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e-Learning effectiveness in interconnected corporate learning environments.

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07 November 2012

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I. Abstract

Approaches to workplace learning are continuously evolving to support business objectives but learning and development practitioners are not delivering on their mandate of developing relevant competencies which deliver on strategic objectives. Globally, the proportion of e-Learning to instructor led training is growing and the investment in e-Learning is steadily increasing. Executives expect to see better alignment of e-Learning initiatives and a proven return on investment. In order to earn their place at the executive boardroom, learning and development practitioners need to understand and align their programmes to the context of the business environment in order to positively influence business performance.

This research set out to investigate the relationship between the corporate learning environment and e-Learning programme effectiveness using a self-administered questionnaire. The survey was completed by 50 corporate learning and development practitioners. It explored e-Learning programme effectiveness and the configuration of learning environments in relation to a corporate learning environment interconnectedness model proposed in this research. Descriptive statistics, correlation analysis and regression modelling were used to determine the relationship between the environment and e-Learning programme effectiveness. The strongest environmental predictors as well as the current perception of e-Learning programme effectiveness within these environments were also identified.

The corporate learning environment was found to be significantly correlated with e-Learning programme effectiveness, specifically in driving higher order benefits of e-Learning programme effectiveness, behaviour change and return on investment. The two strongest predictors of e-Learning programme effectiveness in the corporate learning environment were found to be the definition of clear learning outcomes as well as the provision of opportunities for collaboration in the context of learning. The proposed model of corporate learning environment interconnectedness was also validated and found to be reliable.

II. Key words

e-Learning, workplace learning, e-Learning effectiveness, learning and development, learning evaluation.

III. Declaration

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other university. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

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1. Chapter One – Introduction to Research Problem

1.1. Introduction

Electronic learning or e-Learning has been used as a form of corporate training since the early 1990s (Tai, 2008) and although mixed results have been experienced (Romiszowski, 2004) has become increasingly popular because of the various benefits which it offers, including cost saving, speed and ease of accessibility, shorter learning time, consistency in instruction and 24/7 availability (Biech, 2008; Nokes, & Sappington, 2010; Tai, 2008), however a new era of value is emerging where Return on Investment (ROI) and business impact have become more relevant than these traditional benefits derived from e-Learning (Overton, 2010a). Learning and development departments are becoming a more strategic and respected function within organisations (Paine, 2010) earning learning and development practitioners a seat in the executive boardroom (Stutt, 2010) in mature organisations due to the recognition of their ability to make a significant contribution to business performance and competitiveness (Aguinis, & Kraiger, 2009; Buciuniene, & Kazlauskaite, 2008; Castillo, & del Valle, 2009; Chang, Gong, Law, & Xin, 2009; Ferguson, & Reio, 2010).

If efficiency related benefits provided by technology were the drivers of the first era of value from e-Learning (Gray, 2011a; Mallon, 2011; Overton, 2010a), what are the drivers of the new era of e-Learning value? What makes e-Learning more effective in delivering tangible, measurable business impact and creating a truly sustainable competitive advantage for organisations (Buciuniene, & Kazlauskaite, 2008; Castillo, & del Valle, 2009; Noe, & Tews, 2012)?

This research, titled “e-Learning effectiveness in interconnected corporate learning environments” intends to explore the configuration and interconnectedness of the corporate organisation’s learning environments as a key driver of e-Learning programme effectiveness, suggesting that in order for e-Learning programmes to deliver business results, the learning value chain needs to be well aligned and a golden thread of learning environment components needs to link organisational strategy and goals with e-Learning content delivery. For this purpose, this research proposes a generic model of learning environment interconnectedness where (a) e-Learning content, (b) learning outcomes, (c) organisational competencies, (d) organisational strategy and goals, (e) role profiles, (f), key performance indicators (KPIs) (g) performance development plans (PDPs) and (h) collaboration are

interconnected in various ways and that the existence of these components and their interconnectivity is a reliable predictor of e-Learning programme effectiveness as defined by Kirkpatrick's four levels of evaluation (Kirkpatrick, & Kirkpatrick, 2006) and Phillips' ROI model (Phillips, 2007).

In this cross-sectional study, a group of 50 learning and development practitioners representing 50 corporate organisations were surveyed using an online self-administered questionnaire split into three constructs, the first construct queried basic demographic information about the organisation which they represent, the second explored their corporate learning environment in relation to the components discussed above and the third investigated the perceived effectiveness of their e-Learning programmes.

In this chapter, a brief background of the research problem is discussed, the research problem, purpose and motivation for the research are explained and the scope of the research is clarified. Finally, the structure of the research report is presented.

1.2. Background

A trend is evident in the chosen mediums of skills development and capacity building in organisations. e-Learning is growing in popularity while instructor led interventions and physical workshops are declining (ASTD, 2011). According to the American Society for Training and Development's (ASTD) annual report, instructor led training has reduced from 76% of learning hours in 2001 to 58% in 2010. During this same period, technology based learning hours increased from 11% to 33% (ASTD, 2011).

This trend is also evident in the spending on e-Learning which has increased significantly over the past decade and expected to continue to increase in the foreseeable future. Various industry reports show a clear growth trend in the e-Learning market. Ambient Insight Research predict the e-Learning market in the 77 countries included in their Worldwide Market for Self-paced e-Learning report to grow to $51.5 Billion by 2016 from $35.6 Billion in 2011 (Ambient Insight Research, 2011). In this report, Asia (17.3%), Eastern Europe (16.9%), Africa (15.4%) and Latin America (14.6%) are predicted to show the fastest growth, ranging between 14% and 17% growth annually while the Middle East (8.2%), Western Europe (5.8%) and North America (4.4%) are only expected to show growth rates between 4% and 8% per

annum during this five year period (Ambient Insight Research, 2011). Global Industry Analysts, in their global e-Learning report predict the world-wide e-Learning market to grow to $107.3 Billion by 2015 (PRWeb, 2010). With such significant expenditure on e-Learning, business leaders want to see a return on their investment (Overton, 2010a; Servage, 2005) and it is imperative that learning and development professionals understand these drivers and are able to communicate the return on this investment not only through knowledge retention and application as proposed by Kirkpatrick (Kirkpatrick, & Kirkpatrick, 2006) but also bottom line impact measured using financial ROI calculations (Phillips, 2007). Fundamentally, learning and development managers must be able to produce evidence of learning's impact on business performance (Gray, 2011a).

Also supporting this trend is a growing realisation that people learn differently in organisations than originally thought or at least differently to where emphasis was originally placed leading to 80% of training budgets to be invested in formal learning (Terry, 2007). It has emerged that as much as 90% of learning which takes place in an organisation is informal (Jennings, & Wargnier, 2010), meaning that it is unstructured and unplanned as opposed to scheduled (Gould, 2009). Informal learning cannot be organised but it should be available on-demand (Gould, 2009). The growing popularity of informal learning mediums and decline of instructor led training is reflective of organisations balancing their focus and investment between the various ways employees learn.

Research shows that learning and development departments don't seem to be delivering on their mandate to business. In her article, Overton (2010b) highlights the misalignment between what learning and development departments are delivering and what businesses are hoping to accomplish. This fact is reinforced in research discussed by Kettleborough (2010a) which states that 82% of top 500 organisations do not perceive their learning and development departments to be operationally aligned. Specifically relating to e-Learning, the Towards Maturity research project findings presented by Overton (2010b) reveals that only 50% of respondents believe that e-Learning delivers the skills required by the business.

1.3. Purpose

In order to remain relevant, learning and development practitioners need to understand and talk the language of business (Stutt, 2010), they need to measure the results of their e-Learning interventions (Gray, 2011a; Gray, 2011b; Mallon, 2011) and they are expected to prove value (Lea, 2009; Overton, 2009). In order to achieve this and ensure that e-Learning interventions actually impact business performance, learning and development practitioners need to know what drives effective e-Learning programmes and delivers business results.

This research proposes that the broad learning environment in which learning and development practitioners operate and employees learn is a key driver of the effectiveness of e-Learning programmes. The purpose of this research is therefore to equip learning and development practitioners with the information and tools needed to positively impact business performance and extract maximum value from e-Learning interventions by better aligning this learning medium with their learning environments in the context of how people learn in corporate organisations.

Further to this, a key motivation for this research goes beyond the learning department's success to the organisation's long term success. Castillo and del Valle (2009) indicate that training and development, although a cost, should be considered as an investment which can produce a positive return. Development of human resources has been proven to increase organisational performance (Aguinis, & Kraiger, 2009; Buciuniene, & Kazlauskaite, 2008; Chang, *et al*., 2009; Ferguson, & Reio, 2010). Buciuniene and Kazlauskaite (2008) suggest that traditional sources of competitive advantage no longer suffice and that the human capital within organisations has been identified as a sustainable competitive advantage and a source of profitability which is scarce and difficult to imitate, keeping organisations ahead in a rapidly changing competitive environment (Buciuniene, & Kazlauskaite, 2008; Castillo, & del Valle, 2009; Ferguson, & Reio, 2010; Noe, & Tews, 2012).

Armed with this understanding, learning and development practitioners will be able to talk the language of business (Stutt, 2010) and earn a seat in the executive boardroom (Lea, 2009) which will allow them to more directly influence company performance and competitiveness (Aguinis, & Kraiger, 2009; Buciuniene, & Kazlauskaite, 2008; Chang, *et al*., 2009; Ferguson, & Reio, 2010)

At a macroeconomic level, successful businesses and highly developed human capital leads to increased national competitiveness (Aguinis, & Kraiger, 2009). Aguinis and Kraiger (2009) through their review of over 600 articles, books and chapters published conclude that these improvements in the labour force are significant contributors to national economic growth.

1.4. Problem Statement

Recent research suggests that Learning and Development departments are not delivering their on their mandate to business (Kettleborough, 2010a; Overton, 2010b). This is because training is no longer about a tick in the box to say an employee has attended training (Gray, 2011a), it is about measurable business impact (Overton, 2010a) in the form of targeted efficiencies and ROI (Gray, 2011a).

e-Learning is increasingly recognised as an efficient method of delivering learning (Biech, 2008; Nokes, & Sappington, 2010; Tai, 2008) and investment in e-Learning is increasing annually (Ambient Insight Research, 2011; PRWeb, 2010) as the shift from formal classroom based training to informal and on-demand learning mediums takes hold in corporations (Gould, 2009; Terry, 2007). Learning and development practitioners, now have a responsibility to measure the impact of their learning initiatives (Cross, 2009; Gray, 2011b; Mallon, 2011; Stutt, 2010) and prove their value to the business (Kettleborough, 2010b; Overton, 2009). To achieve these results and to align e-Learning interventions to organisational goals, learning and development practitioners need to understand the drivers of e-Learning programme effectiveness because alignment of e-Learning programmes to these organisational goals has been proven to improve business performance (Gray, 2011a). Simply purchasing and implementing e-Learning content in isolation and without the necessary preparation is unlikely to yield the organisational benefits and value which executives expected when the investment was made.

The learning and development departments' ability to show tangible business value of their e-Learning interventions and articulating this value in a way that business understands is likely to earn them a seat in the executive boardroom (Lea, 2009) and raise the profile of the learning and development function within organisations (Gray, 2011a; Overton, 2009). Learning and development has a fundamental role to play in

developing sustainable competitive advantage for organisations (Castillo, & del Valle, 2009; Noe, & Tews, 2012) in our rapidly changing and challenging world of work.

1.5. Scope

The scope of this research is limited to corporate learning environments which have been evaluated using a proposed corporate learning environment interconnectedness model and survey. Any educational, academic, non-profit and government institutions that are not corporate environments have been excluded. The only learning environments which have been investigated are those where learning and development is undertaken to further personal development as well as profit driven organisational goals.

Within the corporate learning environments investigated only the e-Learning medium of skills and competency development has been investigated. Both generic and customised e-Learning programmes have been included. Any classroom based, instructor led, coaching and mentoring and any other forms of skills development employed in corporate organisations have been excluded.

Only the opinions and perceptions of learning and development practitioners within these corporate environments have been sought, no operational or executive (other than learning and development executives) opinions and perceptions have been obtained.

Effectiveness in this research is measured as defined by Kirkpatrick's and Phillips' evaluation measurement methods. No other definition or view of effectiveness has been tested.

The research findings are limited to the responses received to a survey distributed to learning and development practitioners within South African based organisations although many of these are multinational organisations either headquartered in South Africa or elsewhere.

1.6. Structure of the report

The structure of this research report will follow typical layout for a research report. Chapter one has introduced the research and provided background to the research problem which has been defined and stated the purpose for the research. The scope of the research was also clarified. Chapter two goes on to frame the research within existing literature. At the highest level, human capital development will be discussed as a source of competitive advantage and a positive contributor to performance for corporate organisations. To focus into the specific area of literature, the concepts of workplace learning, e-Learning and learning evaluation are reviewed. Chapter three details the specific research questions which this study intends to answer. The chosen research methodology for conducting this research and its limitations are discussed in chapter four. Chapter five presents the results of the statistical analysis undertaken on the quantitative data gathered from 50 corporate organisations using a self-administered online questionnaire. These results are explored in the context of the specific research questions and existing literature in chapter six and finally, chapter seven presents the key findings of the research stating their relevance, contribution and recommendations to business and academia.

1.7. Conclusion

Chapter one has introduced the research topic and problem which motivated this study. Learning and development departments have reached a crossroad where traditional benefits of e-Learning no longer suffice to stimulate executive support and budgets. Business benefits from e-Learning programmes need to be measured and proven in order to justify further investment. Learning and development practitioners therefore need to better understand and create an environment which yields these benefits. This research intends to explore the corporate learning environment as a contributor and predictor of e-Learning programme effectiveness becoming an enabler of firm performance.

2. Chapter Two – Literature Review

2.1. Introduction to literature reviewed

Human capital is believed to be a primary source of competitive advantage for organisations (Castillo, & del Valle, 2009) in today's dynamic and highly competitive world of work (Gray, 2011a; Noe, & Tews, 2012). To stay competitive, organisations need to learn continuously (Senge, 2008). It is therefore especially important for corporate organisations to develop their human capital (Noe, & Tews, 2012).

This form of learning in an organisational context in known as workplace learning (Illeris, 2003, Rosenberg, 2006; Tynjälä, & Häkkinen, 2005; Wang, 2011; Wang, Ran, Liao, & Yang, 2010) and makes use of formal and informal learning methods (Tynjälä, & Häkkinen, 2005). e-Learning is one such method which is a commonly used medium of workplace learning and is growing in popularity within an organisational learning context (Habermann, Sprenger, & Abdel-Jaber, 2006; Rosenberg, 2006; Wang, 2011; Wang, Ran, & Vogel, 2011). The implementation of e-Learning in a corporate learning context is known in the literature as workplace e-Learning (Wang, 2011; Wang, *et al*., 2010). There is a challenge however, workplace learning and e-Learning models are not well defined in the literature (Collin, 2006; Servage, 2005). This could potentially be the reason why e-Learning interventions often do not live up to the expectations placed on them (Servage, 2005) and have been known to fail in the past (Naeve, Palmér, Nilsson, Ebner, Enoksson, Lytras, … Chatti, 2007; Romiszowski, 2004).

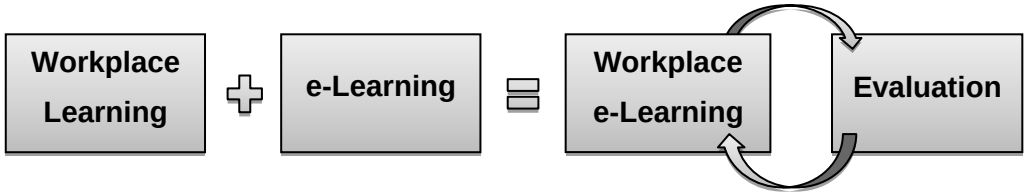
Failure of these programmes means they were not effective in transferring knowledge or skills. The success of learning programmes can be determined by practitioners because training evaluation and effectiveness measurement is a mature field of study and practice which was started in the early 1960s by Donald L. Kirkpatrick who introduced the four levels of training programme evaluation (Kirkpatrick, 2010). These levels of evaluation have been used extensively to evaluate corporate training programmes (Canadian Council on Learning, 2007) and have even been extended by Jack J. Phillips to five levels of evaluation, the fifth level being ROI (Phillips, 2007). Phillips' ROI method is a common technique by which corporations measure the value of their training programmes (Canadian Council on Learning, 2007).

This research will attempt to demystify the conceptual architecture of workplace learning by presenting a proposed model for corporate learning environment

interconnectedness and determine whether corporate organisations, which can be said to have an interconnected workplace learning environment are more likely to produce more effective e-Learning programmes (as determined by Kirkpatrick and Phillips' evaluation levels) as a result.

The literature which has been reviewed to position and guide this research begins with a deeper look into human capital as a competitive advantage and driver of organisational performance. Once established, the literature review will flow as illustrated below in Figure 2.1:

Figure 2.1 – Literature Layout



First, the concept of workplace learning will be explored, followed by e-Learning which is a common medium of workplace learning. Together, these two topics combine to make up the concept of workplace e-Learning which will be discussed and finally the way in which corporate learning programmes are evaluated will be detailed.

Once this foundation has been set, the area of workplace e-Learning and specifically the need for an integrated model of workplace e-Learning will be discussed along with the various individual components which make up this model.

2.2. Human capital development as a means of improving business performance and creating a competitive advantage

The landscape of business is more competitive and dynamic than ever before (Gray, 2011a; Noe, & Tews, 2012). Any organisation seeking to stay competitive in the global economy needs to differentiate through the skills, knowledge and motivation of their workforce (Aguinis, & Kraiger, 2009). In the literature, a competitive advantage is said to be a firm's ability to deliver products or services at a lower cost and/or a higher quality than their competition (Ferguson, & Reio, 2010). Traditional sources of competitive advantage, such as natural resources and access to financial resources and economies of scale however, no longer suffice to create sustainable competitive

advantage for organisations (Buciuniene, & Kazlauskaite, 2008). It is human capital which is now seen as the primary source of sustainable competitive advantage (Castillo, & del Valle, 2009) as this resource is valuable, scarce and difficult to imitate (Castillo, & del Valle, 2009). Noe and Tews (2012) argue that "the development of human capital through training and development may be one of the most important means for an organization to gain a competitive advantage" (Noe, & Tews, 2012, p. 101).

