembly lines competed with one another. The students were able to see what the other teams were doing. This was intended: the assembly lines were set up in the same venue in order to enable the assembly teams to see one another's activities, processes, and how each team member's workspace and jig had been set up. The visibility of all the teams to one another can be seen in Figure 7.6. The whole space became a competitive space as a change in ethos arose when teams started to compete with one another in the assembly process.

Figure 7.6: Three assembly lines, intended to promote competition amongst the teams

7.2.6 The reflective space

A new space for learning was introduced at the end of the 'workday' as students reflected on their work. On completion of each assembly run, the space became one for debriefing and reflection towards improving processes and practices for the next day's assembly line. Debriefing took place at the workstations. While the physical space remained the same, the elements in the space: the jig, the layout, the assembled vehicles took on a new symbolic meaning as they became objects of discussion rather than objects of production. A video camera, data projector and screen were provided as training tools. As part of the training, video footage of the production runs was recorded by an assistant; thus all practical sessions were video- recorded and these videos were shown to the teams to help them to 'see' their production spaces, processes and practices more objectively. The video footage was shown during the debriefing sessions to encourage students to reflect on their actions and to plan the improvements they would undertake for the next assembly run.

7.3 Spatial configurations that increase social relations

The EIP spaces were adapted for the increasing social demands of the vehicle assembly tasks. The spatial context needed to adapt to the different roles played by the facilitator (as teacher, facilitator, and company manager); the students (as learners and as members of a production team); and other role-players, such as the storekeepers (played by students). Relative to the contexts that many students were used to, such as science laboratories, the venues did not express a strong social relation to the profession or field (SR4). In other words, the EIP space was not a highly specialised space (such as a mechanical engineering laboratory or computer workstation) but a more generic one.

The social affordances of the space were of particular importance in the EIP training

because the students were positioned in roles, firstly as individual learners finding out about the *kaizen* principles, but very soon they became collaborative learners and then team members. Each of these shifts entailed a strengthening of the ways in which the students interacted with one another as 'co-worker', 'supervisor' and the 'stock controllers'. For the initial training, cabaret style seating was provided, that is, the students were seated in groups around tables. The word 'cabaret' captures the essentially social relation intended for the classroom space in which students could both listen to short presentations and engage in group-based tasks and discussions. The social relation (SR2) was relatively strong during the training (because group work and group discussions were required), but strengthened even further in the practical training, due to the teamwork involved. At particular times during the practical training, such as during negotiations with the storekeepers around the model parts and tools for the production of jigs, the social relations (SR3) were extended beyond the immediate team and there was engagement with others across the simulated workspace.

In the reflective sessions the space included video-viewing which was intended for constructive critique of the team's and each individual member's performance towards improved planning for the next day. At this stage the space accommodated a both social relation to the self (SR1) and to the team (SR2), as the details of the activities were analysed towards internalising values and improving their own performance, and accommodating the more intense nature of the collaboration in the team work required for the assembly of the model vehicles.

Changes in the training context of the EIP were tracked across video observations of the activities. The spatial changes and their matching social affordances are shown in Table 7.1. This table tracks how the EIP space changed from a traditional teaching space for introducing basic *kaizen* principles to a different physical and symbolic space that could accommodate the work of planning, assembling, negotiating, competing, de-briefing, reflecting and improving.

Table 7.1: Tracking social relations in the EIP spaces

	Description	Explanation
1	The classroom space	The classroom space has affordance to address issues with regard to the social relations to broader society (SR5) – but this affordance was not utilised (apart from very basic *kaizen* principles that were not contextualised for South African workplaces). There were affordances to develop social relations with the self through reflection, and with others as students engaged in group activities.
2	The briefing space	The venue is changed to an assembly line; there are affordances to discuss broader workplace issues (SR3), but discussion and planning were more focused on the preparation for the production runs.
3	The assembly plant	The social relation to others (SR2) is strongly expressed in the assembly line; this is a non-specialised space thus the social relations to the profession or discipline (SR4) were not evident.
4	The inventory space	The stock room is characterised by negotiations with others beyond the immediate team (SR3); the space accommodates the need for the students to justify their requests to the stock controllers.
5	The competitive space	The affordance of competitive space strengthens social relations to team members (SR2), as well as to other teams (SR3), as competing teams see different, improved or innovative ways of assembly and compare their processes to those of the other teams). The social relations within the team (SR2) are strengthened as the different approaches are discussed and critiqued by team members.
6	The reflective space	The debriefing and reflection strengthen both social relations to the team (SR2) and social relations to the self (SR1), as students reflect and give constructive criticism to themselves and one another in the team.

7.4 Evaluating the EIP spatial affordances against the framework

This section evaluates the EIP against the work-readiness spatial affordance criteria. The spatial configurations did not accommodate highly specialised knowledge-based activities, but did accommodate individual and collaborative learning and teamwork. Therefore, the social relations to the profession or field of practice expressed by the training space are relatively weak (SR4), while the social relation to the self (SR1) and to others, particularly within the immediate team, is relatively strong (SR2); given that the space was mainly intended to promote interaction amongst the students. The basic introduction to *kaizen* principles missed the opportunity for a wider discussion on the potential contribution of these principles for social benefit (SR5-). This missed opportunity is unfortunate, given the complexities and difficulties of South Africa's labour market and the social relations with it (Jordaan & Cilliė, 2016).