Training is recognised as the primary means of developing human capital (Castillo, & del Valle, 2009). This recognition of human capital development as a source of competitive advantage is also reflected in research which suggests that there is clearly a positive relationship between firm performance and competitiveness and human capital development (Aguinis, & Kraiger, 2009; Castillo, & del Valle, 2009; Chang, *et al*., 2009). Human resources and learning and development managers can therefore positively influence firm performance through the implementation of learning programmes in the workplace (Ferguson, & Reio, 2010). The next section will discuss the area of workplace learning as a means of human capital development in corporate organisations and contributes to the theory base on which this research builds a proposed corporate learning environment interconnectedness model.

2.3. Workplace learning

Workplace learning literature was reviewed as it is the context in which learning takes place in corporate organisations (Tynjälä, & Häkkinen, 2005; Wang, 2011; Wang, *et al*., 2010) which have been surveyed. Theory relating to workplace learning environments has been used to construct the conceptual corporate learning environment interconnectedness model which is proposed in this research.

Workplace learning is an interesting concept for a variety of entities, including corporations, educators, learning and development professionals as well as employees themselves (Collin, 2006). It refers to learning or training which takes place in the workplace intended to improve both individual and organisational performance (Rosenberg, 2006). This is a wide scope in which there are many stakeholders.

Illeris (2003) proposed that the workplace learning environment consists of four elements; (a) learners or employees, (b) learning content relevant to the work

requirement, (c) the social context of collaboration and teams and (d) other learning stakeholders such as the organisation itself.

Tynjälä and Häkkinen (2005) describe three modes of workplace learning; (a) informal, which is obtained in an unplanned manner through the process of doing one's work, (b) intentional but non formal where a skill or behaviour is intentionally taught but not in a formal setting and (c) formal on or off the job learning taking place face to face, electronically or otherwise.

Workplace learning is different from classroom learning in that it intentionally integrates theory and practice as well as tacit and explicit knowledge at an individual and collective level by recognising that learning occurs in the midst of practice (Raelin, 1998). Workplace learning is learning which takes place in a working environment and is intended to contribute towards attainment of organisational goals (Tynjälä, & Häkkinen, 2005; Wang, 2011; Wang, *et al*., 2010). It is typically embedded in standard processes, is relevant to the job role of the learner so it can be appropriately applied and it involves collaboration with colleagues which contributes to and reinforces the learning experience (Cheng, Wang, Moormann, Olaniran, & Chen, 2012; Tynjälä, & Häkkinen, 2005; Wang, 2011; Wang, *et al*., 2010).

Workplace learning is not only a process of knowledge sharing but also knowledge creation (Tynjälä, & Häkkinen, 2005). These integrated learning activities are important for the continued development of employees in an organisation (Cheng *et al*., 2012) and supports the paradigm shift from learning *AT* work to learning *IS* work (Naeve *et al*., 2007). Development however, happens in a specific context and for a specific purpose. The high-level model proposed by Illeris (2003) does not describe the context in which learning takes place in much detail, referring to the organisation and other stakeholders but stopping short of defining the structures within modern organisations which determine learning and development needs that drive organisational goals. This level of organisational features will be discussed under the heading of an integrated model for workplace e-Learning but first, the specific medium of e-Learning and its combination with workplace learning will be explored in the next section.

2.4. e-Learning

e-Learning literature was reviewed as it is the method or medium of learning delivery which the research intends to measure the effectiveness of. e-Learning is the term used to describe delivery of content, information and instructions to individuals using information and communication technologies (ICT) (Sun, Tsai, Finger, Chen, & Yeh, 2008; Wang, *et al*., 2010; Wang, Ran, & Vogel, 2011). It is a medium used by many organisations to grow the knowledge and develop the skills of employees in a workplace learning context both formal and informal (Cheng *et al*., 2012; Rosenberg, 2006; Sun *et al*., 2008; Wang, 2011; Wang, Ran, & Vogel, 2011). It has become a more prominent feature in the roles of learning and development departments (Habermann, Sprenger, & Abdel-Jaber, 2006) and often constitutes a significant corporate investment (SkillSoft, 2010).

e-Learning offers significant benefits over traditional training methods to educators, learners and organisations by overcoming multiple drawbacks of traditional training programmes. e-Learning allows for just-in-time learning to take place at a time and place convenient and accessible to the learner, reducing delivery costs, travel time and costs as well as time away from the office (Ozdemir, & Abrevaya, 2007; Rosenberg, 2006; Wang, 2011). Learners are able to only commit and undertake the amount of learning which they can accommodate at that point in time. e-Learning is also completely trackable. Unlike traditional training methods, e-Learning administrators are able to query and report on everything that each learner does on the e-Learning system (Servage, 2005).

According to Tynjälä and Häkkinen (2005), e-Learning in its relatively short history has created a lot of confusion due to the many names by which it is known. These include computer based training (CBT), computer aided instruction (CAI), distance learning, blended learning, mobile learning and potentially many other terms. Tynjälä and Häkkinen (2005) go on to say that in fact, it is only technology which changes so rapidly and not the basic process of learning.

It is believed that e-Learning fails to meet employees' expectations of improved performance because it is implemented without the context of organisational needs and goals (Wang, Ran, & Vogel, 2011). When implemented in isolation and without consultation, e-Learning is doomed as it will fail to deliver on the individual and collective expectation. This is due to pedagogical aspects which are key to delivering

effective learning programmes being overlooked (Wang, 2011). Research cited by Servage (2005) represents e-Learning environments as serving bite sized learning chunks which do not satisfy the learner in their quest for knowledge and that the hurried approach of e-Learning on the go leaves little time for reflection, creativity and collaboration which are vitally important if any real learning is to take place. The success of e-Learning in organisations is therefore dependent on the organisational structure and processes which support and drive it. This organisational context will either be a barrier or enabler of this learning medium (Tynjälä, & Häkkinen, 2005). Servage (2005) supports this view saying that a one dimensional approach to e-Learning fails to address the learning needs of individuals and organisations due to its lack of integration into performance driven processes and its overly emphasised technology focus failing to address the human element.

It must also be noted that it is not only these high level structural and process issues which cause e-Learning to underperform, there are more fundamental issues such as technology acceptance, attitude towards e-Learning, perceived usefulness, course ease of use, flexibility and quality as well as assessment methods (Sun *et al*., 2008) which must first be overcome before e-Learning can take off. These can be thought of as the 'hygiene' variables of e-Learning which are required even before more significant impact and value can be addressed. Once in a reasonable position with regards to adoption, the broader context of e-Learning in the workplace can be explored. The next section addresses this area.

2.5. Workplace e-Learning

Workplace e-Learning is the core component being researched in this paper as it integrates the corporate learning environment and the use of electronic learning resources and technology (Wang, *et al*., 2010). Research in this area also contributed to the corporate learning environment interconnected model being proposed.

Workplace e-Learning is the attempt to contextualise e-Learning and overcome the typical implementation issues and pitfalls which often cause e-Learning to miss the mark in delivering individual and collective performance improvements, however, research in this area is fragmented and there is a lack of common conceptual understanding and focus which makes the execution of such strategies challenging (Collin, 2006; Servage, 2005).

The growing role of technology in workplace learning is a blessing and a curse. On the one hand, the benefits and advances they present such as mobile learning and even virtual worlds are significant and attractive but the reality is that most organisation are still grappling with how to best utilise their simple online e-Learning solutions (Green, 2011).

Ideally, a workplace e-Learning environment should create better alignment between e-Learning programmes and organisational goals. It should align organisation and individuals' learning needs by linking learning outcomes with performance metrics and enable collaboration and knowledge sharing (Wang, 2011; Wang, *et al*., 2010). Rosenberg (2006) confirms this by saying that the goal of e-Learning in the workplace is to elevate individual and organisational performance.

Most e-Learning applications have failed to create this alignment (Wang, 2011) and since individuals will only take the time to learn what is relevant to them and what they believe will be useful (Illeris, 2003), only workplace e-Learning environments which can identify what is of importance to the individual will be successful. Unfortunately, workplace e-Learning environments have primarily been used to simply distribute electronic learning content without concern for applicability or relevance (Cheng *et al*., 2012). The goal of these environments should be to create a community of knowledge creation and transformation (Tynjälä, & Häkkinen, 2005). Focusing purely on technical deployment and distribution of content fails to achieve the higher order benefits for the organisation and miss the holistic concepts of organisational learning, knowledge management and collaboration (Servage, 2005). In order to achieve their objective of increased individual and organisational performance, workplace e-Learning environments should logically be tied to KPIs in the organisation (Wang, *et al*., 2010).

Wang, Ran, and Vogel (2011) describe three key areas of responsibility for a workplace e-Learning environment; (a) the alignment of individual learning needs and organisational goals, (b) linking learning objectives and work performance and (c) creating communication and collaboration channels. This model requires a comprehensive people strategy which is capable of leveraging the benefits of e-Learning described by Wang (2011), Ozdemir and Abrevaya (2007) and Rosenberg (2006). The challenge is to move beyond functional capabilities into meaningful application in an organisational context (Servage, 2005). Strategies which leverage e-Learning and the possibilities it presents have unfortunately not been a product of adult learning and organisational learning research which has taken place (Tynjälä, &

Häkkinen, 2005). We therefore lack an integrated framework which exploits collaborative learning, knowledge management, online communities of practice (COPs) and supportive learning environments (Servage, 2005). Fortunately, these topics of contextual and situation-aware e-Learning in the workplace have been the topic of recent debate (Cheng *et al*., 2012; Ferreira-Satler, 2012; Gaeta, Orciuoli, & Ritrovato, 2009; Jeong, Choi, & Song, 2012; Klašnja-Milićević, Vesin, Ivanović, & Budimac, 2011; Kritikou, Demestichas, Adamopoulou, Demestichas, Theologoub, & Paradia, 2008; Tzouveli, Mylonas, & Kollias, 2008).

Measurement of success in achieving higher order benefits for the organisation is an area where a lot of work has been done and is commonly accepted in the literature. This area of learning programme evaluation is discussed next.

2.6. Learning evaluation

Learning evaluation literature was reviewed to identify the most appropriate methods for determining e-Learning effectiveness in the organisations which have been surveyed in this research. This literature was used to construct the e-Learning evaluation component of the survey used for data collection.

How do organisations know if their efforts in creating an effective workplace learning environment have been successful? This is the question executives and learning and development professionals have been asking for many years and fortunately, training evaluation and ROI measurement is a mature field of research which has grown in popularity (Phillips, 2007).

Donald L. Kirkpatrick introduced and refined the four levels of training evaluation in the late 1950s and early 1960s (Kirkpatrick, 2010). Kirkpatrick describes these four levels in his book, “Evaluating training programs: the four levels” as follows (Kirkpatrick, & Kirkpatrick, 2006):

2.6.1. Level I – Reaction

Level I of evaluation measures how those who participate in a learning programme react to it, that is, their level of satisfaction. A positive reaction does not necessarily

mean learning has taken place, however, a negative reaction almost certainly means that it did not (Kirkpatrick, & Kirkpatrick, 2006).

2.6.2. Level II – Learning

Level II of evaluation determines whether participants (a) changed their attitudes, (b) improved their knowledge, and/or (c) increased their skill as a result of the programme. One or more of these must happen in order for a future change in the participant's behaviour to occur (Kirkpatrick, & Kirkpatrick, 2006).

2.6.3. Level III – Behaviour

Level III of evaluation measures the degree of change in behaviour which has occurred attributed to participation in the learning programme. Four conditions are necessary for change in behaviour to occur: (a) the individual must have a desire to change, (b) the individual must know what to change and how, (c) the individual must have the right working conditions to change and (d) the individual must be rewarded in some way for changing. Reflecting on point (c), the conditions or climate which is required may not always be conducive. Kirkpatrick and Kirkpatrick (2006) describe five climatic conditions in an individual's working environment which will either enable or inhibit the change. The first is a "preventing" climate where the individual is not allowed to perform the change. The second is a "discouraging" climate where the individual is not told he or she cannot change, however, changing would not be well received or consistent with accepted behaviour. The third is a "neutral" climate where there is no force for or against the change in the environment. Fourth is an "encouraging" climate where the individual is supported and inspired to change. Finally the fifth is a "requiring" climate where the individual is expected to change and the change is enforced (Kirkpatrick, & Kirkpatrick, 2006).

The fourth condition, reward can be financial or non-financial where the individual is either praised or financially incentivised.

2.6.4. Level IV – Results

Level IV of evaluation describes the consequences of the change brought about by learning programme participation in terms of job performance. These can be

measurable tangible results such as increased sales, reduced errors or improved quality or they can be intangible results such as changes in attitude, motivation or behaviour (Kirkpatrick, & Kirkpatrick, 2006).

Kirkpatrick's four levels of evaluation are used worldwide and almost all organisations use this model to some degree for their learning programme evaluation (Canadian Council on Learning, 2007).

In the 1970s and 1980s, Jack J. Phillips expanded on Kirkpatrick's work and introduced a fifth level of evaluation, ROI which has become a common measurement activity in the workplace (Phillips, 2007).

2.6.5. Level V – ROI

The ROI methodology is described in Biech (2008) as a measurement of the monetary value which organisations obtain from their investment in learning and development. This methodology ensures that learning and development effort is aligned with the organisation's objectives of creating value and also allows its users to identify when interventions are not performing and typically how they can be improved to produce greater value. This methodology has been adopted as the standard evaluation method by the ASTD which is the world's largest training and performance association (Canadian Council on Learning, 2007).

The Kirkpatrick/Phillips method is the most popular method of evaluation globally and has been validated and used extensively worldwide (Canadian Council on Learning, 2007).

Phillips argues that workplace learning practitioners must be accountable for their investments (Phillips, 2007). Executives want to see returns in the way of money saved and efficiencies gained (Servage, 2005). More and more, training or learning and development is being seen as value adding activity rather than a cost (Habermann, Sprenger, & Abdel-Jaber, 2006).

It has been said that the focus on economic value achieved through learning interventions is too high, however, where limited resources are available, organisations need to allocate their resources rationally and invest in those interventions which offer the greatest rate of return (Biech, 2008). By monitoring learning and development

investments, organisations are able to identify programmes which are creating bottom line value and expand these. Where a negative return is identified, programmes can be modified or terminated (Canadian Council on Learning, 2007).

It is important to note that evaluation of ROI, however accurate the attempt, is prone to external factors and influence. These may include the increased managerial attention the programme which is being measured receives or the reluctance to measure programmes which are unlikely to have a positive ROI. Such factors as effectiveness of change management processes and working climate as described by Kirkpatrick and Kirkpatrick (2006) in the organisation may also distort the calculation of ROI (Canadian Council on Learning, 2007).

The higher levels of evaluation (levels IV and V) typically require a higher degree of integration of the learning programme into the organisational job definition and performance management structures to create a level of alignment. The next section discusses the corporate learning environment and the aligning components which drive organisational performance through learning.

2.7. The need for an integrated model of workplace e-Learning

Beneath the surface of pure e-Learning content, a complex world of opportunity, alignment and hidden value is exposed. e-Learning implementation in the workplace is often complex and fragmented due to a lack of a holistic understanding in this multi-disciplined area and lack of tools and methodologies for effective implementation (Collin, 2006; Servage, 2005). For this reason, the integrated workplace learning environment has been reviewed. A structured and logical approach to learning in the work environments is vital (Wang, Ran, & Vogel, 2011), without which, learning systems fail to satisfy the learner's needs and ultimately fall short of contributing to organisational success (Wang, Ran, & Vogel, 2011). e-Learning on its own will not miraculously solve any work related problems (Tynjälä, & Häkkinen, 2005).

Tynjälä and Häkkinen (2005) further highlight that although e-Learning is viewed as a form of workplace learning, it can only be exploited in an appropriate culture and environment, however, the area of policy, systems and structures within organisations which link individual and organisational learning has not been well addressed (Mahmood, & Ferneley, 2006). The challenge therefore is to move beyond functional

application of e-Learning to make it more meaningful in an organisational context, thereby addressing the gap in understanding between learning and development practitioners and corporate executives (Servage, 2005). Cheng, *et al*. (2012) confirm that even current research on successful e-Learning in the workplace emphasises learner characteristics, technology and design elements with insufficient attention to the context of the workplace.

Although e-Learning has been in existence for a number of years, a practical framework for its workplace application has been evasive. This is possibly due to the speed at which this technology evolves and the multi-disciplinary nature of the field involving psychology, education, technology and human resource management (Servage, 2005). A practical model which links e-Learning to the organisational learning ecosystem is likely to prove to be a useful tool for practitioners looking to maximise the benefits of their e-Learning programmes in corporate organisations.

In order to achieve effective e-Learning programmes, which by the industry definition means learners are satisfied by the experience (Level I), gain knowledge as a result (Level II), adapt or change their behaviour appropriately (Level III), improve their individual performance (Level IV) and lead to a financial benefit to the organisation (Level V), an interconnected model is required which links the learners' needs and learning activities with the organisation's priorities. This model needs to incorporate the various components which translate business strategy into learning plans and ultimately improved performance from the individual and the organisation. These components are discussed in the following section.

2.8. Components of an interconnected corporate learning environment

As discussed above, there is a clear need for an integrated model of workplace e-Learning. This model should define the components within a corporate learning environment and the interconnections between the various components.

According to Illeris (2003), the fundamental elements of the learning environment are employees, the learning content, collaboration and the organisation itself as a stakeholder and proposes that any effective workplace learning environment should consider these elements and their interaction. Wang, Ran, and Vogel (2011) further

clarify that learning activities in the workplace should be directed to address "Corporate interests, individual needs, work performance, and social context" (Wang, Ran, & Vogel, 2011, p.169) and should "consider the alignment of individual and organizational learning needs, the connection between learning and work performance, and the interaction between individual learners" (Wang, Ran, & Vogel, 2011, p.169).

This literature provides a solid foundation for a proposed model but remains vague in relation to the practical processes, activities and tools within the modern organisations' learning environment. In this section these broad areas are unpacked further into the components which should make up such a model. Their relevance and relationship with one another is also discussed. Eight components will be introduced, each of which has a relationship with the organisational system, the employee or both. The components are organisational strategy or goals, competencies, role profiles, KPIs, PDPs, collaboration, e-Learning content and learning outcomes.

2.8.1. Organisational strategy and goals

There is widespread acceptance that learning environments must consider organisational goals and needs in order to be relevant. Each organisation has specific objectives which they desire to achieve. These objectives are not achieved by machines or computers, they are achieved by and through people. As discussed by Illeris (2003) and Wang, Ran, and Vogel (2011) above, organisational interests are one of the central components of a workplace learning environment. As stated by Servage (2005), it is this recognition of the ultimate purpose of workplace learning that will align the visions of learning and development practitioners and corporate executives. The top priority for learning departments is therefore to align with business strategy (Lasher, 2008) by predicting the needs of employees and making suitable development opportunities available for them (Mouzakitis, 2009).

2.8.2. Competencies

Organisational performance has been found to be highly correlated with its employees' knowledge and competencies (Abel, 2008). Competencies are made up of knowledge, skills and attitudes which individuals require to do their jobs (García-Barriocanal, Sicilia, & Sánchez-Alonso, 2012). These individual competencies make up the intellectual capital of organisations (García-Barriocanal, Sicilia, & Sánchez-Alonso,

2012). It is important to remember that organisations do not implement learning strategies for the sake of learning but invest in the development of specific competencies required by the organisation (Wang, *et al*., 2010) to achieve its strategic priorities (Draganidis, Chamopoulou, & Mentzas, 2008; Ley, Ulbrich, Scheir, Lindstaedt, Kump, & Albert, 2008). Competency based management is the way by which organisations are able to remain agile and competitive through the on-going development of their human resources (Draganidis, Chamopoulou, & Mentzas, 2008).

In response to competency based management, competency based e-Learning systems are designed around the competencies required to perform specific job roles according to desired performance measures (Cheng, Wang, Yang, Kinshuk, & Peng, 2011) and facilitate individual development plans. Learning paths are in turn designed to develop specific competencies (Hsu, & Ho, 2012) which are linked directly to learning resources by their learning outcomes (García-Barriocanal, Sicilia, & Sánchez-Alonso, 2012). Once again, referring back to the central components of workplace learning, competencies relate to the individual needs stated by Illeris (2003) and Wang, Ran, and Vogel (2011).

2.8.3. Role profiles

Employees have distinctive learning characteristics and job responsibilities. These are defined by a role profile, which is a set of competencies stating the job which organisational members are required to perform (Armstrong, 2012). These role profiles link to competencies in that various roles necessitate varying levels and types of expertise and capability (Wang, *et al*., 2010). Role profiles also define the behaviour, results and performance expected of individuals (Armstrong, 2009).

Job roles link back to Illeris (2003) and Wang, Ran, and Vogel (2011) in that they accommodate the work structure which ties to corporate interests, individual needs and work performance to define an individual's work context (Wang, 2011).

2.8.4. KPIs

The development of e-Learning content is typically driven by instructional design principles but ignores the organisational context (Jia, Wang, Ran, Yang, Liao, & Chiu, 2011). Learning in the workplace should serve to achieve organisational objectives

(Jia, *et al*., 2011). This is what makes learning programmes effective (Kirkpatrick, & Kirkpatrick, 2006).

KPIs represent the measures of organisation and individual performance that are required to achieve success (Wang, 2011). They are used to align organisational goals and individual learning needs and facilitate the connection between individual performance and learning (Wang, *et al*., 2010).

A KPI framework is divided into three levels in order to integrate organisational strategy and job structure. Firstly at the organisation level, second at the business unit level and finally, at a position or individual level (Parmenter, 2007). KPIs can therefore also be seen as a set of performance targets that drive learning towards the goal of improving individual work performance. This clarifies expectations and allows employees to identify performance measures for their position or role (Wang, Ran, & Vogel, 2011). KPIs are linked to roles in that, based on the business unit level objectives, competencies required for each role in the business can be defined (Wang, *et al*., 2010).

Ultimately, KPIs are the critical aligning component between individual and organisational goals, they make organisational goals achievable (Jia, *et al*., 2011; Wang, *et al*., 2010) through human capital as they are the way employee performance is defined and measured.

2.8.5. PDPs

A performance development plan or agreement is the outcome of performance development discussions, reviews and planning. As its name suggests, a PDP is a means through which individuals go about improving their performance within an organisational context as defined by their KPIs (Armstrong, 2009). These development plans form part of the individual needs as described by Illeris (2003) and Wang, Ran, and Vogel (2011) in the workplace learning ecosystem. They set out what employees are required to learn, what competencies need to be developed, using what means (Armstrong, 2009) and how performance will be measured (Armstrong, 2012). PDPs also define what support is required, typically from managers to achieve the desired level of performance but also usually contain areas of self-managed learning (Armstrong, 2012) of which e-Learning is a primary tool.

2.8.6. e-Learning content and learning outcomes

Learning content, including e-Learning is one of the primary tools people use to learn and develop themselves within an organisational context (Wang, Ran, & Vogel, 2011). Rosenberg (2006) confirms that the goal of e-Learning is to enhance individual and organisational performance. For this reason, learning content and outcomes form one of the key components in the workplace learning environment (Illeris, 2003; Wang, Ran, & Vogel, 2011).

Learning outcomes are specific statements of what users will learn and are expected to know when concluding a learning activity (MacLean, & Scott, 2011). Fabry (2009) highlights and emphasises the need for stating learning outcomes clearly to learners in order to keep the learning objectives in mind as well as attending to the need for interaction between learners and instructors which are critical to ensure success. Clearly stated learning outcomes not only create a better organised learning activity but also make the intentions of the course explicit thereby supporting learners through the change process (MacLean, & Scott, 2011). Leimbach (2010) indicates that stating learning outcomes or goals is one of a number of learning transfer activities which have a meaningful impact on improving results achieved from standalone training.

The way employees know whether or not specific material is relevant for them is through the definition and communication of these specific learning outcomes attached to each piece of learning content. This knowledge motivates and prepares learners for the learning experience (Leimbach, 2010). Learning outcomes also link learning content to individual competencies which need to be developed (Naeve, Sicilia, & Lytras, 2008; Wang, 2011) and should therefore be “well organized, updated, and maintained for continuous learning” (Wang, 2011, p.194). They fulfil the need to structure learning activities into outputs (Naeve, Sicilia, & Lytras, 2008) which when achieved, develop individual competencies (Naeve, Sicilia, & Lytras, 2008) that serve organisational goals (Wang, 2011).

2.8.7. Collaboration

Learning is dynamic, complex and social, therefore, a shift is needed towards a more open, social and collaborative learning environment (Kamtsiou, Naeve, Kravcik, Burgos, Zimmermann, Klamma, … Koskinen, 2007). Despite being information rich, e-Learning on its own does not enable exchange of experiences and individual know-

how (Chikh, & Berkani, 2010), in fact, e-Learners often complain about lack of interaction and isolation when undertaking e-Learning (Johnson, Hornik, & Salas, 2008). Including collaboration opportunities in the learning environment adds the element of social interaction, community and tacit information sharing, not just explicit information transfer (Chikh, & Berkani, 2010).

In light of this, there is a broad and growing base of literature on collaborative electronic learning coined “e-Learning 2.0”. e-Learning 2.0 is the overlap between traditional e-Learning and Web 2.0 tools which leverage the collaborative capability of the internet (Sbihi, & El Kadiri, 2010). Web 2.0 is the evolution of the internet which enabled this interactive environment for collaboration (Rodrigues, Sabino, & Zhou, 2011). In an e-Learning 2.0 environment, learners can share and learn together which promotes the creation of a collective intelligence, recreating the traditional learning style of the classroom where interaction between learners is possible (Sbihi, & El Kadiri, 2010). It is believed that that this social networking is what ties e-Learning with knowledge management in an organisational context (Kane, Robinson-Combre, & Berge, 2010) allowing employees to not only learn but also share their knowledge.

There is a well researched and strong case for the integration of learning and collaboration (Servage, 2005) which is critical in driving individual and organisational success (Chikh, & Berkani, 2010). Effective learning environments create a place where knowledge sharing and collaboration with others is possible (Tynjälä, & Häkkinen, 2005). This forms the social context of workplace learning referred to by Illeris (2003) and Wang, Ran, and Vogel (2011). In this context, learners have more freedom and more responsibility. They take control of their development within the learning environment (Sbihi, & El Kadiri, 2010).

People, above technology are those that create productive and positive learning experiences and working relationships (Servage, 2005). Learning in workplace settings specifically is more collaborative as knowledge is shared between co-workers and collaboration forms an important part of the learning experience (Wang, *et al*., 2010). It is recommended that where possible e-Learning interventions are coupled with opportunities for personal interaction (Tynjälä, & Häkkinen, 2005) as social interaction also allows individuals to observe others’ behaviour and modify their own in turn (Chikh, & Berkani, 2010). These collaborative interactions are made even more effective with the understanding of individual work context including learning needs, level of performance and expertise (Wang, 2011). These group-based learning

activities increase cognitive ability, improve learning efficiency (Yu, & Kuo, 2012) and allow organisations to transfer knowledge and develop skills at an exponential rate (Kane, Robinson-Combre, & Berge, 2010). “Creating and maintaining a shared learning space within an e-learning environment is important for enhancing learning, value, and satisfaction for participants” (Johnson, Hornik, & Salas, 2008, p364).

2.8.8. Summary of the integrated model

In the context of this workplace e-Learning environment, organisational strategy and goals refer to the objectives and ambition of the organisation as a whole and as delivered by the employees working within the organisation. To deliver against the objectives of the organisation, individuals or human resources require specific competencies which they employ to fulfil their role within the organisation. This role is defined by organisations as a role or job profile which each individual possesses. To determine individual performance against their role, organisations make use of KPIs which measure the success of the individual in fulfilling their role. PDPs are used to improve individual performance against these KPIs over time through the development of competencies. Learning outcomes determine scope and utility of specific learning content for an individual in developing their skills and satisfying their personal learning needs and development plan to ultimately improve their performance against KPIs.

2.9. Conclusion - Relevance of the literature reviewed to the research

The area of human capital as a source of competitive advantage and a driver of business performance was discussed to incite the interest of executives and business leaders and justify increased attention on learning and development programmes. It is not any learning programmes that these business leaders should focus on but rather workplace learning which is contextual and sensitive to the challenges and needs of the organisation and is focused on developing desirable knowledge and skills within human resources (Tynjälä, & Häkkinen, 2005; Wang, 2011; Wang, *et al*., 2010). e-Learning was specifically studied because it provides efficiency benefits over traditional learning methods (Ozdemir, & Abrevaya, 2007; Rosenberg, 2006; Wang, 2011) but, as described by the literature on workplace e-Learning has not been well aligned to organisational needs and failed to deliver on stakeholders’ expectations (Green, 2011; Wang, 2011). These expectations have been defined in the literature by the

development and application of training programme evaluation models which range from lower order benefits of satisfaction and knowledge gain to higher order benefits of improved job performance and ROI (Kirkpatrick, & Kirkpatrick, 2006; Phillips, 2007). To yield higher order benefits from e-Learning programmes, such programmes need to be driven by organisational strategy and goals and this can only occur through alignment of the numerous components within the corporate learning environment (Servage, 2005). Each of these components as well as the specific and necessary interconnections between them has been discussed.

The above context is the foundation of this research paper and highlights the gap in the literature which this research intends to address. Business leaders who have limited resources want to invest in initiatives which will drive organisational objectives and deliver a return on investment. In order for the learning and development function to receive the desired attention and investment, it must prove that e-Learning, which has grown in popularity (ASTD, 2011) and has been proven to be cost effective (Ozdemir, & Abrevaya, 2007; Rosenberg, 2006; Wang, 2011) can drive business objectives and deliver a good return on investment (Canadian Council on Learning, 2007). The literature reviewed did not contain a comprehensive and practical model which learning and development practitioners can use to align their e-Learning programmes with organisational objectives. For that reason, the literature reviewed informed the development of such a model as well as a data collection instrument which are presented in chapter four and goes on to test this model as a predictor of effective corporate e-Learning programmes using quantitative statistical methods. To justify the need for this model as a tool to improve e-Learning programme effectiveness, current perceptions of corporate e-Learning programme effectiveness were also tested in line with popular and accepted learning programme evaluation models. Practitioners will benefit from this research by its justification of the importance of alignment in driving effectiveness and the model output which can be used to diagnose and enhance learning environments as well as take guidance from it in terms of the relationships which should exist to drive e-Learning programme effectiveness in an organisational performance context. Academia will benefit from the contribution towards a more comprehensive model of corporate learning environment alignment which achieves greater e-Learning programme effectiveness and a better understanding of the key effectiveness drivers.

The next chapter discusses the four specific research questions which encapsulate the objectives of this research and serve as the framework for data analysis and presentation of the research findings.

3. Chapter Three – Research Questions

3.1. Introduction

In chapter two, the recent literature on the topic of human capital development using e-Learning and specifically workplace learning was discussed as a source of improved business performance and competitive advantage. The specific means of human capital development in scope of this research is e-Learning and the focus of this study is the exploration of the corporate organisation's learning environment as a possible contributor to improved e-Learning programme effectiveness. In light of this objective and the purpose of this research presented in chapter one, four research questions are presented in this chapter and answered by this research. The first research question explores whether there is actually a positive relationship between the corporate learning environment and e-Learning programme effectiveness. The second explores which of the corporate learning environment elements are the strongest predictors of e-Learning programme effectiveness at the various evaluation levels. Question three investigates whether corporate organisations currently perceive their e-Learning programmes to be effective and finally, question four examines whether or not the corporate learning environment interconnectedness model proposed in this research is valid.

3.2. General Research Question

The overarching question that the research will attempt to answer is; do interconnected corporate learning environments lead to higher effectiveness of e-Learning programmes in corporate organisations?

3.3. Specific Research Questions

There are a number of specific questions which the research will address in order to answer this question. These are:

3.3.1. Research question one

What is the relationship between learning environment interconnectedness and the effectiveness of e-Learning programmes?

This question seeks to determine whether a positive linear relationship exists between the learning environment of a given corporate organisation and the effectiveness of e-Learning programmes undertaken within that organisation. To determine the nature of this relationship, correlation analysis was used to test the correlation between the various levels of e-Learning programme effectiveness as presented in the literature and the learning environment components as presented in the proposed corporate learning environment interconnectedness model. Regression modelling was also used to test the predictive properties of the corporate learning environment of e-Learning programme effectiveness.

3.3.2. Research question two

Which of the learning environment elements are the strongest predictors of e-Learning programme effectiveness?

Given the relationship between corporate learning environments and e-Learning programme effectiveness, this question seeks to identify which of the corporate learning environment elements are the strongest contributors and predictors of effective e-Learning programmes at the various levels of evaluation. Further regression analysis was used to isolate the significant and powerful predictors within the corporate learning environment at various levels of e-Learning programme effectiveness.

3.3.3. Research question three

To what degree do corporate organisations perceive e-Learning programmes to be effective?

To justify the need for increased focus on e-Learning programme effectiveness, the third question determined the degree to which corporate organisations perceive their current e-Learning programmes to be effective. Descriptive statistics were used to determine perceptions and draw conclusions relating to e-Learning programme effectiveness.

3.3.4. Research question four

Is the proposed corporate learning environment interconnectedness model valid?

As the research is based on an untested model of corporate learning environment interconnectedness, the validity of this model was investigated in the research using correlation analysis and descriptive statistics. These methods determine whether the major learning environment components and relationships described in the literature and proposed by the model are reflected in the corporate learning environments surveyed.

3.4. Conclusion

This chapter clarified the focus areas of this research and sets the direction of further chapters which will hone in on each of the four research questions posed. Chapter four will discuss how this research was designed to answer the four questions, thereafter, chapter five will present the results of the survey conducted which will be discussed in the context of these research questions and purpose of the study in chapter six. Finally, chapter seven will draw conclusions and recommendations to business and academia with reference to the findings and answers to these questions.

4. Chapter Four – Research Methodology

4.1. Introduction

As outlined in chapter three, this research sets out to explore, using quantitative methods, the relationship between the variables of corporate learning environment interconnectedness and e-Learning programme effectiveness. To achieve this analysis, a corporate learning environment interconnectedness model is proposed which identifies the key components and interconnectivity between these within a corporate learning environment. Furthermore, the research aims to identify the powerful predictors of e-Learning programme effectiveness in corporate organisations and the degree to which corporate organisations perceive e-Learning programmes to be effective.

The specific research questions which this research intends to answer are:

a) What is the relationship between learning environment interconnectedness and the effectiveness of e-Learning programmes?
b) Which of the learning environment elements are the strongest predictors of e-Learning programme effectiveness?
c) To what degree do corporate organisations perceive e-Learning programmes to be effective?
d) Is the proposed corporate learning environment interconnectedness model valid?

This chapter details the methodology used to conduct this research. Specifically, this chapter will discuss the research design, population and sample as well as data collection, data analysis and limitations of the research.

4.2. Research Design / Methodology

The research design for this research is explanatory. According to Saunders and Lewis (2012), explanatory research is a study focusing on the relationship between variables. This research investigated the relationship between two variables, (a) e-Learning programme effectiveness and (b) corporate learning environment interconnectedness and can therefore be described as explanatory. Explanatory research does not have to be quantitative or qualitative, it can be either (Saunders, & Lewis, 2012). For this research, a survey strategy using a self-administered online questionnaire was used. A survey strategy involves the collection of data from an audience using interviews,

observations or questionnaires (Bryman, & Bell, 2003). In the context of the research, this strategy allowed the researcher to collect primary cross-sectional quantitative data which was used to statistically determine the relationship between the two primary variables and multiple sub-variables being explored.

4.3. Scope

The scope of this research encompasses corporate learning environments and the e-Learning programmes contained therein. The research does not address educational or non-corporate learning environments nor does it address learning programmes which are not related to e-Learning such as instructor led, simulated or mentoring.

4.4. Unit of analysis

The unit of analysis for this research is perceptions of learning and development practitioners regarding corporate learning environments and e-Learning effectiveness.

4.5. Universe / Population

A population refers to all the members of a specific group (Saunders, & Lewis, 2012). The population identified for this research is all the corporate organisations in South Africa which make use of e-Learning in their organisations. The universe for this research is ALL corporate organisations making use of e-Learning programmes.

4.6. Sample

A sample is a sub-group of the chosen population (Bryman, & Bell, 2003). For this research the sample is made up of four groups. The first group is four (4) corporate organisations represented by their learning and development practitioners (human resources managers, learning and development managers or similar job roles) in the Human Capital Institute Africa. These organisations were nominated by the director of the Human Capital Institute Africa due to their use of e-Learning and willingness to participate in academic research.