As the training space was transformed to simulate a vehicle assembly plant, this created a new context for the students, and it changed the focus from general discussions about *kaizen* principles and general preparation for the practical part of the EIP to a focus on the work of assembling the model vehicles. The transformation of the space to a simulated vehicle assembly plant strengthened the social relations to others

(SR2) with regard to its spatial arrangements for intensive team -work. When the simulated assembly plant ‘opened’ at the start of the simulated working day, briefing sessions took place at the workstations, rather than in the ‘classroom’, which further simulated a work environment and introduced the students to a work culture in which teams hold morning briefing sessions. The assembly plant introduced a new element of teamwork, thus strengthening the social relation (SR) as the teams discussed, interacted and collaboratively planned their work.

The setup of a separate room as storeroom containing the material resources for the assembly introduced an additional spatial element that slightly strengthened social relations to work colleagues beyond the immediate assembly team (SR3). The storage space and its contents enabled the students acting as stock controllers to understand the importance of a properly planned stock room that would accommodate the work of others that it supported, as well as having to deal with numerous requests for vehicle parts and tools from the different teams.

In order to encourage the students (in their roles as production team members) to pay attention to quality as well as delivery on time, the spatial arrangements encouraged a spirit of competitiveness (SR2). This was afforded by allowing the teams of the different assembly lines to see one another at work. The competitive affordance of the space further strengthened both the social relations to others (SR2). Although no new technical knowledge was introduced in the competitive space, students learned from the other teams and this encouraged them to seek new ways of enhancing efficiency as they strove to beat their competitors.

Table 7.2. Evaluation of the EIP against the work-readiness spatial criteria

***Kaizen* principles**	**Key theoretical constructs from LCT**		**Key spatial concepts in 'lean' work-readiness training**	**EIP spatial affordances**
	Social relations to the world of work	**Codes**		
Providing value (quality)	Social relations to broader society	SR5+	Physical/virtual spaces to discuss societal contribution.	-
		SR5-	No/inadequate physical/virtual spaces to discuss societal contribution.	The classroom space and the briefing spaces were not used to discuss larger social issues.
Continuous improvement (towards innovation)	Social relations to a field or profession	SR4+	Physical/virtual space approximate to related industry profession	-
		SR4-	No/little attention to spatial needs of the discipline/field	The assembly line was simplified and generic, thus there was no opportunity to develop social relations to the profession/discipline.
Understanding work in organisations	Social relations to a company/ industry	SR3+	Physical/virtual space social relations across a workspace	The inventory space and competitive space enabled (limited) work beyond the immediate team.
		SR3-	No/inadequate physical/virtual space for social relations across a workspace	-
Respect for others in organisations	Social relations to others	SR2+	Physical/virtual space for working with/for others	The simulated assembly line and competitive space supported teamwork and learning
		SR2-	No/inadequate physical/virtual spatial provision for teamwork	.
Eliminating waste	Social relations to the self	SR1+	Physical/virtual space for reflection on practice and discussion against theory	Video-viewing and discussion of the production runs supported personal growth
		SR1-	Little/no physical/virtual space for reflection in/on practice or discussion	-

When the assembly plant 'closed' at the end of the day, it became a space for the students to reflect on their activities, thus enhancing social relations to the self (SR1). The students learned to study themselves on the video footage and consider and critique their actions with a view to improvement. They also learned to give constructive feedback to one another. The reflective space was therefore one in which new learning happened towards improved production through constructive feedback. This involved an affordance for strengthening social relations to others (SR2).

Table 7.2 summarises the evaluation of the EIP's spatial affordances in terms of the conceptual and theoretical framework developed for the study. The table shows that the spatial changes created affordances for the development of social relations to the self

(SR1) and social relations to others (in the form of teamwork) (SR2). There was a slight affordance for building social relations with a workplace beyond the immediate team (SR3). There was no attempt to simulate an actual workplace or approximate the tools and materials to those used in an actual industry; so there was no disciplinary or professional spatial affordance (SR4). While the spaces of the traditional, interactive classroom with its 'cabaret' seating had the potential to support discussion on the *kaizen* principles and their application to and meaning for workplaces in South Africa (SR5), this affordance was not used. The classroom activities were more directly focused on the task at hand.

7.4.1 Reflections on the spatial affordances of EIP

This section evaluated the spatial affordances of the EIP with respect to the potential impact on the intrapersonal and interpersonal dispositions of the students undergoing work-readiness training. While the classroom space of the EIP is common and familiar in many training contexts, the spatial reconfigurations for the practical EIP training are unique in that they create a simulated experience in almost any available space.

7.4.2 The Way forward: Synthesizing the findings

In examining the manner in which the EIP space is transformed from a classroom set-up to a simulated vehicle assembly workspace, and thus making the world of work real to the student, this study endeavours to make the extent to which the EIP learning space gives access to epistemic knowledge and/or social relations more explicit. This chapter provided the last element of how the different arrangements of a training programme, namely the curricular, the pedagogical arrangements and spatial elements come together to give access to social relations. In the next chapter, conclusions will be drawn on the effect of the *kaizen*-based training on the work readiness of graduates from South African Universities of Technology. The chapter will also clearly delineate the contribution that this study makes to the implementation of work readiness training at post- school education institutions in South Africa.

8 CHAPTER EIGHT CONCLUSIONS: THE EMPLOYABILITY IMPROVEMENT PROGRAMME

8.1 Overview of Chapter Eight

The thesis is concluded in this chapter. The chapter provides a summary of what the thesis set out to achieve; how it addressed the research questions and the contribution that the thesis may make to knowledge. Areas for further research are mapped, based on areas of this study that require further investigation. This chapter also explains the implications of the findings for practice, that is, for the implementation of training programme in support of higher education students' work- readiness in technical and vocational fields. Specific recommendations are offered for the improvement of the EIP, based on the findings of the evaluation study.

8.2 What this thesis set out to achieve

This thesis aimed to contribute a theorised understanding of work-readiness, with a particular focus on the implementation of effective work-readiness training in the South African University of Technology sector. To achieve the stated aim, a comprehensive review of the literature on work-readiness training in higher education was undertaken. A conceptual framework was built following an in-depth study of the literature on *kaizen*-based work-readiness training. To address the aim, a realistic, theory-based evaluation study (Pawson & Tilley, 1997; Chen & Rossi, 1980) was designed, with the following objectives: 1) To conceptualise effective work-readiness curricula; 2) To identify and/or develop appropriate work-readiness pedagogies and 3) To identify the physical and virtual spaces needed to support work-readiness training. LCT (Maton, 2014) was found to be a substantive theory that provided theoretical rigour and, together with the conceptual framework, enabled the development of evaluation criteria with which to measure the extent to which the curriculum, pedagogy and physical and virtual spaces of the EIP were able to support students' learning towards work-readiness. Curriculum documents were studied and evaluated against the criteria for work- readiness curricula. Subsequently video data and participant interviews were analysed and evaluated against the criteria for pedagogies of work-readiness. Finally, the video data of the spaces used for the training was assessed against the criteria for spatial affordances for work-readiness training. Table 8.1 summarises the evaluation criteria developed from the conceptual and theoretical frameworks for the evaluation of *kaizen*-based work-readiness training.

8.2.1 Evaluating the EIP

The evaluation criteria comprise five types of social relations: social relations to the broader society (SR5); social relations to a field or profession (SR4); social relations to a company or industry (SR3); social relations to others (SR2); and social relations to the self (SR1). While many studies of work-readiness training explain that intrapersonal and interpersonal skills are needed for work-readiness (e.g. Kaider et al. 2017; Mohamad et al., 2016); and some studies are more specific with regard to lists or dimensions of interpersonal and intrapersonal competences and abilities (e.g. Caballero et al., 2011); this study has provided a theoretically consistent framework within which the many descriptions of skills and lists of attributes that have been empirically studied and reported on in the research literature can be theoretically located. The theoretical framework has thus provided an insight into the underpinning principles and logic of work-readiness training. Drawing on this framework enables a theory-based evaluation of programme in support of students' work-readiness. This was the intention of a realistic, theory-based evaluation of the EIP.

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Table 8.1: Evaluation criteria for work-readiness training

Kaizen principles	Key theoretical constructs from LCT		Key concepts in work-readiness curricula	Key concepts in work-readiness pedagogy	Key concepts in spatial affordances for work-readiness training
	Social relations	Codes			
Providing value (quality)	Social relations to broader society	SR5+	Contribution to broader society.	Critically reflective learning activities about broader social contribution through work	Physical/virtual spaces to discuss societal contribution.
		SR5-	Little attention to contribution.	Little/no critically reflective learning activities	No/inadequate physical/virtual spaces to discuss societal contribution.
Continuous improvement (towards innovation)	Social relations to a field or profession	SR4+	Professional development, conduct, identity.	Identity building and iterative learning within professional/ disciplinary contexts	Physical/virtual space approximate to related industry profession
		SR4-	No/little attention to conduct, etc.	Little or no identity building or iterative learning within professional/disciplinary contexts	No/little attention to spatial needs of the discipline/field
Understanding work in organisations	Social relations to a company/ industry	SR3+	Understanding contribution to the workplace.	Problem-based learning within and across groups.	Physical/virtual space for social relations across a workspace
		SR3-	Little/no attention to contribution to a workplace.	Little/no problem-based learning within and across groups.	No/inadequate physical/virtual space for social relations across a workspace
Respect for others in organisations	Social relations to others	SR2+	Working with/for others	Participatory and engaged team-based learning	Physical/virtual space for working with/for others
		SR2-	Little/no attention to teamwork, etc.	Little/no participatory or engaged team-based learning	No/inadequate physical/virtual spatial provision for teamwork
Eliminating waste	Social relations to the self	SR1+	Inclusion of values development in the curriculum.	Reflective learning activities towards self-efficacy	Physical/virtual space for reflection on practice and discussion against theory
		SR1-	Little/no attention to values.	Little/no reflective learning activities	Little/no physical/virtual space for reflection in/on practice or discussion

8.2.2 How the research questions were addressed?

The overarching research question guiding this study was: How could a short international short course contribute to South African students' work-readiness? This guiding research question was addressed using a realistic, theory-based evaluation methodology that focused on the three years of the EIP implementation (2016 – 2018) at two sites. In further focusing the research, the following research sub-questions were posed:

1. How did the EIP curriculum conceptualise work-readiness?
2. How did the EIP pedagogy develop students' work-readiness?
3. How did the EIP's spatial affordances support work-readiness?

In addressing the research questions, it was found that the EIP curriculum conceptualised work-readiness as the preparation of students for workplaces through the internalisation of *kaizen* values, such as the elimination of waste in particular; and respect for other (SR1). A work-readiness curriculum was understood as one in support of understanding and practising teamwork (SR2), and the contribution of productive work to a company (SR3). The selection of topics for inclusion in the EIP curriculum focused strongly on these concepts and aspects of work. The EIP did not include topics related to improving labour relations in workplaces (SR3), professional identity in disciplinary contexts (SR4), or the potential of productive work to contribute to society and the developing economy (SR5). Much of the EIP referenced Japanese productivity as examples of work practices.