The Human Capital Institute Africa is a not-for-profit professional association focusing on strategic leadership and talent management by offering products and services to

human resources professionals which enable them to assume their talent management roles (Human Capital Institute Africa, 2012). The Human Capital Institute Africa provides educational conferences and learning opportunities to all professionals operating in talent related roles (Human Capital Institute Africa, 2012).

The second group is twenty eight (28) companies working with an organisation named Tools of Greatness. Tools of Greatness is a human capital and organisational development focused organisation which provides resources to improve the effectiveness of individuals, teams and organisations (Tools of Greatness, 2012).

The third group is seven (7) corporate organisations represented by their learning and development practitioners in the South African Learning and Development Community of Practice. These organisations were contacted via the Learning and Development Community of Practice's online forum.

The South African Learning & Development Community of Practice has two chapters, one in Gauteng and the other in Cape Town, South Africa. The community meets quarterly to discuss learning and development related topics, is organised by a committee of volunteers and membership to the community is open to anyone with a passion for learning (Learning and Development Community of Practice, South Africa, 2012).

These professional associations have been chosen due to their primary focus on people and organisational development of which e-Learning and the learning function of the organisation are primary components. Learning and development managers or human resources managers associated with these organisations have been chosen as they are the individuals within the corporate organisation who observe the effectiveness of e-Learning programmes and have the required information on the configuration and interconnection of the learning environment within the organisation.

The fourth group in the sample is made up of forty six (46) organisations in the researcher's network. The researcher's network has been included in the sample as the researcher is involved in the e-Learning industry and has knowledge of and relationships with corporate organisations making use of e-Learning as a mode of learning delivery.

The total sample therefore consists of eighty five (85) organisations made up as shown in Table 4.1:

Table 4.1 – Sample Breakdown

Source	Group size
Human Capital Institute Africa	4
Tools of Greatness	28
Learning and Development Community of Practice	7
Researcher Network	46
Total Sample Size	**85**

This sample has been chosen because members of these organisations and representatives in the organisations within the researcher's network are interested in and committed to the development of their learning environments and the effectiveness of their efforts. They also have the required information about their corporate learning environment and e-Learning programme success to answer the in-depth questions which make up the survey instrument distributed.

The sample is relatively small due to the fact that only corporate organisations making use of e-Learning could participate in the research and only one response could be obtained from each organisation. This individual response represented the organisation in its view of learning environment configuration, interconnectedness and e-Learning programme effectiveness. For this reason, multiple responses from a single organisation were not sought.

An online questionnaire was sent to the 85 members of the sample. 59 responses were received, however, eight of these responses were incomplete. In seven of the eight cases, only section A of the survey concerning the demographics of the organisation was completed and sections B and C were not completed. These responses add no value to the analysis as they do not contain the critical information about the learning environment (Section B) and e-Learning programme effectiveness (Section C) and were therefore excluded. The eighth of the incomplete responses had completed sections A and B but did not complete section C. Unfortunately this response still could not add any value to the research as no comparison could then be achieved between the learning environment and e-Learning programme effectiveness in this particular organisation. One more response was ultimately excluded from the analysis which was a complete response, however it was from an independent

consultant which did not match the profile of the unit of analysis, being corporate organisations.

Ultimately, 50 usable responses were analysed. In a survey study, a response rate indicates the proportion of the sample who return a complete and usable questionnaire (Salant, & Dillman, 1994). The 50 responses received represent a response rate of 58.8%. This is a reasonable response rate in a survey which uses personalised cover letters and follow ups (Salant, & Dillman, 1994). A minimum of 48 responses were targeted in order to provide sufficient responses to perform statistical analysis while also considering the degree of access to respondents, time available and financial constraints of this research. The high response rate achieved was due to the researcher's relationship with their network as well as the directors of the Human Capital Institute Africa and Tools of Greatness, their willingness to assist and the willingness and eagerness of companies to participate in research of this nature. The comprehensive follow up and reminder process employed also contributed to the response rate achieved. Feedback provided during the process indicated that the subject matter of the research is a real business challenge which respondents were grappling with and expressed great interest in the findings of the research.

4.7. Sampling method

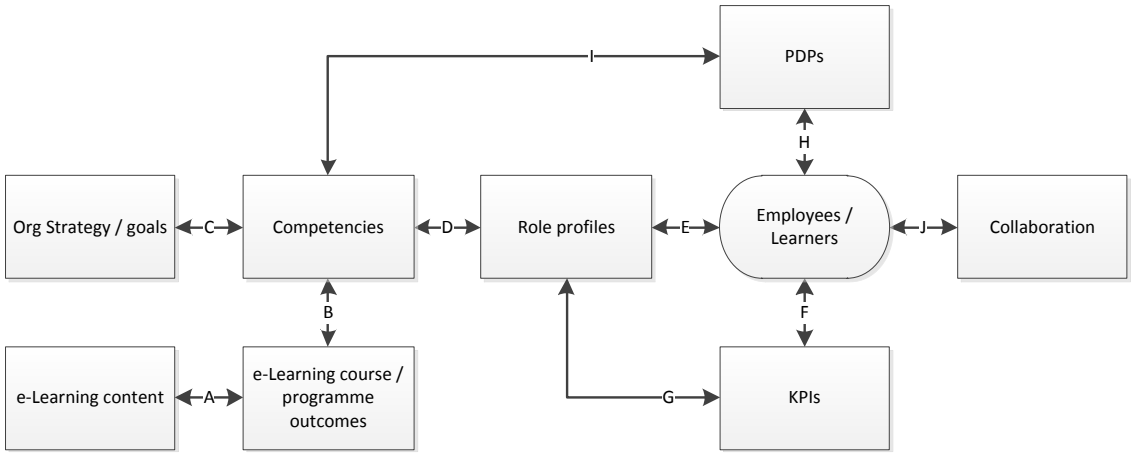
The sampling method for this research is convenience sampling as it is made up of organisations which the researcher has access to, either directly or via the professional associations engaged. A convenience sample is a non-probability sampling technique (Swanson, & Holton, 2005) and was used because the researcher does not have access to information of the entire population of corporate organisations using e-Learning in South Africa. Although convenient, this sample is appropriate due to the roles of the individuals sampled and the representation of leading South African firms in the sample. Respondents include prominent and leading organisations in their respective industries including some of the largest financial services, mining, consulting, services, manufacturing and telecommunications organisations in South Africa. 50% of respondents represented organisations with an annual revenue of over R1 Billion / US$117 Million (22% over R10 Billion / US$1.1 Billion) and 76% were from organisations with over 1,000 employees (26% with over 10,000 employees).

4.8. Proposed corporate learning environment interconnectedness model

Throughout this research reference is made to a model of corporate learning environments and interconnectivity between the components within the environment. To guide the development of the questionnaire on the corporate learning environment and to conduct the analysis of responses in relation to the research questions posed in chapter three, a proposed model of the corporate learning environment containing learning environment components and their interconnectivity was required. Following a review of the literature, an appropriate model of this nature could not be found so one was developed by the researcher which incorporates the various dimensions of a corporate learning environment and their interactions. The model development was guided by existing literature on workplace learning reviewed and discussed in chapter two.

The proposed model, depicted in Figure 4.1 below, contains eight major corporate learning environment components; e-Learning content, e-Learning outcomes, organisational strategy, competencies, role profiles, KPIs, PDPs and collaboration.

Figure 4.1 – Proposed Corporate Learning Environment Interconnectedness Model



In addition to the components, the model illustrates ten relationships or interconnections labelled "A" through to "J" between the components. The model suggests that these interconnections exist in aligned corporate learning environments.

A. **e-Learning content** is available and has known and documented **learning outcomes** (Fabry, 2009; Habermann *et al*., 2006; MacLean, & Scott, 2011; Naeve, Sicilia, & Lytras, 2008; Wang, 2011).

B. These **learning outcomes** are linked to documented organisational **competencies** (García-Barriocanal, Sicilia, & Sánchez-Alonso, 2012; Jia, *et al*., 2011; Leimbach, 2010; Naeve, Sicilia, & Lytras, 2008; Wang, Ran, & Vogel, 2011).
C. The **competencies** are derived from **organisational strategy and goals** (Abel, 2008; Collin, 2006; Draganidis, Chamopoulou, & Mentzas, 2008; García-Barriocanal, Sicilia, & Sánchez-Alonso, 2012; Illeris, 2005; Jia, *et al*., 2011; Lasher, 2008; Ley, *et al*., 2008; Mouzakitis, 2009; Naeve, Sicilia, & Lytras, 2008; Servage, 2005; Wang, 2011; Wang, Ran, & Vogel, 2011).
D. The **competencies** are grouped into recognised **role profiles** in the organisation (Armstrong, 2009; Armstrong, 2012; Cheng, *et al*., 2011; Draganidis, Chamopoulou, & Mentzas, 2008; García-Barriocanal, Sicilia, & Sánchez-Alonso, 2012; Ley, *et al*., 2008; Naeve, Sicilia, & Lytras, 2008; Wang, Ran, & Vogel, 2011).
E. These **role profiles** are directly assigned to **employees** (Armstrong, 2009; Armstrong, 2012; Cheng *et al*., 2012; Wang, Ran, & Vogel, 2011).
F. **Employees** have documented **Key Performance Indicators** (Armstrong, 2009; Armstrong, 2012; Jia, *et al*., 2011; Parmenter, 2007; Wang, 2011; Wang, Ran, & Vogel, 2011).
G. **KPIs** are linked to individual **role profiles** (Armstrong, 2009; Armstrong, 2012; Cheng, *et al*., 2011; Jia, *et al*., 2011; Wang, *et al*., 2010).
H. **Employees** have **Performance Development Plans** (Armstrong, 2009; Armstrong, 2012; Wang, Ran, & Vogel, 2011).
I. **PDPs** are linked to organisational **competencies** (Armstrong, 2009; Draganidis, Chamopoulou, & Mentzas, 2008; Hsu, & Ho, 2012; Wang, 2011; Wang, *et al*., 2010).
J. **Employees** also have an environment and opportunity to **collaborate** with others (Cheng, *et al*., 2011; Chikh, & Berkani, 2010; Fabry, 2009; Jia, *et al*., 2011; Johnson, Hornik, & Salas, 2008; Kamtsiou, *et al*., 2007; Kane, Robinson-Combre, & Berge, 2010; Li, Dong, & Huang, 2009; Rodrigues, Sabino, & Zhou, 2011; Sbihi, & El Kadiri, 2010; Servage, 2005; Tynjälä, & Häkkinen, 2005; Wang, Ran, & Vogel, 2011; Yu, & Kuo, 2012).

This model, which was developed with guidance from existing literature on workplace learning is the model used to test the composition of the corporate learning environments of responding organisations and its variables (components and interconnections) are those used to conduct the statistical analysis to answer the questions posed by this research.

4.9. Data collection

4.9.1. Procedure

The data collection process which was followed has been adapted from Couper (2008). The steps listed below were followed to ensure that a methodical approach was undertaken for the data collection and that the process yielded a high response rate.

a) **The Learning and Development Community of Practice, the Human Capital Institute Africa and Tools of Greatness were contacted to obtain their support**
The Learning and Development Community of Practice committee, the managing executive of the Human Capital Institute Africa and the managing director of Tools of Greatness were contacted in order to introduce them to the research and request their support for the distribution of the questionnaire to their contacts. Each agreed to assist and provided an indication of the individuals and organisations which they would be able to reach and methods through which they could be reached.

b) **Distribution list**
A distribution list of all desired respondents from each sample group was compiled as a tracking document.

c) **Invitation and questionnaire link**
A formal email invitation including a covering letter was sent out to all members of the sample with the hyperlink to the online questionnaire in the email. In cases where the recipients responded to say they were not the appropriate individual within the organisation to respond to the survey, the contact details of the appropriate individual were obtained and the request was sent to the appropriate individual indicating a referral from the original recipient.

d) **Follow up of receipt**
One week after the questionnaire link was sent, all recipients of the survey invitation who did not indicate by email that they have completed the survey were contacted to ensure they received the invitation and questionnaire link.

e) First follow up for completion

One week before the deadline for responses, an email follow up was sent to all recipients of the survey invitation who did not indicate by email that they have completed the survey, to remind them of the deadline and request that they complete the online questionnaire if they had not already done so.

f) Final follow up for completion

A final follow up email was sent to all recipients of the survey invitation who did not indicate by email that they had completed the survey two days before the deadline to request that they complete the online questionnaire if they had not already done so.

4.9.2. Instrument

The questionnaire developed by the researcher begins with a cover letter which can be found in Appendix A. This section outlines the instructions and directions on how the survey should be completed.

The questions in the three sections of the questionnaire are statements on a 7-point Likert scale ranging from “Strongly Disagree” to “Strongly Agree” (Strongly disagree, disagree, somewhat disagree, neither agree nor disagree, somewhat agree, agree, strongly agree) and several multiple choice demographic and descriptive questions relating to the organisation and individual completing the survey. A 7-point scale was used as opposed to a 5-point scale because it is expected to provide more variance in the responses and enhance the reliability of the scale in measuring respondents’ attitudes (Brace, 2008).

The questions in the questionnaire were split into three constructs:

a) The first section asked a number of demographic and descriptive questions about the organisation and the individual completing the questionnaire. These included; principal industry of the organisation, role level of the respondent, number of employees in the organisation and annual revenue of the organisation. These questions were asked in order to validate whether responses received were representative of the type of organisations who make use of e-Learning as a method of skills development as well as to give the necessary credibility to a sample which was not random by design.

b) The second section tested the configuration and degree of interconnectivity of the corporate learning environment by using the corporate learning environment interconnectedness model proposed in this research as a baseline and framework for the questioning relating to the existence of each component as well as the existence of interconnections between the components.

The construction of these questions was guided by workplace learning concepts extracted from organisational learning theory and literature reviewed. Between two and four questions were asked to verify the existence of each learning environment component and one or two questions were asked to determine whether a relationship existed between certain components. The questions in this section were structured in such a way that the relevance to e-Learning programmes specifically is explicit. The questions in this section were constructed into the three scales and 18 variables of the learning environment analysis which will be discussed in this chapter.

c) The third section tests the perception of e-Learning programme effectiveness in the organisation using a methodology developed in previous literature. Donald L. Kirkpatrick's popular four levels of evaluation (Kirkpatrick, & Kirkpatrick, 2006) with the addition of Jack J. Phillips' evolution of the method and addition of the fifth level of evaluation, ROI (Biech, 2008). The questions in this section were structured under the following categories, as per Kirkpatrick and Phillips' methodologies:

I. **Level I - Reaction (Kirkpatrick)**
   How do employees feel about the e-Learning programme?
II. **Level II - Learning (Kirkpatrick)**
   Do employees obtain knowledge and skill through the use of the e-Learning programme?
III. **Level III - Behaviour (Kirkpatrick)**
   Are users able to apply what they have learned through the e-Learning programme?
IV. **Level IV - Results (Kirkpatrick)**
   Does the application of knowledge and skill obtained from the e-Learning programme lead to improved job performance?
V. **Level V - Return on Investment (Phillips)**
   Is there an observable monetary benefit for the organisation from the delivery of the e-Learning programme?

Between three and four questions were asked relating to each level of evaluation to test whether this level of e-Learning programme effectiveness was achieved in the environment. The questions in this section were constructed into six scales which make up the variables of the e-Learning programme effectiveness analysis and will be discussed in detail in this chapter. An offline version of the questionnaire can be found in Appendix B.

4.9.3. Instrument validation

To increase the reliability and validity of the questionnaire and also to identify any errors or ambiguities, a pre-test of the questionnaire was conducted (Brace, 2008).

The questionnaire was pre-tested on three members of the population who were asked to review the flow and clarity of the questions, identify any errors and determine whether fifteen (15) minutes would be sufficient time to complete the questionnaire.

This process was valuable as the feedback received led to minor rewording of three of the questions, confirmed that an appropriate flow existed throughout the questionnaire and that 15 minutes was sufficient time to complete the questionnaire.

4.9.4. Survey scale construction

The 47 questions in the questionnaire were constructed into 25 scales which are extensively used in the analysis process as inputs into the correlation and regression analysis.

The 31 questions in the learning environment section (construct B) of the survey were combined into 19 scales:

a) Learning environment **components** scale which consists of 24 items
b) Eight **individual learning environment component** scales consisting of between two and four items each.
c) Learning environment **interconnectedness** scale which consists of 18 items
d) Ten **individual learning environment interconnection** scales consisting of between one and two items.

e) **Combined learning environment** scale, which consists of all the questions in the learning environment construct of the survey, 31 items. These 19 scales are depicted in Table 4.2 below:

Table 4.2 – Survey Construct B Mapping to Scales

Construct	Variable	Survey questions				Cronbach Alpha	Variable	Cronbach Alpha	Variable	Cronbach Alpha
Learning environment components	Learning content	B5	B6	B10	B11	0.793	Components	0.924	Combined	0.948
	Learning outcomes	B7	B8	B9		0.878				
	Competencies	B12	B13			0.778				
	Org Strategy	B1	B2			0.883				
	Role profiles	B16	B17			0.811				
	Employees	A3				N/A				
	PDP	B24	B25	B27	B28	0.802				
	Collaboration	B29	B30	B31		0.781				
	KPIs	B19	B20	B21		0.791				
Learning environment interconnectedness	Learning content-Learning outcomes (A)	B7	B9			0.701	Connectivity	0.920		
	Learning outcomes-Competencies (B)	B14	B15			0.860				
	Competencies-Org Strategy (C)	B3	B4			0.920				
	Competencies-Role profiles (D)	B18				N/A				
	Role profiles-Employees (E)	B16	B17			0.811				
	Employees-KPIs (F)	B21	B23			0.768				
	Role profiles-KPIs (G)	B22				N/A				
	Employees-PDP (H)	B25	B28			0.755				
	Competencies-PDP (I)	B26	B27			0.716				
	Employees-Collaboration (J)	B30	B31			0.692				

In order to validate the reliability of each of the scales used, the cronbach alpha coefficient of each scale was calculated and can also be seen in Table 4.2 for each scale. Cronbach alpha is used to test the reliability of a scale by determining its internal consistency (Pallant, 2011). The literature recommends that a cronbach alpha coefficient value of 0.7 is the lower limit determining a reliable scale although short scales with less than ten items may have lower values (Pallant, 2011). The scales constructed for this research were all found to have good internal consistency and achieved cronbach alpha coefficient values of 0.7 or above.