In addressing research question 2 on the EIP pedagogy, the pedagogical strategies and approaches promoted values building (SR1) through processes of inductive reasoning, allowing students to experience the consequences of poor planning and poor time management on a personal level. Team learning (SR2) was a central and consistently applied pedagogy across the EIP – thus likely to instil in students a deep understanding of how effective teamwork can lead to increased productivity. The simulated workplace, supported by concept building in the local context, and systematic processes of problem solving and decision-making through inductive reasoning supported potential contributions to a workplace.

However, the pedagogies did not prepare students to enter into South African workplaces, many of which are characterised by poor labour relations and conflict.

Neither did the pedagogies support students' identification with their profession, largely due to the generic nature of the training, or students' sense of meaningful work and their potential to make a wider contribution to society and economic development.

In addressing research question 3 on the spatial affordances of the EIP in support of work-readiness, the use of video for reflection on the assembly runs supported students' personal growth and the internalisation of core *kaizen* values (SR1). The simulated assembly line and competitive space had strong affordances for teamwork and team-learning (SR2), while the inventory space and competitive space enabled some idea of work relations beyond the immediate team (SR3). Because the assembly line was simplified and generic, there was no opportunity to develop a professional identity in relation to a disciplinary context (SR4). While the classroom space and the briefing space could easily have been adapted for discussion, for example in small groups, the focus in reflections on practice were always on improvements towards innovation, and not the potential social meaning and impact (SR5) of productive work and innovation.

In the next section the contribution to knowledge is explained with reference to Table 8.2 which summarizes the evaluation findings.

Table 8.2: Summary of the evaluation of the EIP

Kaizen principles	Key theoretical constructs from LCT		Key concepts in work-readiness curricula	Key concepts in work-readiness pedagogy	Key concepts in spatial affordances for work-readiness training
	Social relations	Codes			
Providing value (quality)	Social relations to broader society	SR5	-	-	-
		SR5	There was no topic on broader contribution of productive work to society.	The limited use of local examples did not support students' understanding of social contribution through productive work.	The classroom space and the briefing spaces were not used to discuss larger social issues.
Continuous improvement (towards innovation)	Social relations to a field or profession	SR4	-	-	-
		SR4	There were no topics that addressed professionalism in a disciplinary context.	The potential of the use of iteration towards innovation, including reflection on/for practice did not include identification with a profession.	The assembly line was simplified and generic, thus there was no opportunity to develop social relations to the profession/discipline.
Understanding work in organisations	Social relations to a company/ industry	SR3	Topics in organisational structures and work process were present.	The simulated workplace, as well as concept building in the local context, problem solving and decision-making through inductive reasoning supported potential contributions to a workplace.	The inventory space and competitive space enabled (limited) work beyond the immediate team.
		SR3	-	Concept building, using the Japanese context and forms of inductive reasoning that were too challenging did not contribute to workplace productivity.	-
Respect for others in organisations	Social relations to others	SR2	The role of teamwork in planning, organising, identifying and solving problems was present.	Pedagogies in support of team-based learning, showing respect for others by practising housekeeping and pedagogies for planning were oriented to good teamwork.	The simulated assembly line and competitive space supported teamwork and learning
		SR2	-	-	.
Eliminating waste	Social relations to the self	SR1	Waste elimination, time management and lean manufacturing principles were present as embedded values.	Teaching inductive reasoning, time management and planning built values.	Video-viewing and discussion of the production runs supported personal growth
		SR1	-	Attempts to motivate students did not take into account students' prior experience.	-

8.3 Contribution to knowledge

The study has made the range of personal and interpersonal skills explicit through its theorisation and has adapted these to identify meaningful training for the world of work. The knowledge contribution that the EIP curriculum evaluation makes is the development of the theory-driven evaluation instrument, which has an application beyond the EIP to work-readiness programme in general. The research has shown that social relations to the wider society (SR5) are supported when examples from the local context are used. The use of a foreign contexts and examples, limits students' ability to develop social relations to the local social and economic context. Thus local examples and local illustrations create meaning for students in ways in which foreign contexts and examples cannot achieve.

The evaluation of the EIP pedagogy has contributed to an understanding of a pedagogy for work-readiness, such as the range of pedagogies that support students to become work-ready, as well as the limitations that these pedagogies might have, such as failing to build the necessary concepts in support of inductive reasoning in a work context, or failing to contextualise examples adequately to support students' understanding of workplaces and work conditions in South Africa.

With regard to the EIP's spatial affordances, the study identified an approach to spatial configurations intended to enable the strengthening of social relations in the context of work-readiness training, articulating how *kaizen* principles can be translated into classroom spatial features and provided examples of the changing affordances for different social relations through changing spatial arrangements.

In many forms of simulated training, particularly in computer -simulated environments, it is usually only the epistemic relation that is simulated, for example, in flight simulation (Ke & Carafano, 2016) or surgical simulation (Rosen, 2008). There is thus human-computer interaction but not human-human interaction. In much 'high tech' simulation there could thus be a mismatch between the affordances of the simulated space and the intention to develop social skills. In any workplace, which is what the EIP training intends to simulate, there are almost always stronger social relations as there would always be people working together, whether in assembly teams, design teams or business teams. In addition, there would be a team leader and members in charge of different elements of the work process who all need to be coordinated and who all need to work together. In most forms of University-based simulation, such as an engineering student's final year project (Jollands et al. 2012), the workplace is usually not simulated. Therefore, a student project represents the work process as having stronger epistemic relations and weaker social relations, as the student often works alone on the project.

In contrast, the EIP simulates the social relation of the work being undertaken. While in a real workplace there is likely to be a stronger epistemic relation than that of the EIP training, the EIP's intention is the generic preparation of students for a variety of work environments. It is not intended for a specific industry, but to introduce students going out into the world of work for the first time to the social conditions under which they will be working. The EIP thus deliberately weakens the epistemic relation in order to focus on strengthening the social relation by focusing on potentially transferable social skills.