4.9.4.1. Learning environment components scale

The learning environment components scale combines the questions relating to the existence of major learning environment components in the organisation as defined by the proposed corporate learning environment interconnectedness model (Figure 4.1). These components include; e-Learning content, learning outcomes, competencies, organisational strategy, role profiles, PDPs, collaboration and KPIs. This scale was tested and was found to be reliable with a cronbach alpha coefficient of 0.924.

4.9.4.2. Individual learning environment component scale

The eight learning environment components were each constructed into a scale which was used in statistical analysis. The scales combine the questions relating to the existence of each proposed component within the corporate learning environment. These scales were all found to be reliable with the following cronbach alpha coefficient values. e-Learning content (0.793), learning outcomes (0.878), competencies (0.778), organisational strategy (0.883), role profiles (0.811), PDPs (0.802), collaboration (0.781) and KPIs (0.791).

4.9.4.3. Learning environment interconnectedness scale

The learning environment interconnectedness scale combines the questions relating to the relationship between the major learning environment components in the organisations as defined by the proposed corporate learning environment interconnectedness model (Figure 4.1). These interconnections are; (a) e-Learning content link to learning outcomes, (b) learning outcomes link to competencies, (c) competencies link to organisational strategy, (d) competencies link to role profiles, (e) role profiles link to employees, (f) employees link to KPIs, (g) role profiles link to KPIs, (h) employees link to PDPs, (i) competencies link to PDPs and (j) employees link to collaboration. This scale was tested and was found to be reliable with a cronbach alpha coefficient of 0.920.

4.9.4.4. Individual learning environment interconnection scales

Eight of the ten learning environment interconnections were constructed into a scale which was used in statistical analysis. The scales combine the questions relating to the relationship between the proposed components within the corporate learning environment. The two interconnections which were not constructed into a scale contained only one item and a scale was therefore not required. These scales which were constructed were all found to be reliable with the following cronbach alpha coefficient values. e-Learning content link to learning outcomes (0.701), learning outcomes link to competencies (0.860), competencies link to organisational strategy (0.920), competencies link to role profiles (N/A), role profiles link to employees (0.811), employees link to KPIs (0.768), role profiles link to KPIs (N/A), employees link to PDPs (0.755), competencies link to PDPs (0.716) and employees link to collaboration (0.692).

4.9.4.5. Combined learning environment scale

The combined learning environment scale combines the questions relating to the existence of major learning environment components in the organisation as well as the relationship between them. This combined relationship is depicted in the proposed corporate learning environment interconnectedness model (Figure 4.1). This scale was tested and was found to be reliable with a cronbach alpha coefficient of 0.948.

The 16 questions in the e-Learning programme effectiveness construct of the questionnaire were combined into six scales to align with the literature on learning programme effectiveness measurement presented by Kirkpatrick and Kirkpatrick (2006) for the first four levels and Phillips (2007) for the fifth level, ROI. The six scales are listed below:

a) Level I of e-Learning programme effectiveness evaluation (Reaction) scale which consists of 3 items.
b) Level II of e-Learning programme effectiveness evaluation (Learning) scale which consists of 4 items.
c) Level III of e-Learning programme effectiveness evaluation (Behaviour) scale which consists of 3 items
d) Level IV of e-Learning programme effectiveness evaluation (Results) scale which consists of 3 items
e) Level V of e-Learning programme effectiveness evaluation (ROI) scale which consists of 3 items
f) Combined e-Learning programme effectiveness scale (a combination of the above five scales) which consists of all 16 questions in the e-Learning programme effectiveness construct of the survey.

These six scales are depicted in Table 4.3 below:

Table 4.3 – Survey Construct C Mapping to Scales

Construct	Variable	Survey questions				Cronbach Alpha	Variable	Cronbach Alpha	Variable	Cronbach Alpha
e-Learning effectiveness	Level I	C1	C2	C3		0.814	**Level I**	0.814	Effectiveness	0.942
	Level II	C4	C5	C6	C7	0.837	**Level II**	0.837		
	Level III	C8	C9	C10		0.757	**Level III**	0.757		
	Level IV	C11	C12	C13		0.933	**Level IV**	0.933		
	Level V	C14	C15	C16		0.715	**Level V**	0.715		

4.9.4.6. Level I of e-Learning programme effectiveness evaluation scale

The Level I of e-Learning programme effectiveness evaluation scale combines the questions relating to the reaction of the learners to the e-Learning programme (Kirkpatrick, & Kirkpatrick, 2006). This scale was tested and was found to be reliable with a cronbach alpha coefficient of 0.814.

4.9.4.7. Level II of e-Learning programme effectiveness evaluation scale

The Level II of e-Learning programme effectiveness evaluation scale combines the questions relating to the knowledge gained by the users of e-Learning programme (Kirkpatrick, & Kirkpatrick, 2006). This scale was tested and was found to be reliable with a cronbach alpha coefficient of 0.837.

4.9.4.8. Level III of e-Learning programme effectiveness evaluation scale

The Level III of e-Learning programme effectiveness evaluation scale combines the questions relating to the behaviour change which has occurred as a result of the e-Learning programme (Kirkpatrick, & Kirkpatrick, 2006). This scale was tested and was found to be reliable with a cronbach alpha coefficient of 0.757.

4.9.4.9. Level IV of e-Learning programme effectiveness evaluation scale

The Level IV of e-Learning programme effectiveness evaluation scale combines the questions relating to the organisational benefits which have occurred as a result of the e-Learning programme (Kirkpatrick, & Kirkpatrick, 2006). This scale was tested and was found to be reliable with a cronbach alpha coefficient of 0.933.

4.9.4.10. Level V of e-Learning programme effectiveness evaluation scale

The Level V of e-Learning programme effectiveness evaluation scale combines the questions relating to the monetary value derived from the organisation's investment in the e-Learning programme (Biech, 2008). This scale was tested and was found to be reliable with a cronbach alpha coefficient of 0.715.

4.9.4.11. Combined e-Learning programme effectiveness scale

The combined e-Learning programme effectiveness scale combines the questions relating to all five levels of e-Learning programme effectiveness evaluation. This scale was tested and was found to be reliable with a cronbach alpha coefficient of 0.942.

4.9.5. Questionnaire distribution

An electronic survey tool (www.surveymonkey.com) was used to develop and administer the questionnaire. The questionnaire was distributed via an email link to the eighty five (85) learning and development practitioners in the sample groups. A response rate of 56.5% was targeted to obtain a minimum of 48 responses and a response rate of 58.8% was achieved resulting in fifty (50) usable responses. The control document which was developed to list all survey invitation recipients was the sampling frame (Saunders, & Lewis, 2012) used for the research. The comprehensive data collection procedure discussed above was successful in achieving the targeted response rate for the survey.

4.10. Data analysis

Various statistical analysis techniques were employed as required to most suitably answer each of the research questions posed in chapter three.

4.10.1. Research question one – What is the relationship between learning environment interconnectedness and the effectiveness of e-Learning programmes?

To determine the nature of the relationship between corporate learning environment interconnectedness and e-Learning programme effectiveness, two statistical techniques were used, correlation analysis and regression.

Correlation was used to determine the relationship between each learning environment component and each level of e-Learning programme effectiveness evaluation as well as the relationship between each learning environment interconnectivity element and each level of e-Learning programme effectiveness evaluation.

Three regression models were also developed to further explore these relationships, specifically looking at the power of the learning environment in predicting e-Learning programme effectiveness in the organisation. All three regression models used the combined e-Learning programme effectiveness scale as the dependent or criterion variable. The first regression model used the environmental components as predictor variables, the second model used the interconnectivity elements as predictor variables and the third model used the combined learning environment scale as the predictor variable.

4.10.2. Research question two – Which of the learning environment elements are the strongest predictors of e-Learning programme effectiveness?

To determine which of the corporate learning environment elements are the strongest predictors of e-Learning programme effectiveness, ten stepwise regression models were developed. Stepwise regression is an automated statistical procedure which successively adds or deletes variables in a model to obtain the best result (Albright, Winston, & Zappe, 2009). For each of the five levels of e-Learning programme effectiveness evaluation, two stepwise regression models were developed where that level of effectiveness was used as the criterion variable. The first model used the learning environment components as predictor variables and the second model used the learning environment interconnectivity elements as the predictor variables. Each model allowed only the significant predictors of effectiveness at that level of evaluation into the model with a cut-off point of $p<0.15$ as the criterion for entry into the model.

4.10.3. Research question three – To what degree do corporate organisations perceive e-Learning programmes to be effective?

To determine whether or not corporate e-Learning programmes are perceived to be effective, the means of the scales for e-Learning programme effectiveness levels I, II, III, IV and V as well as the combined effectiveness scale were analysed. These scales are constructed of questions in construct C of the questionnaire dealing with respondents' perceptions of e-Learning programme effectiveness. Statistical means are used to reveal the central tendency of a variable (Hatcher, 2003) therefore this information will reveal the degree to which respondents believe their organisations' e-

Learning programmes are effective at the various levels of evaluation as well as overall.

4.10.4. Research question four – Is the proposed corporate learning environment interconnectedness model valid?

To assist in the validation of the corporate learning environment interconnectedness model proposed by this research, a correlation analysis was conducted between each of the corporate learning environment components to confirm whether the learning environment components proposed to be interconnected are correlated with each other.

In some cases, the model depicts interconnections between employees and a component in the corporate learning environment. In such cases, a correlation could not be calculated because the relationship was not represented by a continuous variable which is required for a correlation analysis (Pallant, 2011). In these cases, the researcher opted to use analysis of statistical means of specific questions in the survey whose agreeable responses would indicate whether this relationship does in fact exist in their learning environment.

Table 4.4 below presents the interconnections between employees and components proposed in the model and the question which represents the relationship between them. The means of these questions were evaluated to determine whether respondents agree or disagree that these relationships exist in their corporate learning environment.

Table 4.4 – Employee to Corporate Learning Environment Component Interconnections

Relationship	Survey question number and text
Employees-Role profiles	B16. Each individual in the organisation has a documented role / job profile.
Employees-PDPs	B25. Each individual in the organisation has a Performance Development Plan / Contract.
Employees-KPI	B21. Each individual in the organisation has documented Key Performance Indicators.
Employees-Collaboration	B30. The organisation provides opportunities for collaborative learning face to face.

4.10.5. Data analysis summary

Table 4.5 below summarises the data analysis techniques used.

Table 4.5 – Data Analysis Techniques Used

Research question	Methodology	Description
Research Question 1: Relationship between learning environment interconnectedness and e-Learning programme effectiveness	• Pearson Correlation • Regression	Correlations were calculated between e-Learning effectiveness levels and corporate learning environment components and interconnections. Regression models were constructed to test the predictive power of the learning environment of e-Learning programme effectiveness.
Research Question 2: Strongest predictors of e-Learning programme effectiveness	• Regression	Various stepwise regression models were constructed to determine which learning environment elements were the strongest predictors of e-Learning programme effectiveness.
Research Question 3: Perceived degree of corporate e-Learning programme effectiveness	• Descriptive Statistics	The means of predetermined scales were analysed to reveal the degree to which corporate learning and development practitioners perceive their e-Learning programmes to be effective.
Research Question 4: Corporate learning environment interconnectedness model validity	• Pearson Correlation • Descriptive Statistics	Correlations were calculated between each of the learning environment components to determine if components which were proposed to be linked are correlated with each other. Means of specific questions were analysed to determine whether a relationship exists between employees and certain learning environment components.

4.11. Limitations

Research limitations are those factors which compromise the generalisability of the results obtained by the research. The limitations of this research are explained in this section.

In this research, learning and development practitioners were asked about e-Learning programme effectiveness rather than the learners and line managers themselves. This limitation was acceptable because this was a preliminary investigation of the influence of corporate learning environment interconnectedness on e-Learning programme effectiveness. A case study or other more in depth methods should now be applied to obtain more accurate e-Learning programme effectiveness responses due to the convincing findings of the research. This is a proposed as an area of future research.

The model used to evaluate corporate learning environment interconnectedness has not previously been empirically tested. This research serves as a preliminary investigation of the interaction between learning environment interconnectedness and e-Learning programme effectiveness. Although tested as a part of this research's findings, a qualitative approach is recommended to evolve the model by discussing its scope with experienced learning and development practitioners in corporate organisations.

Although significant and reliable results were obtained regarding the effects of the learning environment on e-Learning programme effectiveness in corporate organisations surveyed, given the scope of this research, it was not possible to isolate the effect of interconnected learning environments on e-Learning programme effectiveness meaning that there may be other contributing factors which are affecting the results. Being a preliminary investigation, this was acceptable. Further research should be undertaken to isolate the effects of the environment from external factors by employing an experimental design.

ROI evaluations which typically require detailed investigation of the learning interventions and business metrics were measured using a self-administered questionnaire. This was acceptable because the research was not only based on ROI to determine e-Learning effectiveness and extracted data relating to the other four levels of evaluation. In cases where organisations are already measuring ROI of their programmes, this information was obtained using the questionnaire. A more thorough approach would be required to obtain accurate ROI feedback and not just perceptions. Again, this is a recommendation for future case study based or experimental design progressions of this research.

5. Chapter Five - Results

5.1. Introduction

Chapter five will present the results of the survey conducted in line with the four research questions posed in chapter three and the research methodology discussed in chapter four.

The data source for this research was a self-administered questionnaire of learning and development practitioners in corporate organisations. This survey was administered to assess the learning environments in which these professionals operate and the perceived effectiveness of the e-Learning programmes which they make available to their organisations.

The learning environment was assessed in relation to the corporate learning environment interconnectedness model proposed in this research which identifies eight components (e-Learning content, learning outcomes, competencies, organisational strategy, role profiles, PDPs, collaboration and KPIs) and ten interconnections between them. e-Learning effectiveness was assessed in line with existing learning programme evaluation models proposed by Kirkpatrick (Kirkpatrick, & Kirkpatrick, 2006) and Phillips (Phillips, 2007). This integrated model measures evaluation at five levels; reaction, learning, behaviour, results and ROI.

The questionnaire administered was divided into three constructs; construct A contained four questions describing the demography of the respondent and the organisation which they were representing. Construct B contained 31 questions relating to the learning environment which exists in the organisation. Construct C contained 16 questions relating to the effectiveness of e-Learning programmes within the organisation.

5.2. Demographic information – Survey construct A

The section below presents the demographics of the sample who responded to the survey. A total of 50 usable responses were obtained. Specific demographic variables collected were principal industry of the organisation, role level of the individual completing the survey, number of people employed by the organisation as well as the annual revenue of the organisation.

5.2.1. Principal industry

Principal industry was broken down into the following options:
Academic, Agriculture, Communications, Construction, Consulting, Financial Services, Government, Healthcare, Hospitality, Information Technology, Manufacturing, Medical, Mining, Non-profit, Retail, Services, Transportation and Other. Table 5.1 below shows the frequency of these responses occurring.

Table 5.1 – Principal Industry Frequencies

Principal industry	Frequency	Percent
Financial Services	16	32%
Other	8	16%
Information Technology	7	14%
Consulting	4	8%
Mining	4	8%
Manufacturing	3	6%
Communications	2	4%
Retail	2	4%
Transportation	2	4%
Healthcare	1	2%
Services	1	2%
Academic	0	0%
Agriculture	0	0%
Construction	0	0%
Government	0	0%
Hospitality	0	0%
Medical	0	0%
Non-Profit	0	0%
	50	**100%**

The majority of responses were from financial services (32%) and information technology (14%) firms. Consulting and mining firms accounted for 8% of respondents each, Manufacturing firms accounted for 6%, communications, retail and transportation firms were represented with 4% of responses each, Healthcare and services firms each represented 2% and finally, academic, agriculture, construction, government, hospitality, medical, and non-profit firms were not represented at all.

Eight respondents selected “Other” for this question on principal industry indicating that they did not feel their particular industry was in the list of options provided. These respondents provided the following principal industries for their organisations; downstream petroleum, energy, education, FMCG, gaming, management consulting, media and entertainment and telecommunications.

5.2.2. Role level

Role level was broken down into the following options as can be seen in Table 5.2: Executive, Senior Management, Middle Management, Supervisory and Non-Management / Technical / Professional.

Table 5.2 – Role Level Frequencies

Role Level	Frequency	Percent
Senior Management	20	40%
Middle Management	16	32%
Non-Management / Technical / Professional	8	16%
Executive	4	8%
Supervisory	2	4%
	50	**100%**

The majority of responses were from senior managers (40%) and middle managers (32%). Non-management / technical / professionals accounted for 16% of respondents, executives accounted for 8%. Finally, supervisors represented only 4% of responses.

5.2.3. Number of employees

Number of Employees was broken down into the following options as can be seen in Table 5.3:
1 – 100, 101 – 500, 501 – 1000, 1001 – 5000, 5001 – 10000, 10001 – 50000 and Over 50000.

Table 5.3 – Number of Employees Frequencies

Number of Employees	Frequency	Percent
1,001 – 5,000	15	30%
10,001 - 50,000	11	22%
5,001 – 10,000	10	20%
101 – 500	7	14%
501 – 1,000	4	8%
Over 50,000	2	4%
1 – 100	1	2%
	50	**100%**

The majority of responses were from organisations with 1,000 – 5,000 employees representing 30% of responses. Organisations with 10,001 – 50,000 employees accounted for 22%. 5,001 – 10,000 employee organisations accounted for 20%, 101 – 500 employee organisations represented 14% of responses and 501 – 1,000 employee organisations represented 8% of responses. 4% of responses were from organisations

with over 50,000 employees. Finally, only 2% of responses were from organisations with 1 – 100 employees.

5.2.4. Annual Revenue

Annual revenue was broken down into the following options as can be seen in Table 5.4:
Under R5 million, R5-49 million, R50-200 million, R201 million-R1 billion, R1-10 billion, Over R10 billion and Don't know.

Table 5.4 – Annual Revenue Frequencies

Annual Revenue	Frequency	Percent
R1-10 billion	14	28%
Over R10 billion	11	22%
R201 million-R1 billion	10	20%
Don't know	8	16%
R5-49 million	4	8%
R50-200 million	3	6%
Under R5 million	0	0%
	50	**100%**

The majority of responses came from organisations with an annual revenue of R1-10 billion (28%). Organisations earning over R10 billion represented 22% and earners of R201 million-R1 billion represented 20% of responses. 16% of respondents did not know their organisation's annual revenue. 8% of respondents were from organisations earning R5-49 million, 6% were from organisations earning R50-200 million and finally, none earning under R5 million.

5.3. Learning environment – Survey construct B

The second construct of the questionnaire contained questions relating to the eight components in the learning environment and ten interconnections between these components. All questions in this section were compulsory in order to obtain the necessary information about the learning environment. Table 5.5 below details the frequency analysis of each question in this section of the questionnaire. A 7-point likert scale was used for all questions with a response range between "Strongly Disagree" (numerical value = 1) and "Strongly Agree" (numerical value = 7). Table 5.6 below details the minimum and maximum response values, mean, mode and standard deviation for each question.

Table 5.5 – Survey Response Frequencies (Construct B)

Question	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
B1.Your organisational strategy and goals are clearly defined.	0%	2%	2%	0%	8%	38%	50%
B2.Your organisational strategy and goals are clearly communicated.	2%	0%	2%	0%	16%	50%	30%
B3.There is a clear link between organisational objectives and job competencies.	2%	4%	4%	2%	30%	34%	24%
B4.The development of organisational strategy and definition of organisational competencies are aligned.	2%	2%	6%	12%	28%	34%	16%
B5.The organisation provides learning interventions to develop individual knowledge and skills.	0%	0%	0%	2%	8%	42%	48%
B6.e-Learning is used in learning interventions.	0%	2%	4%	2%	18%	40%	34%
B7.Outcomes or specific objectives of the e-Learning content are known.	0%	0%	6%	2%	16%	38%	38%
B8.Learners are made aware of the outcomes of the e-Learning content.	0%	4%	4%	6%	14%	40%	32%
B9.Learning outcomes are displayed in the e-Learning material.	0%	4%	2%	6%	10%	36%	42%
B10.e-Learning is easily accessible to those who have e-Learning content available for them.	0%	2%	6%	4%	14%	30%	44%
B11.e-Learning available is of good instructional design and quality.	0%	2%	6%	8%	12%	40%	32%
B12.The organisation has documented competencies required to fulfil specific job functions.	2%	6%	2%	4%	36%	32%	18%
B13.Learners are aware of the competencies required for their role / job profile.	0%	4%	8%	12%	36%	28%	12%
B14.e-Learning outcomes are aligned to individual competencies.	4%	4%	8%	14%	32%	30%	8%
B15.e-Learning is used to develop individual competencies in the organisations.	2%	4%	10%	8%	22%	40%	14%
B16.Each individual in the organisation has a documented role / job profile.	0%	6%	6%	6%	20%	26%	36%
B17.Employees know and understand their role / job profile.	0%	4%	6%	6%	32%	38%	14%
B18.Role / job profiles are based on a combination of individual competencies.	0%	2%	12%	6%	26%	42%	12%
B19.The organisation makes use of Key Performance Indicators at a business unit / division level.	0%	2%	0%	6%	10%	44%	38%
B20.The organisation makes use of Key Performance Indicators at an individual level.	0%	2%	4%	2%	14%	46%	32%
B21.Each individual in the organisation has documented Key Performance Indicators.	2%	2%	6%	2%	16%	36%	36%
B22.Individual Key Performance Indicators are based on the role / job profile which each individual performs.	0%	4%	6%	0%	18%	40%	32%
B23.Individual performance against Key Performance Indicators is reviewed at least annually.	0%	0%	2%	4%	10%	40%	44%
B24.The organisation makes use of Performance Development Plans / Contracts to drive knowledge and skills development.	0%	0%	4%	10%	20%	28%	38%
B25.Each individual in the organisation has a Performance Development Plan / Contract.	0%	4%	10%	8%	10%	38%	30%
B26.Performance Development Plans / Contracts contain individual competencies which need to be developed.	0%	4%	6%	6%	16%	48%	20%
B27.e-Learning content is placed on Performance Development Plans / Contracts to develop competencies.	8%	6%	16%	14%	18%	28%	10%
B28.Individuals' performance is reviewed at least annually against their Performance Development Plan / Contract.	0%	6%	2%	8%	16%	34%	34%
B29.e-Learning programmes are blended with opportunities to collaborate and discuss the subject matter with others.	4%	14%	22%	4%	14%	26%	16%
B30.The organisation provides opportunities for collaborative learning face to face.	2%	2%	2%	2%	18%	34%	40%
B31.The organisation provides opportunities for collaborative learning electronically.	6%	8%	10%	8%	24%	30%	14%

Table 5.6 – Survey Response Statistics (Construct B)

Question	Min	Max	Mean	Mode	Standard Deviation
B1.Your organisational strategy and goals are clearly defined.	2	7	6.28	7	1.01
B2.Your organisational strategy and goals are clearly communicated.	1	7	5.98	6	1.08
B3.There is a clear link between organisational objectives and job competencies.	1	7	5.52	6	1.39
B4.The development of organisational strategy and definition of organisational competencies are aligned.	1	7	5.28	6	1.34
B5.The organisation provides learning interventions to develop individual knowledge and skills.	4	7	6.36	7	0.72
B6.e-Learning is used in learning interventions.	2	7	5.92	6	1.14
B7.Outcomes or specific objectives of the e-Learning content are known.	3	7	6.00	6, 7	1.09
B8.Learners are made aware of the outcomes of the e-Learning content.	2	7	5.78	6	1.30
B9.Learning outcomes are displayed in the e-Learning material.	2	7	5.98	7	1.27
B10.e-Learning is easily accessible to those who have e-Learning content available for them.	2	7	5.96	7	1.28
B11.e-Learning available is of good instructional design and quality.	2	7	5.78	6	1.27
B12.The organisation has documented competencies required to fulfil specific job functions.	1	7	5.34	5	1.39
B13.Learners are aware of the competencies required for their role / job profile.	2	7	5.12	5	1.26
B14.e-Learning outcomes are aligned to individual competencies.	1	7	4.88	5	1.45
B15.e-Learning is used to develop individual competencies in the organisations.	1	7	5.20	6	1.46
B16.Each individual in the organisation has a documented role / job profile.	2	7	5.62	7	1.48
B17.Employees know and understand their role / job profile.	2	7	5.36	6	1.22
B18.Role / job profiles are based on a combination of individual competencies.	2	7	5.30	6	1.25
B19.The organisation makes use of Key Performance Indicators at a business unit / division level.	2	7	6.08	6	1.03
B20.The organisation makes use of Key Performance Indicators at an individual level.	2	7	5.94	6	1.11
B21.Each individual in the organisation has documented Key Performance Indicators.	1	7	5.80	6, 7	1.40
B22.Individual Key Performance Indicators are based on the role / job profile which each individual performs.	2	7	5.80	6	1.29
B23.Individual performance against Key Performance Indicators is reviewed at least annually.	3	7	6.20	7	0.93
B24.The organisation makes use of Performance Development Plans / Contracts to drive knowledge and skills development.	3	7	5.86	7	1.16
B25.Each individual in the organisation has a Performance Development Plan / Contract.	2	7	5.58	6	1.46
B26.Performance Development Plans / Contracts contain individual competencies which need to be developed.	2	7	5.58	6	1.28
B27.e-Learning content is placed on Performance Development Plans / Contracts to develop competencies.	1	7	4.52	6	1.76
B28.Individuals' performance is reviewed at least annually against their Performance Development Plan / Contract.	2	7	5.72	6, 7	1.39
B29.e-Learning programmes are blended with opportunities to collaborate and discuss the subject matter with others.	1	7	4.52	6	1.89
B30.The organisation provides opportunities for collaborative learning face to face.	1	7	5.94	7	1.30
B31.The organisation provides opportunities for collaborative learning electronically.	1	7	4.82	6	1.75

Overall responses tended to be uniform and negatively skewed which means respondents tended to agree with all the questions.

5.4. e-Learning effectiveness – Survey construct C

The third construct of the questionnaire contained questions relating to the effectiveness of the e-Learning programmes within the organisation. The questions asked were aligned to the commonly used five levels of learning programme evaluation; reaction, learning, behaviour, results and ROI. All questions in this section were also compulsory in order to obtain the necessary information about e-Learning programme effectiveness in the environment. Table 5.7 below details the frequency analysis of each question in this section of the questionnaire. A 7-point likert scale was used for all questions with a response range between "Strongly Disagree" (numerical value = 1) and "Strongly Agree" (numerical value = 7). Table 5.8 below details the minimum and maximum response values, mean, mode and standard deviation for each question.

Table 5.7 – Survey Response Frequencies (Construct C)

Question	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
C1.Learner reactions to e-Learning content / programmes are measured.	6%	24%	8%	2%	22%	22%	16%
C2.Learners enjoy e-Learning content / programmes.	0%	6%	8%	28%	22%	30%	6%
C3.Learners provide positive feedback about e-Learning content / programmes.	0%	8%	14%	18%	22%	30%	8%
C4.Learner knowledge is assessed before (pre) e-Learning takes place.	6%	20%	14%	10%	22%	22%	6%
C5.Learner knowledge is assessed after (post) e-Learning takes place.	2%	8%	8%	10%	16%	32%	24%
C6.Individual learning / knowledge gain can be demonstrated as a result of e-Learning undertaken.	0%	10%	18%	10%	22%	34%	6%
C7.Skills are acquired or improved through the use of e-Learning.	0%	6%	6%	20%	14%	40%	14%
C8.e-Learning provides learners with knowledge of the behavioural changes required of them.	2%	10%	6%	10%	28%	36%	8%
C9.Learners change their behaviour as a result of the e-Learning.	2%	4%	10%	26%	32%	22%	4%
C10. The learners' working environment is conducive to behaviour change required to improve performance.	2%	6%	12%	16%	30%	30%	4%
C11.Knowledge / skills gained from e-Learning lead to improved job performance.	0%	4%	4%	22%	22%	40%	8%
C12.Knowledge / skills gained from e-Learning lead to improved attitude or motivation.	2%	4%	8%	28%	14%	40%	4%
C13. Knowledge / skills gained from e-Learning lead to a positive change in behaviour.	2%	4%	10%	32%	24%	20%	8%
C14.e-Learning interventions are implemented with the intention of achieving financial saving or reward for the organisation.	0%	4%	4%	12%	20%	36%	24%
C15.A Financial saving or reward for the organisation can be directly attributed to e-Learning interventions undertaken.	0%	6%	16%	24%	24%	18%	12%
C16.Financial saving or reward directly attributed to e-Learning interventions undertaken is measured.	6%	18%	26%	16%	10%	16%	8%

Table 5.8 – Survey Response Statistics (Construct C)

Question	Minimum	Maximum	Mean	Mode	Standard Deviation
C1.Learner reactions to e-Learning content / programmes are measured.	1	7	4.40	2	2.01
C2.Learners enjoy e-Learning content / programmes.	2	7	4.80	6	1.29
C3.Learners provide positive feedback about e-Learning content / programmes.	2	7	4.76	6	1.44
C4.Learner knowledge is assessed before (pre) e-Learning takes place.	1	7	4.12	5, 6	1.78
C5.Learner knowledge is assessed after (post) e-Learning takes place.	1	7	5.22	6	1.66
C6.Individual learning / knowledge gain can be demonstrated as a result of e-Learning undertaken.	2	7	4.70	6	1.50
C7.Skills are acquired or improved through the use of e-Learning.	2	7	5.18	6	1.40
C8.e-Learning provides learners with knowledge of the behavioural changes required of them.	1	7	4.92	6	1.51
C9.Learners change their behaviour as a result of the e-Learning.	1	7	4.64	5	1.27
C10. The learners' working environment is conducive to behaviour change required to improve performance.	1	7	4.72	5, 6	1.39
C11.Knowledge / skills gained from e-Learning lead to improved job performance.	2	7	5.14	6	1.21
C12.Knowledge / skills gained from e-Learning lead to improved attitude or motivation.	1	7	4.84	6	1.36
C13. Knowledge / skills gained from e-Learning lead to a positive change in behaviour.	1	7	4.64	4	1.35
C14.e-Learning interventions are implemented with the intention of achieving financial saving or reward for the organisation.	2	7	5.52	5	1.31
C15.A Financial saving or reward for the organisation can be directly attributed to e-Learning interventions undertaken.	2	7	4.68	4, 5	1.42
C16.Financial saving or reward directly attributed to e-Learning interventions undertaken is measured.	1	7	3.86	3	1.74

Overall responses tended to be uniform and negatively skewed which means respondents tended to agree with all the questions.

5.5. *Research question one – What is the relationship between learning environment interconnectedness and the effectiveness of e-Learning programmes?*

The survey data was collected in an attempt to answer the four primary research questions posed in this study. The first research question explores the relationship between the corporate learning environment and the effectiveness of e-Learning programmes within these environments.

Respondents were asked a total of 31 questions relating to their corporate learning environment and a further 16 questions relating to the perceived e-Learning programme effectiveness within their organisation. These 47 questions were combined into various variables and scales, as discussed in chapter four. The relationship between the learning environment and e-Learning effectiveness was tested using a correlation analysis between the learning environment component variables; e-Learning content, learning outcomes, competencies, organisational strategy, role profiles, PDPs, collaboration and KPIs and the learning environment interconnections; e-Learning content link to learning outcomes, learning outcomes link to competencies, competencies link to organisational strategy, competencies link to role profiles, role profiles link to employees, employees link to KPIs, role profiles link to KPIs, employees link to PDPs, competencies link to PDPs and employees link to collaboration.

Correlation is used to determine the direction and strength of a linear relationship between variables (Pallant, 2011). Pearson correlation analysis was used for its ability to determine whether a significant relationship exists between two numeric variables (Hatcher, 2003). In the analysis conducted on the survey data collected, the significance of the relationship between each level of e-Learning effectiveness and each component and interconnection within the learning environment was tested.

The correlation coefficient determines the nature of the relationship between the variables (Hatcher, 2003). The size of the correlation coefficient indicates the strength of the relationship between the two variables (Hatcher, 2003). When the relationship between the variables is strong, one is able to predict values of the one variable from the other with a high degree of accuracy (Hatcher, 2003). According to Hatcher (2003) a correlation coefficient of approximately 0.80 indicates a strong relationship, a coefficient of approximately 0.50 indicates a moderate relationship while a coefficient of approximately 0.20 represents a weak correlation.

The probability value (p value) in a correlation analysis represents the significance of the relationship between the variables indicating that a large correlation coefficient (in absolute value) would be obtained if the null hypothesis was found to be true (Hatcher, 2003). A p value smaller than 0.05 would lead to rejecting the null hypothesis making the relationship significant.

5.5.1. Results of correlation analysis

The first correlation analysis shown in Table 5.9 below tested the relationship between the e-Learning programme effectiveness scales, level I through to level V as well as the combined effectiveness scale and the eight learning environment components.

Table 5.9 – Corporate Learning Environment Components to e-Learning Effectiveness Correlation

	Learning content	Learning outcomes	Competencies	Org Strategy	Role profiles	PDP	Collaboration	KPIs
Level I	0.527**	0.629**	0.420**	0.229	0.099	0.366**	0.611**	0.115
Level II	0.522**	0.479**	0.315*	0.226	0.234	0.391**	0.494**	0.239
Level III	0.460**	0.455**	0.497**	0.410**	0.475**	0.408**	0.450**	0.334*
Level IV	0.484**	0.362**	0.356*	0.120	0.123	0.157	0.406**	0.231
Level V	0.539**	0.596**	0.399**	0.222	0.337*	0.444**	0.508**	0.192
Effectiveness	0.583**	0.580**	0.448**	0.273	0.282*	0.408**	0.570**	0.252

** p <0.01; * p <0.05; N =50

A positive relationship was found between all levels of e-Learning programme evaluation and all learning environment components. Examining the combined effectiveness scale as our primary variable of analysis for the relationship between the learning environment and e-Learning programme effectiveness, this variable was found to have a statistically significant moderately strong relationship with e-Learning content, learning outcomes, competencies, PDPs and collaboration in the environment. A statistically significant but weak relationship was found between e-Learning effectiveness and role profiles while an insignificant, weak relationship was found between e-Learning effectiveness and organisational strategy as well as KPIs in the environment.

The next correlation analysis shown in Table 5.10 below tested the relationship between the e-Learning programme effectiveness scales, level I through to level V as well as the combined effectiveness scale and the ten learning environment interconnections.

Table 5.10 – Corporate Learning Environment Interconnections to e-Learning Effectiveness Correlation

	Learning content-Learning outcomes	Learning outcomes-Competencies	Competencies-Org Strategy	Competencies-Role profiles	Role profiles-Employees	Employees-KPIs	Role profiles-KPIs	Employees-PDP	Competencies-PDP	Employees-Collaboration
Level I	0.629**	0.480**	0.451**	0.287*	0.099	0.148	0.144	0.234	0.393**	0.519**
Level II	0.499**	0.423**	0.425**	0.244	0.234	0.251	0.237	0.225	0.390**	0.407**
Level III	0.491**	0.513**	0.562**	0.409**	0.475**	0.303*	0.349*	0.191	0.419**	0.463**
Level IV	0.396**	0.411**	0.373**	0.335*	0.123	0.243	0.168	0.028	0.341*	0.401**
Level V	0.613**	0.423**	0.362**	0.219	0.337*	0.295*	0.323*	0.299*	0.350*	0.457**
Effectivenes	0.603**	0.514**	0.497**	0.336*	0.282*	0.281*	0.275	0.227	0.436**	0.514**

** p <0.01; * p <0.05; N =50

A positive relationship was found between all e-Learning programme effectiveness levels and all learning environment interconnections. Examining the combined effectiveness scale, this variable was found to have a statistically significant moderate to strong relationship with e-Learning content having learning outcomes, a statistically significant moderate relationship with learning outcomes linked to competencies, competencies aligned to organisational strategy, competencies mapped to PDPs and employees collaborating. A statistically significant but weak relationship was found between e-Learning effectiveness and competencies mapped to role profiles, employees having role profiles and employees having KPIs. An insignificant, weak relationship was found between e-Learning effectiveness and role profiles linked to KPIs and employees having PDPs.

5.5.2. Results of regression analysis

Three regression models were developed to further investigate the relationship between e-Learning programme effectiveness and the corporate learning environment. Like correlation analysis, regression analysis is conducted to determine whether a relationship exists between variables (Hatcher, 2003).