The study makes a contribution to theory, by developing the social relations of LCT's Specialization dimension into five distinct types of social relation, and studying the 'trained gaze', derived from the social plane (Figure 3.3) to uncover how such a gaze might be expanded into a work-ready gaze. The study has provided a conceptual and theoretical framework for thinking about curricula, pedagogies and spaces in a way that reflects shared goals towards the improvement of society (SR5), professional identification (SR4), understanding work processes and relationships with work colleagues (SR3), interpersonal dispositions (SR2) and personal values (SR1).

8.4 A programme for further research

From the findings of the study there were different opinions on the advantages and disadvantages of generic vs disciplinary forms of work-readiness provision. While the opinions of students, interns, facilitators and workplace supervisors were an important part of the evaluation process, the voices of academic staff in faculties were not included. Thus, gaining their opinions on the issue of the generic vs the discipline specific – or possibly interdisciplinary training that could be appropriate across a range of similar industries – should be sought. The literature on work-readiness training is similarly divided on the advantages and disadvantages of the generic vs disciplinary forms of work-readiness training (Mohamad et al. 2016). Hence, the extent to which there is a need for better alignment of work-readiness training with the discipline or field, and with regard to the simulation and the artefacts used, is an area for further study.

An additional area for further research concerns how students might be prepared for South African workplaces with their history of poor labour relations. This is the realityin many South African workplaces and if it is ignored (as the EIP largely does) students may not be adequately prepared to make a contribution to the workplace where they are set to become interns, or where they might find long-term work. While no work-readiness training programme can resolve the macroeconomic factors that affect the

South African labour market, there could be specific actions to be taken to address social relations to companies (SR3) more fully in the short term, such as including issues related to workplace relationships in the simulation processes.

Another area for further research has to do with the affective dimension of work-readiness training. The period of transition from higher education student to employee is an emotional period that is stressful for many students (Bandaranaike & Willison 2015; Masole & Van Dyk 2016), particularly in a context of increasing graduate unemployment.

A particular area for further study arising from the thesis is the potential of the theory-based evaluation criteria to be further developed into an instrument for the assessment of students' work-readiness. The research has shown that there are many dimensions to the criteria. For example, social relations to the self (SR1) could include both self-esteem and self-critique; social relations to others (SR2) could include both collaboration and competition, social relations to a workplace (SR3) could include contributions to productivity, to serving clients, and to improving labour relations (SR3), and so on. Social relations to a profession or field of practice (SR4) and social relations to the broader society (SR5) emerged from the study, but would need additional research to understand more fully how these might be reflected in training.

8.5 Contribution to practice

This thesis offers a number of contributions to practice, specifically appropriate forms of training towards higher education students' work-readiness.

8.5.1 Curriculum review and development

The curriculum evaluation raised several implications for practice in general, such as the role of departments and faculties in work-readiness training, as well as the development of work-readiness training programmes. It has been pointed out that departments and faculties need to take a greater interest in and contribute to the training if it is to be taken seriously by students (Murman 2016). Curricula for work-readiness need to take into account the local context and how it might be used effectively in training. A clear implication of the curriculum evaluation points to the need for Universities of Technology, other training providers, and key industry representatives across different sectors, to work closely together to ensure that work-readiness training meets local needs and that the training programme offered is responsive to these needs in order to prepare graduates for transition into the world of work.

8.5.2 Pedagogy

The evaluation of the pedagogies that are employed in the EIP revealed the need for better sequencing of the slides to ensure alignment of the examples used in the theoretical module with regard to the principles that the EIP seeks to introduce to students. It may also be necessary to develop a comprehensive workbook/textbook with South African case studies to provide an in-depth understanding of concepts. The involvement of academic department staff is necessary for the accommodation of discipline-specific portfolios in the simulation. Lastly, it is necessary to enhance the reflective pedagogies to include a contribution to the improvement of lives.

8.5.3 Spatial affordances

The EIP could be described as 'place-conscious education' (Gruenewald 2003). Designing physical learning environments that can connect students to effective work practices reflects a University's pedagogical commitment to students' work-readiness success. The EIP activities take place in the same physical venue, showing the variety of the spatial affordances that can be created, which can impact on the development of intrapersonal and interpersonal dispositions. However, the fact that the spatial affordances exist, does not mean that they will necessarily be utilised. The EIP thus presents an inexpensive form of training that requires some basic equipment and hardly any technology to develop different forms of social relations amongst participants.

8.6 Recommendations

The following recommendations are offered as a way of improving the EIP. It is proposed that each new cycle of EIP training makes use of formative evaluation for the purpose of continuing improvement. Apart from ensuring that the EIP improves with each implementation, such a process would be strongly aligned with *kaizen* values.

8.6.1 Curriculum

The 'South Africanization' of the curriculum should be considered. This would include examples from the South African context, as well as curricular content on work practices and labour relations in South Africa. While the latter might extend the time necessary for of the EIP, the benefit to students would be considerable. In addition, attention should be paid to the role of productive work in contributing to and benefitting communities in need.

Most of the students and graduates in the study were of the view that the offering of the EIP in the last semester before the students go for work placement may be too late, as it does not allow time to evaluate the students' understanding of the training before they leave the institution. It may be necessary, therefore, to locate the EIP training earlier, perhaps in the third semester of study.

8.6.2 Pedagogy

The study on the EIP pedagogies has demonstrated the need to include an orientation to the dynamics of the workplace in the EIP, as well as the inter- relatedness of the different portfolios in the workplace, including appropriate forms of communication and respect for line management. Thus, there is a need for the simulated work environment to have all (or most of the) functional portfolios of a work environment, as well as role players representing a variety of portfolios.