A regression model tests whether the criterion variable can be predicted by the effects of the predictor variables (Hatcher, 2003). In this research the dependent or criterion variable in all the models is e-Learning effectiveness as represented by the combined e-Learning effectiveness scale and the predictor variables are the individual learning environment components and interconnections.

These models were designed to determine the predictive power of the existence of specific components and their interconnectivity in the corporate learning environment on the effectiveness of e-Learning programmes in the organisation.

5.5.3. Regression model one - Multicolinearity analysis

Multicolinearity exists when the independent variables in a regression model are highly correlated causing the model to have inflated results (Pallant, 2011). A multicolinearity analysis (shown in Table 5.11 below) was run on the predictor variables in the first model to determine if there was multicolinearity between the variables. Multicolinearity analysis related columns are shaded in grey in the regression model tables below.

The degree of multicolinearity is determined by the Variance Inflation value. A variance inflation value higher than 10 would indicate the existence of multicolinearity (Pallant, 2011). It can therefore be confirmed that there is no multicolinearity between the predictor variables in the first regression model.

5.5.4. Regression model one – environmental components as predictors of e-Learning programme effectiveness

Once multicolinearity is ruled out, the interpretation of the model can continue. In the first regression model shown in Table 5.11 below, the criterion variable is e-Learning programme effectiveness and the predictor variables are the learning environment components. This model intends to determine the relationship and predictive power of the existence of these components in a corporate learning environment on e-Learning programme effectiveness.

Table 5.11 – Regression Model One – Corporate Learning Environment Components

R-Square =	**0.453**
Adjusted R-Square =	**0.346**
P	**<0.01**
F =	**4.24**

Variable	Parameter Estimate	Standard Error	t Value	Pr > |t|	Tolerance	Variance Inflation
Intercept	0.4055	1.0569	0.38	0.7032		0
e-Learning content	0.2825	0.2804	1.01	0.3196	0.2598	3.8497
Learning outcomes	0.2223	0.2224	1.00	0.3233	0.2682	3.7287
Competencies	0.1009	0.1731	0.58	0.5632	0.3688	2.7117
Org Strategy	-0.1527	0.1665	-0.92	0.3644	0.5873	1.7026
Role profiles	0.0532	0.1441	0.37	0.7137	0.4927	2.0298
PDP	0.0092	0.1545	0.06	0.9527	0.4714	2.1216
Collaboration	0.2605	0.1757	1.48	0.1459	0.3856	2.5936
KPIs	0.0006	0.1631	0.00	0.9972	0.5980	1.6723

In a regression model, like in a correlation analysis, it is important to note the p value which determines whether the model constructed is statistically significant. A p value equal to or below 0.05 indicates that the model is statistically significant (Hatcher, 2003). The p value of regression model one depicted above is smaller than 0.01, meaning that the model is statistically significant.

Seeing that the model itself is significant, the next important value to look at in the regression model is the coefficient of determination or “R-Square” as it indicates the proportion of the variability in the criterion variable that can be attributed to the values

of the predictor variables (Hatcher, 2003). The higher the value of this coefficient between 0.00 and 1.00 the more predictive power the model has.

In this model, the coefficient of determination value is 0.453, meaning that as much as 45.3% of the variability in e-Learning effectiveness can be explained by the existence of these eight components in the corporate learning environment.

Understanding that this is a relatively small sample of N = 50, it is recommended that the Adjusted R-Square is also examined as the R-Square in smaller samples tends to be optimistic. The adjusted R-Square may be a better estimate of the true population value in case the R-Square value is overestimated (Pallant, 2011). The adjusted R-Square value for this model is 0.346 which still accounts for 34.6% of the variance.

Each of the predictor variables has individual parameter estimates which indicate the strength of the predictor in the model (Howell, 2008). The parameter estimates in this model ranged between -0.153 which indicates a negative relationship (Howell, 2008) with e-Learning programme effectiveness and 0.282 which reflects a positive relationship with e-Learning programme effectiveness (Howell, 2008).

5.5.5. Regression model two - Multicolinearity analysis

As with the first model, a multicolinearity analysis was run (shown in Table 5.12 below) and it was revealed that there was no evidence of multicolinearity between the predictor variables in the second regression model.

5.5.6. Regression model two – environmental connectivity elements as predictors of e-Learning programme effectiveness

In the second regression model shown in Table 5.12 below, the criterion variable is e-Learning programme effectiveness and the predictor variables are the learning environment interconnectedness elements. This model intends to determine the relationship and predictive power of the existence interconnections between components in the learning environment on e-Learning programme effectiveness.

Table 5.12 – Regression Model Two – Corporate Learning Environment Interconnections

R-Square =	**0.485**
Adjusted R-Square =	**0.354**
P	**<0.01**
F =	**3.68**

Variable	Parameter Estimate	Standard Error	t Value	Pr > |t|	Tolerance	Variance Inflation
Intercept	0.1471	1.0523	0.14	0.8895		0
e-Learning content -Learning outcomes	0.4758	0.1855	2.57	0.0143	0.4250	2.3527
Learning outcomes-Competencies	-0.1547	0.1833	-0.84	0.4038	0.2525	3.9608
Competencies-Org Strategy	0.0821	0.1338	0.61	0.5432	0.5099	1.9612
Competencies-Role profiles	0.0211	0.1407	0.15	0.8814	0.5089	1.9650
Role profiles-Employees	0.0974	0.1781	0.55	0.5876	0.3189	3.1360
Employees-KPIs	0.0432	0.2161	0.20	0.8425	0.2950	3.3899
Role profiles-KPIs	-0.0028	0.2054	-0.01	0.9893	0.2229	4.4862
Employees-PDP	-0.1957	0.1712	-1.14	0.2598	0.3306	3.0249
Competencies-PDP	0.1571	0.1931	0.81	0.4208	0.2282	4.3816
Employees-Collaboration	0.2827	0.1258	2.25	0.0304	0.5485	1.8231

The p value of the second regression model is also smaller than 0.01, meaning that this model is also statistically significant. The coefficient of determination value is 0.485, meaning that as much as 48.5% of the variability in e-Learning programme effectiveness can be explained by the existence of interconnections in the corporate learning environment. The adjusted R-Square value is 0.354 explaining as much as 35.4% of variability in e-Learning programme effectiveness.

Each of the predictor variables have individual parameter estimate which indicate the strength of the predictor in the model (Howell, 2008). The parameter estimates in this model ranged between -0.196 and 0.476 which reflect the direction of the relationship of each component with e-Learning programme effectiveness (Howell, 2008).

5.5.7. Regression model three – The whole corporate learning environment as a predictor of e-Learning programme effectiveness

The third regression model, shown in Table 5.13 below employed the combined learning environment scale (components and interconnections) as the predictor variable of the criterion variable, e-Learning programme effectiveness. This model intends to determine the relationship and predictive power of the learning environment as a whole on e-Learning programme effectiveness.

Table 5.13 – Regression Model Three – Combined Corporate Learning Environment

R-Square =	0.364
Adjusted R-Square =	0.351
P	<0.01
F =	27.48

Variable	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	0.2720	0.8648	0.31	0.7545
combine	0.7993	0.1525	5.24	<.0001

The p value of the third regression model is also smaller than 0.01, meaning that this model is statistically significant. The coefficient of determination value is 0.364, meaning that as much as 36.4% of the variability in e-Learning effectiveness can be explained by the learning environment in which they exist. The adjusted R-Square value is slightly lower at 0.351 explaining as much as 35.1% of variability in e-Learning programme effectiveness.

The predictor variable "combine" was found to have a high parameter estimate of 0.7993 which indicates that this is a strong predictor (Howell, 2008) of e-Learning programme effectiveness.

5.6. Research question two – Which of the learning environment components are the strongest predictors of e-Learning programme effectiveness?

The second research question posed investigates which of the learning environment elements and interconnectivity elements are the strongest predictors of e-Learning programme effectiveness within corporate organisations.

To answer this research question, ten stepwise regression models were constructed. Two models were developed for each level of e-Learning programme effectiveness, each aiming to identify the strongest predictors (components and / or interconnections) of that level of e-Learning effectiveness evaluation. Each model presented below displays all variables which entered the stepwise regression model meeting the entry criterion of $p<0.15$. Variables with a p value between 0.05 and 0.15 which are not significant at an academic level (95% confidence level) have been included for information purposes only and are shaded in grey in the tables below.

5.6.1. E-Learning programme effectiveness at Level I – Learning environment components as predictors

In this model, shown in Table 5.14 below, the criterion variable is level I of e-Learning programme effectiveness, reaction. Three predictors met the p<0.15 criterion to enter the model.

Table 5.14 – Stepwise Regression Model (Level I – Components)

R-Square =	**0.524**
P	**<0.01**

Variable Entered	Partial R-Square	Model R-Square	Pr > F
Learning outcomes	0.3951	0.3951	<.0001
Collaboration	0.1003	0.4954	0.0037
Role profiles	0.0283	0.5237	0.1051

The learning environment component stepwise regression model for e-Learning programme effectiveness level I was found to be statistically significant with a p value smaller than 0.01 and an R-Square value of 0.524 meaning that as much as 52.4% of variability in level I of e-Learning programme effectiveness can be explained by the existence of these three corporate learning environment components.

The three strongest predictor variables were found to be learning outcomes with a Partial R-Square of 0.3951 (40%), collaboration with a Partial R-Square of 0.1003 (10%) and role profiles with a Partial R-Square of 0.0283 (3%). The partial R-Square shows the percentage of variance explained by each of the predictors in the stepwise regression model (Albright, Winston, & Zappe, 2009).

5.6.2. E-Learning programme effectiveness at Level I – Learning environment connectivity elements as predictors

In this model, shown in Table 5.15 below, the criterion variable is level I e-Learning programme effectiveness, reaction. Two predictors met the p<0.15 criterion to enter the model.

Table 5.15 – Stepwise Regression Model (Level I – Interconnections)

R-Square =	**0.480**
P	**<0.01**

Variable Entered	Partial R-Square	Model R-Square	Pr > F
e-Learning content -Learning outcomes	0.3960	0.3960	<.0001
Employees-Collaboration	0.0837	0.4797	0.0085

The learning environment interconnectedness stepwise regression model for e-Learning programme effectiveness level I was found to be statistically significant with a p value smaller than 0.01 and an R-Square value of 0.480 meaning that as much as 48% of variability in level I of e-Learning programme effectiveness can be explained by the interconnectedness between these corporate learning environment components.

The two strongest predictor variables were found to be e-Learning content having learning outcomes with a Partial R-Square of 0.3960 (40%) and employees collaborating with a Partial R-Square of 0.0283 (3%).

5.6.3. E-Learning programme effectiveness at Level II – Learning environment components as predictors

In this model, shown in Table 5.16 below, the criterion variable is level II of e-Learning programme effectiveness, learning. Two predictors met the p<0.15 criterion to enter the model.

Table 5.16 – Stepwise Regression Model (Level II – Components)

R-Square =	**0.320**
P	**<0.01**

Variable Entered	Partial R-Square	Model R-Square	Pr > F
e-Learning content	0.2726	0.2726	0.0001
Collaboration	0.0475	0.3202	0.0762

The learning environment component stepwise regression model for e-Learning programme effectiveness level II was found to be statistically significant with a p value smaller than 0.01 and an R-Square value of 0.320 meaning that as much as 32% of variability in level II of e-Learning programme effectiveness can be explained by the existence of these two corporate learning environment components.

The two strongest predictor variables were found to be e-Learning content with a Partial R-Square of 0.2726 (27%) and collaboration with a Partial R-Square of 0.0475 (5%).

5.6.4. E-Learning programme effectiveness at Level II – Learning environment connectivity elements as predictors

In this model, shown in Table 5.17 below, the criterion variable is level II of e-Learning programme effectiveness, learning. Two predictors met the p<0.15 criterion to enter the model.

Table 5.17 – Stepwise Regression Model (Level II – Interconnections)

R-Square =	**0.299**
P	**<0.01**

Variable Entered	Partial R-Square	Model R-Square	Pr > F
e-Learning content -Learning outcomes	0.2487	0.2487	0.0002
Employees-Collaboration	0.0503	0.2989	0.0727

The learning environment interconnectedness stepwise regression model for e-Learning programme effectiveness level II was found to be statistically significant with a p value smaller than 0.01 and an R-Square value of 0.299 meaning that as much as 29.9% of variability in level II of e-Learning programme effectiveness can be explained by the interconnectedness between these corporate learning environment components.

The two strongest predictor variables were found to be e-Learning content having learning outcomes with a Partial R-Square of 0.2487 (25%) and employees collaborating with a Partial R-Square of 0.0503 (5%).

5.6.5. E-Learning programme effectiveness at Level III – Learning environment components as predictors

In this model, shown in Table 5.18 below, the criterion variable is level III of e-Learning programme effectiveness, behaviour. Three predictors met the p<0.15 criterion to enter the model.

Table 5.18 – Stepwise Regression Model (Level III – Components)

R-Square =	0.381
P	<0.01

Variable Entered	Partial R-Square	Model R-Square	Pr > F
Competencies	0.2472	0.2472	0.0002
e-Learning content	0.0853	0.3325	0.018
Role profiles	0.0481	0.3806	0.065

The learning environment component stepwise regression model for e-Learning programme effectiveness level III was found to be statistically significant with a p value smaller than 0.01 and an R-Square value of 0.381 meaning that as much as 38.1% of variability in level III of e-Learning programme effectiveness can be explained by the existence of these corporate learning environment components.

The three strongest predictor variables were found to be competencies with a Partial R-Square of 0.2472 (25%), e-Learning content with a Partial R-Square of 0.0853 (9%) and role profiles with a Partial R-Square of 0.0481 (5%).

5.6.6. E-Learning programme effectiveness at Level III – Learning environment connectivity elements as predictors

In this model, shown in Table 5.19 below, the criterion variable is level III of e-Learning programme effectiveness, behaviour. Three predictors met the p<0.15 criterion to enter the model.

Table 5.19 – Stepwise Regression Model (Level III – Interconnections)

R-Square =	0.440
P	<0.01

Variable Entered	Partial R-Square	Model R-Square	Pr > F
Competencies-Org Strategy	0.3154	0.3154	<.0001
Employees-Collaboration	0.0639	0.3793	0.0327
Role profiles-Employees	0.0606	0.4399	0.0306

The learning environment interconnectedness stepwise regression model for e-Learning programme effectiveness level III was found to be statistically significant with a p value smaller than 0.01 and an R-Square value of 0.440 meaning that as much as 44% of variability in level III of e-Learning programme effectiveness, behaviour can be

explained by the interconnectedness between these corporate learning environment components.

The three strongest predictor variables were found to be competencies being aligned with organisational strategy with a Partial R-Square of 0.3154 (32%), employees collaborating with a Partial R-Square of 0.0639 (6%) and employees having role profiles with a Partial R-Square of 0.0606 (6%).

5.6.7. E-Learning programme effectiveness at Level IV – Learning environment components as predictors

In this model, shown in Table 5.20 below, the criterion variable is level IV of e-Learning programme effectiveness, results. Three predictors met the p<0.15 criterion to enter the model.

Table 5.20 – Stepwise Regression Model (Level IV – Components)

R-Square =	**0.305**
P	**<0.01**

Variable Entered	Partial R-Square	Model R-Square	Pr > F
e-Learning content	0.2346	0.2346	0.0004
Competencies	0.0344	0.2690	0.1436
Org Strategy	0.0360	0.3050	0.1297

The learning environment component stepwise regression model for e-Learning programme effectiveness level IV was found to be statistically significant with a p value smaller than 0.01 and an R-Square value of 0.305 meaning that as much as 30.5% of variability in level IV of e-Learning programme effectiveness can be explained by the existence of these corporate learning environment components.

The three strongest predictor variables were found to be e-Learning content with a Partial R-Square of 0.2346 (23%), organisational strategy with a Partial R-Square of 0.0360 (3%) and competencies with a Partial R-Square of 0.0344 (3%).

5.6.8. E-Learning programme effectiveness at Level IV – Learning environment connectivity elements as predictors

In this model, shown in Table 5.21 below, the criterion variable is level IV of e-Learning programme effectiveness, results. Two predictors met the p<0.15 criterion to enter the model.

Table 5.21 – Stepwise Regression Model (Level IV – Interconnections)

R-Square =	**0.207**
P	**<0.01**

Variable Entered	Partial R-Square	Model R-Square	Pr > F
Learning outcomes-Competencies	0.1689	0.1689	0.003
Employees-Collaboration	0.0377	0.2065	0.142

The learning environment interconnectedness stepwise regression model for e-Learning programme effectiveness level IV was found to be statistically significant with a p value smaller than 0.01 and an R-Square value of 0.207 meaning that as much as 20.7% of variability in level IV of e-Learning programme effectiveness can be explained by the interconnectedness between these corporate learning environment components.

The two strongest predictor variables were found to be learning outcomes being aligned to competencies with a Partial R-Square of 0.1689 (17%) and employees collaborating with a Partial R-Square of 0.0377 (4%).

5.6.9. E-Learning programme effectiveness at Level V – Learning environment components as predictors

In this model, shown in Table 5.22 below, the criterion variable is level V of e-Learning programme effectiveness, ROI. Two predictors met the p<0.15 criterion to enter the model.

Table 5.22 – Stepwise Regression Model (Level V – Components)

R-Square =	**0.401**
P	**<0.01**

Variable Entered	Partial R-Square	Model R-Square	Pr > F
Learning outcomes	0.3549	0.3549	<.0001
Collaboration	0.0464	0.4013	0.0625

The learning environment component stepwise regression model for e-Learning programme effectiveness level V was found to be statistically significant with a p value smaller than 0.01 and an R-Square value of 0.401 meaning that as much as 40.1% of variability in level V of e-Learning programme effectiveness can be explained by the existence of these corporate learning environment components.

The two strongest predictor variables were found to be learning outcomes with a Partial R-Square of 0.3549 (36%) and collaboration with a Partial R-Square of 0.0464 (5%).

5.6.10. E-Learning programme effectiveness at Level V – Learning environment connectivity elements as predictors

In this model, shown in Table 5.23 below, the criterion variable is level V of e-Learning programme effectiveness, ROI. Two predictors met the p<0.15 criterion to enter the model.