In cases where the pedagogical arrangements of the EIP require practical tasks in support of students' understanding of concepts, attention needs to be given to the flow and sequence of such tasks.

The study has pointed out the benefits to students when the examples used in the training are from the South African context, and when the facilitator is able to link students' prior knowledge to the new concepts and practices introduced in the EIP. There is thus a need to include greater representation of South African workplaces, products and innovations in the slides, video-clips and examples.

The pedagogy of iteration as a translation of the *kaizen* concept of continuous improvement might be considered as a pedagogy for more general use, such as giving students the opportunity to re-do a project.

8.6.3 Spaces

An adequate space is required for the EIP, including places to store materials and equipment. Moving the EIP off campus to a workplace venue or training room should be considered as lending status to the training (De Vin & Jacobssen 2017). Alternatively, using a good quality staff development venue in a faculty could also be considered. Visits to actual workplaces could further enhance students' understanding

of work practices, particularly if they were able to observe work practices and analyse them using the *kaizen* tools, such as the *gemba* walks proposed by (Murman et al. 2014).

8.7 Final reflections

Somewhere between the criticisms of *kaizen*-based work-readiness training as 'instruments for the oppression of the workforce' (Sears, 2003) and the praise heaped on them as courses where students 'learned more … than [in] any course they had taken in college' (Murman 2016: vi) – is a middle ground that recognises their shortcomings and acknowledges their potential. The shortcomings of the EIP have been pointed out in the evaluation process – in particular, the need for the EIP to take into account students' professional identification with the field of practice, the South African labour relations context, and the greater societal contribution that can be made through the exercise of professional and ethical work practices. The strength of the EIP, which was shown in the evaluation, emanates from the nature of *kaizen* itself: continuous improvement. Continuous improvement is translated into pedagogy as iteration towards improvement and innovation. This pedagogy is highly innovative

– indeed academic departments might consider the use of iterative cycles towards improvement in student projects, for example. Such iterative pedagogies are unusual in higher education, where there is always a rush to complete the curriculum before the end of the academic year. *Kaizen* teaches a 'slow pedagogy' (Berg & Seeber 2016): the importance of planning – and the time that this takes, and the importance of re-doing something, and re-doing it again, in order to make it better.

It is hoped that the recommendations arising from this study will be implemented in the spirit of *kaizen*, continuous improvement towards innovation. As small changes are implemented across the EIP it is hoped that it will become an effective programme in support of South African higher education students' work-readiness for the South African world of work.

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10 APPENDICES

APPENDIX A: DATA COLLECTION INSTRUMENTS AND CONSENT FORMS

OBSERVATION SCHEDULE

EMPLOYABILTY IMPROVEMENT PROGRAMMEPROGRAMMEME VIDEO No. …..
Date:……

Site:…….Venue:…….Time:……

Notes: ……...

Description of context			**SR codes**
~~IIII~~	**The student is doing:**	***In vivo* codes**	**SR codes**
	Listening		
	Note-taking		
	Asking		
	Discussing in groups		
	Work activity		
	Presenting		
	Plenary discussion		
	Writing		
	Waiting		
	Other		
	The facilitator is doing:		
	Lecturing/presenting content		
	Writing		
	Posing questions		
	Giving feedback		
	Listening		
	Observing		
	Giving a demo		
	Administrative tasks/input		
	Other		

Letter to Student Participants

D Ed study titled: 'The Effect of *Kaizen*-Based Training on the Work-Readiness of Graduates from South African Universities of Technology'

CANDIDATE: Fundiswa Nofemela (Director: Work-integrated Learning, Mangosuthu University of Technology, D Ed candidate Cape Peninsula University of Technology)

SUPERVISOR: Professor Chris Winberg (South African Research Chair, Faculty of Education, Cape Peninsula University of Technology)

Dear Student Participant

As a student participant on the Employability Improvement Program I am requesting to interview you for research purposes. The focus of my research study is how to improve training for employability. It will thus be the student participants who will benefit from this research project. I assure you of your confidentiality, as explained below.

Please consider the following in your response:

4. You are requested to give permission individually, not as a group;
5. Whether or not you give this permission, is entirely your personal decision, and it is entirely voluntary;
6. There will be no rewards for giving this permission, as there will of course be no penalty for refusing it;
7. You have a right to withdraw your permission at any stage –and I would then exclude your data in the research;
8. I will use your contributions for the purpose of improving training on the Employability Improvement Program (EIP) and for scholarly research and publication and not for any other purpose;
9. Confidentiality will be ensured through a number of mechanisms:

- Pseudonyms or a numerical system (e.g., Student 1, Student 2, etc.) will be used when verbatim quotations are used for illustrative purposes in my study or in academic papers;
- Your institution and department will not be identified;

- Background information that could make could make your identification possible will not be included in any academic paper or public document.

This project has ethics clearance from the Cape Peninsula University of Technology, and the university has given permission for the research activities to take place on their campus.

Please feel free contact me if you have any questions.

Fundiswa Nofemela

Ms Fundiswa Nofemela
Email: nofemela51@gmail.com

Consent form (Student Participants)

I,_____give Ms Fundiswa Nofemela permission to interview me and to use my work for the purpose of studying and improving the 'Employability Improvement Program' (EIP) and for scholarly research purposes.

I understand that the researcher intend to use her research findings for her D Ed study and for the purpose of publications and conference presentations.

I also understand that: Whether or not to give this permission is a personal decision, and it is entirely voluntary. There will be no rewards for giving this permission, as there will of course be no penalty for refusing it. I have the right to withdraw my permission at any stage and my data will then be excluded from the study.

The researcher would use the data generated for the purpose of her D Ed study, for scholarly publication and conference presentation and not for any other purpose.

My identity and that of my university and department will be protected.

My signature below indicates my permission to be interviewed to use my teaching portfolio (in progress or completed) for scholarly research purposes.

Signed at_____(Place) on_____(Date)

_____(Signature)

INTERVIEW SCHEDULE FOR STUDENT PARTICIPANTS

EMPLOYABILTY IMPROVEMENT PROGRAMME/INTERVIEW SCHEDULE/ STUDENTS No. …..Date:…… Interviewer:…… Interviewee(s):…… Site:…….Venue:…….Time:…… Notes:		
1.	**Social relations to the self**	**SR codes**
Question	*Before I ask about the more specific aspects of the E IP, what are some of the really basic things that you leaned on the EIP? Did you personally benefit from the course – particular in terms of personal growth?*	*SR1*
Notes		
Prompts	Basic social skills, honesty and integrity, basic personal presentation, reliability, willingness to work, understanding of actions and consequences, positive attitude to work, responsibility, self-discipline	
2.	**Social relations to others**	
Question	*What did you learn about teamwork?*	*SR2*
Notes		
Prompts	Proactivity, diligence, self-motivation, judgement, initiative, assertiveness, confidence, acting autonomously	
3.	**Social relations to a workplace**	
Question	*Did you develop other skills that will prepare you for other kinds of work in a workplace [can name field]*	*SR3*
Notes		
Prompts	Reading, writing, numeracy, presentation skills	
4.	**Social relations to a profession**	
Question	*Did you learn anything that you think will be very important in your future work? Or in finding a job in your field? [can name field]*	*SR4*
Notes		
Prompts	Reasoning, problem solving, adaptability, work-process management, teamwork, personal task and time management, functional mobility, basic ICT skills, basic interpersonal and communication skills, emotional and aesthetic awareness, customer service skills.	
5.	**Social relations to society**	
Question	*What did you learn on the EIP that you think will make you highly desirable as a future employee and contribute in your field? [can name field]*	*SR5*
Notes		
Prompts	Teamwork, business thinking, commercial awareness, continuous learning, vision, job-specific skills, enterprise skills	
6.	**Other**	
Question	*Is there anything else that you would like to tell me about the EIP?*	
Notes		
Prompt	Thank participants, inform them of process of member-checking	

Letter to Facilitators (to observe EIP training)

D Ed study titled: 'The Effect of *Kaizen*-Based Training on the Work-Readiness of Graduates from South African Universities of Technology'

CANDIDATE: Fundiswa Nofemela (Director: Work-integrated Learning, Mangosuthu University of Technology, D Ed candidate Cape Peninsula University of Technology)
SUPERVISOR: Professor Chris Winberg (South African Research Chair, Faculty of Education, Cape Peninsula University of Technology)

Dear …….

As a facilitator on the Employability Improvement Programme I am requesting permission to observe and video-record your training.

I assure you of your confidentiality, as explained below.

Please consider the following in your response:

1. You are requested to give permission in your individual capacity;
2. Whether or not you give this permission, is entirely your personal decision, and it is entirely voluntary;
3. There will be no rewards for giving this permission, as there will of course be no penalty for refusing it;
4. You have a right to withdraw your permission at any stage –and we would then exclude your teaching practice data in the research;
5. I use your contributions for the purpose of improving training on teaching portfolios and for scholarly research and publication and not for any other purpose;
6. Confidentiality will be ensured through a number of mechanisms:

- Pseudonyms or a numerical system (e.g., Facilitator 1, Facilitator 2, etc.) will be used when verbatim quotations are used for illustrative purposes in academic papers;
- Your institution and department will not be identified;
- Background information that could make identification possible will not be included in any academic paper or public document.

This project has ethics clearance from the Cape Peninsula University of Technology, and all the universities have given their permission for the research activities to take place on their campuses.

Please feel free to contact me should you have any queries.

Fundiswa Nofemela

Ms Fundiswa Nofemela
Email: nofemela51@gmail.com

Consent form (to observe EIP training)

I,_____give the researchers mentioned above permission to observe the Employability Improvement Training for the purposes of enhancing the training, for the purposes of doctoral study, and for scholarly research purposes.

I understand that the researcher intends to share her research findings in the form of her doctoral thesis, publications and conference presentations.

I also understand that: Whether or not to give this permission is a personal decision, and it is entirely voluntary. There will be no rewards for giving this permission, as there will of course be no penalty for refusing it. I have the right to withdraw my permission at any stage and my data will then be excluded from the study.

The researchers would use the data they have collected for the purpose of this study only and not for any other purpose.

My identity and that of my university and department will be protected.

My signature below indicates my permission to be observed in my teaching practice for scholarly research purposes.

Signed at_____(Place) on_____(Date)

_____(Signature)

Letter to Facilitators/Workplace supervisors (interview request)

D Ed study titled: 'The Effect of Kaizen-Based Training on the Work-Readiness of Graduates from South African Universities of Technology'

CANDIDATE: Fundiswa Nofemela (Director: Work-integrated Learning, Mangosuthu University of Technology, D Ed candidate Cape Peninsula University of Technology)
SUPERVISOR: Professor Chris Winberg (South African Research Chair, Faculty of Education, Cape Peninsula University of Technology)

Dear …….

As a facilitator/workplace supervisor on the Employability Improvement Programme I am requesting permission to interview you for the purpose of improving the programme, for my doctoral study and for scholarly purposes. I assure you of your confidentiality, as explained below.

Please consider the following in your response:

7. You are requested to give permission in your individual capacity;
8. Whether or not you give this permission, is entirely your personal decision, and it is entirely voluntary;
9. There will be no rewards for giving this permission, as there will of course be no penalty for refusing it;
10. You have a right to withdraw your permission at any stage –and we would then exclude your teaching practice data in the research;
11. I use your contributions for the purpose of improving training on teaching portfolios and for scholarly research and publication and not for any other purpose;
12. Confidentiality will be ensured through a number of mechanisms:

- Pseudonyms or a numerical system (e.g., Facilitator 1, Facilitator 2, etc.) will be used when verbatim quotations are used for illustrative purposes in academic papers;
- Your institution and department will not be identified;
- Background information that could make identification possible will not be included in any academic paper or public document.

This project has ethics clearance from the Cape Peninsula University of Technology, and all the

universities have given their permission for the research activities to take place on their campuses.

Please feel free to contact me should you have any queries.

Fundiswa Nofemela

Ms Fundiswa Nofemela

Email: nofemela51@gmail.com

Consent form (Interview)

I,_____give Ms Fundiswa Nofemela permission to interview me for the purpose of improving teaching and learning in on the Employability Improvement Programme (EP) and for scholarly research purposes.

I understand that the researcher intends to share her research findings in the form of her doctoral thesis as well as publications and conference presentations arising from the research findings.

I also understand that: Whether or not to give this permission is a personal decision, and it is entirely voluntary. There will be no rewards for giving this permission, as there will of course be no penalty for refusing it. I have the right to withdraw my permission at any stage and my data will then be excluded from the study.

The researcher will use the data they have collected for the purpose of this study only and not for any other purpose.

My identity and that of my university and department will be protected.

My signature below indicates my permission to be observed in my teaching practice for scholarly research purposes.

Signed at_____(Place) on_____(Date)

_____(Signature)

With thanks,

Fundiswa Nofemela

Ms Fundiswa Nofemela
Email: nofemela51@gmail.com

INTERVIEW SCHEDULE FOR WORKPLACE SUPERVISORS AND FACILITATORS

**EMPLOYABILTY IMPROVEMENT PROGRAMME INTERVIEW SCHEDULE W<u>ORKPLACE</u> S
<u>UPERVISORS AND FACILITATORS</u>**

No. …..Date:……

Interviewer:……

Interviewee(s):……

Site:…….Venue:…….Time:……

Notes:

1.	**Social relations to the self**	**ER/SR codes**
Question	*How did you think students personally benefited from the course – particular in terms of personal growth and intra-personal competencies?*	*SR1*
Notes		
Prompts	Prompts: basic social skills; honesty and integrity; basic personal presentation; reliability; willingness to work; understanding of actions and consequences; positive attitude to work; responsibility; self-discipline	
2.	**Social relations to others**	
Question	*What do you think students learned about working with others/teamwork?*	*SR2*
Notes		
Prompts	Proactivity; diligence; self-motivation; judgement; initiative; assertiveness; confidence; acting autonomously	
3.	**Social relations to a workplace**	
Question	*What basic skills do you think students developed on the EIP about understanding work processes?*	*SR3*
Notes		
Prompts	Prompts: reading, writing; numeracy, presentation skills	
4.	**Social relations to a profession**	
Question	*Do you think the students learned or acquired key skills that would be important in their future work? Or in finding a job in [name field]?*	*SR4*
Notes		
Prompts	Reasoning; problem solving; adaptability; work-process management; personal task and time management; basic ICT skills; basic interpersonal and communication skills; emotional and aesthetic awareness, customer service	
5.	**Social relations to society**	*SR5*
Question	*Are there high- level skills that the students learned on the EIP that could make them highly desirable as future employees in [name fields]?*	
Notes		
Prompts	team working; business thinking; commercial awareness; continuous learning; vision; job-specific skills; enterprise skills	
6.	**Other**	
Question	*Is the anything else that you would like to tell me about the EIP?*	
Notes		
Prompt	Thank participants, inform them of process of member checking	

APPENDIX B: RESEARCH CLEARANCE CERTIFICATE

Cape Peninsula University of Technology

***For office use only	
Date submitted	16 Aug 2017
Meeting date	N/A
Approval	P/Y√/N
Ethical Clearance number	EFEC 3-9/2017

FACULTY OF EDUCATION

RESEARCH ETHICS CLEARANCE CERTIFICATE

This certificate is issued by the Education Faculty Ethics Committee (EFEC) at Cape Peninsula University of Technology to the applicant/s whose details appear below.

1. **Applicant and project details (Applicant to complete this section of the certificate and submit with application as a Word document)**

Name(s) of applicant(s):	**Ms Fundiswa Nofemela**	
Project/study Title:	**The effect of *kaizen*-based training on the employability of graduates from South African Universities of Technology**	
Is this a staff research project, i.e. not for degree purposes?	No	
If for degree purposes the degree is indicated:	Yes (D.Ed.)	
If for degree purposes, the proposal has been approved by the FRC	Yes	
Funding sources:	NRF/South African Research Chair in Work-integrated Learning	

2. **Remarks by Education Faculty Ethics Committee:**

This doctoral research is granted ethical clearance valid until 3 September 2021.		
Approved: √	**Referred back:**	**Approved subject to adaptations:**
Chairperson Name: Chiwimbiso Kwenda **Chairperson Signature:**		**Date: 4 September 2017**
Approval Certificate/Reference: EFEC 3-9/2017		

EFEC Form V3_updated 2016