Table 5.23 – Stepwise Regression Model (Level V – Interconnections)

R-Square =	**0.428**
P	**<0.01**

Variable Entered	Partial R-Square	Model R-Square	Pr > F
e-Learning content -Learning outcomes	0.3760	0.3760	<.0001
Employees-Collaboration	0.0523	0.4283	0.0437

The learning environment interconnectedness stepwise regression model for e-Learning programme effectiveness level V was found to be statistically significant with a p value smaller than 0.01 and an R-Square value of 0.428 meaning that as much as 42.8% of variability in level V of e-Learning programme effectiveness can be explained by the interconnectedness between these corporate learning environment components.

The two strongest predictor variables were found to be e-Learning content having learning outcomes with a Partial R-Square of 0.3760 (38%) and employees collaborating with a Partial R-Square of 0.0523 (5%).

5.6.11. E-Learning programme effectiveness summary

The significant ($p<0.05$) and borderline significant ($0.05<p<0.15$) variables found through this analysis are summarised in Table 5.24 below which lists each of the predictors at their level of significance along with their partial R-Square in brackets. Borderline significant variables have been marked in red and are italicised.

Table 5.24 – Predictor Variables Summary (By Level)

Effectiveness Level	Strongest predictors
Level I - Reaction	**Component** Learning outcomes (0.3951) Collaboration (0.1003) *Role profiles (0.0283)*
	Connectivity e-Learning content -Learning outcomes (0.3960) Employees-Collaboration(0.0837)
Level II - Learning	**Component** e-Learning content (0.2726) *Collaboration (0.0475)*
	Connectivity e-Learning content -Learning outcomes (0.2487) *Employees-Collaboration (0.0503)*
Level III - Behaviour	**Component** Competencies (0.2472) e-Learning content (0.0853) *Role profiles (0.0481)*
	Connectivity Competencies-Org Strategy (0.3154) Employees-Collaboration (0.0639) Role profiles-Employees (0.0606)
Level IV - Results	**Component** e-Learning content (0.2346) *Competencies (0.0344)* *Org Strategy (0.0360)*
	Connectivity Learning outcomes-Competencies (0.1689) *Employees-Collaboration (0.0377)*
Level V – ROI	**Component** Learning outcomes (0.3549) *Collaboration (0.0464)*
	Connectivity e-Learning content -Learning outcomes (0.3760) Employees-Collaboration (0.0523)

5.7. Research question three – To what degree do corporate organisations perceive e-Learning programmes to be effective?

The third research question investigated the degree to which corporate organisations currently perceive e-Learning programmes to be effective.

Participants were asked 16 questions relating to the various levels of e-Learning programme effectiveness in their corporate learning environments. These questions

were grouped into the five levels of evaluation as depicted in Table 5.25 below. The resulting statistical means of each of these scales which are between 1 and 7 are presented to reveal the degree to which corporate organisations perceive e-Learning programmes to be effective.

Table 5.25 – e-Learning Programme Effectiveness Results

Scale	Mean
Level I – Reaction	4.65
Level II – Learning	4.81
Level III – Behaviour	4.76
Level IV – Results	4.87
Level V – ROI	4.69
Effectiveness (Combined)	4.76

The means analysis revealed the following; Level I of e-Learning effectiveness evaluation measuring reaction achieved a mean of 4.65. Level II of e-Learning effectiveness evaluation measuring learning achieved a mean of 4.81. Level III of e-Learning effectiveness evaluation measuring behaviour achieved a mean of 4.76. Level IV of e-Learning effectiveness evaluation measuring results achieved a mean of 4.87. Level V of e-Learning effectiveness evaluation measuring ROI achieved a mean of 4.76. The overall mean for e-Learning effectiveness evaluation was 4.76. All of these mean results represent a point between the descriptors “Neither agree nor disagree” and “Somewhat agree”.

5.8. Research question four – Is the proposed corporate learning environment interconnectedness model valid?

To contribute to the validation of the proposed corporate learning environment interconnectedness model, a correlation analysis was conducted between the individual components of the corporate learning environment.

Table 5.26 – Corporate Learning Environment Inter-Component Correlations

	Learning content	Learning outcomes	Competencies	Org Strategy	Role profiles	PDP	Collaboration	KPIs
Learning content	1							
Learning outcomes	***0.81473****	1						
Competencies	0.38166**	***0.51355****	1					
Org Strategy	0.41132**	0.45261**	***0.53312****	1				
Role profiles	0.21781	0.31057*	***0.62511****	0.46024**	1			
PDP	0.46005**	0.50041**	***0.47388****	0.45846**	0.49966**	1		
Collaboration	0.61628**	0.55183**	0.60262**	0.45129**	0.33064*	0.58436**	1	
KPIs	0.35082*	0.31213*	0.41109**	0.47913**	***0.47921****	0.51001**	0.3208*	1

** p <0.01; * p <0.05; N =50

Figure 5.26 above shows the correlation coefficients between each component in the corporate learning environment. All components were found to be significantly correlated with each other at the 95% or 99% confidence level except for one relationship which was between e-Learning content and role profiles which was not a relationship proposed in the model. All correlation coefficients with the exception of this relationship were found to be between 0.31 and 0.81. The component interconnections which are proposed in the corporate learning environment interconnectedness model are marked in red and are italicised.

Table 5.27 below shows the statistical means of four of the questions in the survey which were used to determine whether or not a relationship exists between employees and certain components in the environment. These relationships could not be tested using correlation analysis because employees in the organisation was a categorical variable and not a continuous variable on which a correlation analysis could be run.

Table 5.27 – Employee to Corporate Learning Environment Component Interconnections

Relationship	Survey question number and text	Mean of the question
Employees-Role profiles	B16. Each individual in the organisation has a documented role / job profile.	5.62
Employees-PDPs	B25. Each individual in the organisation has a Performance Development Plan / Contract.	5.58
Employees-KPI	B21. Each individual in the organisation has documented Key Performance Indicators.	5.80
Employees-Collaboration	B30. The organisation provides opportunities for collaborative learning face to face.	5.94

All four relationships between employees and the components role profiles, PDPs, KPIs and collaboration reported a mean between 5.58 and 5.94 which reflects a description on the higher end between “somewhat agree” and “agree” on the seven point scale used in the survey.

5.9. Conclusion

Chapter five presented the results of the statistical analysis conducted on the data obtained from the survey administered with reference to the research questions posed. The raw data collected from the 50 responses to the questionnaire can be found in Appendix C. Chapter six will delve deeper into the data and the interpretation of the results to answer the four primary research questions of this study.

6. Chapter Six – Discussion of Results

6.1. Introduction

As stated in chapter one, human capital significantly contributes to organisational performance and competitiveness (Castillo, & del Valle, 2009). The purpose of this research was therefore to investigate the relationship between e-Learning programme effectiveness and the corporate learning environment in order to enable learning and development practitioners to make a more meaningful impact through their investment in e-Learning and create a source of differentiation for their organisation through human capital (Aguinis, & Kraiger, 2009).

The previous chapter presented the result of the research conducted. This chapter will discuss these results in light of the purpose of the research, the literature introduced in chapter two and the corporate learning environment interconnectedness model proposed in this research.

First, the significance of the demographics of the sample will be discussed, followed by a discussion of the findings in relation to the four research questions posed in chapter three.

6.2. Significance of the demographics of the sample

Four demographic questions were asked of respondents to the survey. These questions were asked in order to determine the profile of the organisation on behalf of which the response was provided. This information is relevant to determine whether the sample is representative of the population and the type of organisations which make use of e-Learning as a medium for skills development even though the sample obtained was not random.

6.2.1. Principal industry

The first demographic question was related to the principal industry in which the organisation operates. Almost half of the responses (46%) were from organisations in the financial services (32%) or information technology (14%) industries with the remainder from consulting (8%), mining (8%), manufacturing (6%), communications (4%), retail (4%), transportation (4%), healthcare (2%) and services (2%). E-Learning

being primarily suited to knowledge worker environments where communication technology is available, these responses indicate a sample which is representative of the type of organisations which typically make use of e-Learning.

6.2.2. Role level

The second demographic question was related to the role level of the individual completing the survey. 72% of respondents were occupying middle or senior management level positions with the remainder being non-management / technical / professionals (16%), executives (8%) or supervisors (4%). This is relevant because, as discussed by Stutt (2010), learning and development practitioners have yet to reach the executive boardroom in most organisations. That being the case, this sample is representative of the level of position which learning and development practitioners currently occupy.

6.2.3. Number of employees

The third demographic question was related to the number of employees in the organisation. 72% of responses were from organisations with between 1,000 and 50,000 employees. 26% of these with over 10,000 employees. The remainder of respondents being from organisations having between 101 and 500 employees (14%), 501 and 1,000 employees (8%), over 50,000 employees (4%) or between 1 and 100 employees (2%). This is relevant due to the size of organisations which implement e-Learning programmes. As it is predominantly large organisations which can afford to implement e-Learning programmes and are likely to achieve economies of scale benefits from the solution, the sample is representative of the size of organisations which implement e-Learning programmes.

6.2.4. Annual Revenue

The final demographic question was related to the annual revenue of the responding organisations. 50% of respondents had an annual revenue over R1 Billion with 22% over R10 Billion. The remainder had an annual revenue of R201 Million – R1 Billion (20%), R5 – 49 Million (8%) or R50 – 200 Million (6%). 16% of respondents did not know their organisation's annual revenue.

6.3. Research question one – What is the relationship between learning environment interconnectedness and the effectiveness of e-Learning programmes?

6.3.1. Introduction

This question was asked in order to determine the nature of the relationship, if any, between the corporate learning environment and the effectiveness of e-Learning programmes which exist in these environments. Understanding this relationship will allow learning and development practitioners to better align their learning environments to derive greater value from investments and effort in e-Learning programmes (Illeris, 2003; Wang, Ran, & Vogel, 2011).

6.3.2. Statistical analysis

The statistical analysis conducted to answer research question one was correlation analysis as well as regression modelling. These statistical techniques were used due to their ability to reveal the nature of relationships between variables (Hatcher, 2003). In the context of this research, these relationships are those between the corporate learning environment and e-Learning programme effectiveness.

Two correlation procedures were run to determine the relationship. The first was between learning environment components and e-Learning programme effectiveness and the second between component interconnectivity and e-Learning programme effectiveness.

Three regression models were also constructed to determine whether the corporate learning environment is a reliable predictor of e-learning programme effectiveness. All three models used the combined e-Learning programme effectiveness variable as the dependent or criterion variable. Regression model one used the corporate learning environment components as the predictor variables, model two used the component interconnectedness elements of the corporate learning environment as predictor variables and the third model used the combined corporate learning environment as the predictor variable.

6.3.3. Interpretation of results – Correlation analysis

6.3.3.1. Introduction to results of the correlation analysis

Two correlation studies were conducted to determine the nature of the relationship between the corporate learning environment and e-Learning programme effectiveness. The first study examined the correlation between each corporate learning environment component and e-Learning programme effectiveness at the various levels (Table 5.9) and the second examined the relationship between the interconnectivity of these components and e-Learning programme effectiveness (Table 5.10).

The correlation analysis conducted revealed that a positive, however not always significant relationship exists between all levels of e-Learning effectiveness and all components as well as interconnectivity elements within the corporate learning environment.

6.3.3.2. Results of e-Learning programme effectiveness correlation to learning environment components

With regards to components, Table 5.9 revealed that the existence of e-Learning content, documented learning outcomes, defined competencies and opportunities for collaboration within the corporate learning environment were significantly correlated at all levels of evaluation while the existence of PDPs was found to be significantly correlated at all levels with the exception of level IV. The existence of role profiles was found to be significant at an overall effectiveness level as well as levels III and V but not at levels I, II and IV.

Leimbach (2010) discusses what he refers to in his research as “learning transfer activities” which have been proven to improve the results of training programmes and our correlation findings support his research findings. According to Leimbach (2010), learning transfer activities fall into three categories, “learner readiness”, “learning transfer design” and “organisational alignment” which contain aspects such as learning outcomes, competencies, PDPs and role profile definition.

Interestingly, the existence and communication of organisational strategy as well as the existence of KPIs were only found to be significantly correlated at level III where a demonstrable behaviour change as a result of e-Learning is evaluated. This finding supports existing literature as according to Lasher (2008) and Mouzakitis (2009), the

goal of learning departments is to align learning to the organisational strategy and KPIs are the way in which organisational and individual goals are aligned (Jia, *et al*., 2011). Levels I and II of effectiveness evaluation were not found to be significantly correlated to organisational strategy and KPIs because employees do not react to or are expected to be satisfied with the existence of strategy or KPIs nor do they gain assessed knowledge from the existence of these components in the environment. It is relevant that level III, behaviour change is significantly correlated because the existence of KPIs and a clearly communicated business strategy allows individuals to adapt their behaviour accordingly which would make these guiding organisational structures significantly correlated to e-Learning programme effectiveness. In the next section, we discuss that the mere existence of these two components is not enough to prove significance at higher levels of evaluation, results and ROI but that their interconnectedness with other key components is required to become significantly correlated.

Overall, it appears that the components which employees interact with directly and are more explicit to them are those that were highly correlated to e-Learning programme effectiveness. Employees are actively engaged with e-Learning content, development of competencies, interpersonal collaboration and their personal development plans, however they are less directly involved in the alignment and communication of organisational strategy, role profile definition and KPI development which are more indirect functions.

6.3.3.3. Results of e-Learning programme effectiveness correlation to learning environment component interconnectivity

In this analysis, Table 5.10 reveals that e-Learning content having clear learning outcomes, learning outcomes being linked to specific competencies, competencies reflecting the requirements set out by the organisation's strategy, competencies being reflected on PDPs as well as employees collaborating were all significantly correlated at all levels of e-Learning effectiveness evaluation.

Areas relating to role profiles and KPIs which employees are not directly engaged with and are defined by the organisation's human resources and line functions were found to be significant at more of the levels when interconnected than they were as individual components only but still not at all levels. All but one of the component interconnections were found to be significant at level III as was the case with all

individual component correlations. This finding reinforces the trend that the environment plays an important role in driving behaviour change in employees through e-Learning interventions. This supports the literature stating that factors such as collaboration and PDPs have been found to specifically impact the area of behaviour change (Armstrong, 2009; Cheng, *et al*., 2011; Chikh, & Berkani, 2010).

The correlation between employees having PDPs and e-Learning programme effectiveness was the only interconnection not found to be significantly correlated at level III of evaluation. It was found to be relatively weak overall and was only found to be significant at level V of evaluation where ROI is evaluated. Level V is of great interest to practitioners and executives alike so it is important to explore why this relationship was significant at this level but not others. Learning, behaviour change or observable performance improvement would be required in order for a financial return to be achieved, however, this result is potentially due to the fact that only 56% of respondents agree that e-Learning content is placed on individuals' PDPs.

It is important to note that although existence and communication of organisational strategy was only found to be significantly correlated at level III as an individual component, organisational strategy driving the definition of required competencies (Organisational strategy linked to competencies in the model) as a connectivity element was found to be significantly correlated at the 99% confidence level at all levels of evaluation. This finding supports the importance of an interconnected corporate learning environment.

6.3.3.4. Summary of correlation analysis results

It can be concluded that there is a high degree of correlation and a significant positive relationship between the corporate learning environment and e-Learning programme effectiveness.

A key finding from the correlation analysis between the corporate learning environment and e-Learning programme effectiveness is that the components which employees are directly engaged with on a daily basis (e-Learning content, learning outcomes, competency development, individual performance development plans and collaboration) are the most highly correlated to e-Learning programme effectiveness while those which are defined by the organisation (Strategy, role profiles and KPIs) in functions such as organisational development and job design are less significant in

driving e-Learning programme results. Perhaps having employees themselves more involved in the definition of these structures will create a higher level of engagement and ultimately drive better business results and returns.

Another key finding is that the corporate learning environment is especially significant when it comes to driving a change in behaviour (level III of evaluation). 17 of the 18 variables tested were found to be significantly correlated with driving behaviour change through e-Learning programmes as defined by Kirkpatrick and Kirkpatrick (2006). Whether that translates to improved results and financial return on the investment in e-Learning would depend on the value of the taught behaviour to the organisation. Learners, as expected, will learn the material provided, however, the alignment of strategy to skills development will determine the ultimate value of the learning to the organisation. Interestingly, 16 of the 18 variables tested were also found to be significantly correlated with return on investment achieved through e-Learning programmes which means that effective e-Learning programmes are likely to yield a positive financial return as defined by Biech (2008).

6.3.4. Interpretation of results – Regression models

6.3.4.1. Introduction to results of the regression analysis

Three regression models were developed and tested to determine the predictive properties of the corporate learning environment on e-Learning programme effectiveness and to reinforce the results of the correlation analysis. The first regression model employed the corporate learning environment components as predictors of e-Learning programme effectiveness (Table 5.11), the second employed the interconnectivity elements between the components as predictors (Table 5.12) and the third employed the corporate learning environment as a whole as a predictor of e-Learning programme effectiveness (Table 5.13).

All three regression models were found to be significant at the 99% confidence level and explained a high amount of the variability in e-Learning programme effectiveness. Multicolinearity was also tested and was not found to be present meaning that the results of the models were not inflated by interaction between the predictor variables (Pallant, 2011).

6.3.4.2. Results of regression model one

Regression model one (Table 5.11) which used corporate learning environment components as predictors of e-Learning programme effectiveness was found to be statistically significant, explaining as much as 45% of the variability in e-Learning programme effectiveness.

Reflecting similar results to the correlation analysis conducted, organisational level components which employees are not directly engaged with (Strategy, Role profiles and KPIs) as well as PDPs were found to be poorer predictors of e-Learning programme effectiveness based on their parameter estimates while those with which there is direct engagement (e-Learning content, learning outcomes, competencies and collaboration) were found to be better predictors with e-Learning content, learning outcomes and collaboration strongest overall. This finding supports Illeris (2003) and Wang, Ran, and Vogel (2011) who suggest that the e-Learning content as well as the social context are key components in the workplace learning environment.

6.3.4.3. Results of regression model two

Regression model two (Table 5.12) which used interconnectivity elements between the corporate learning environment components as predictors of e-Learning programme effectiveness was found to be statistically significant, explaining as much as 48.5% of the variability in e-Learning programme effectiveness. This is fractionally higher than model one which used individual components, indicating that interconnectivity in the environment is as important if not slightly more important than the components themselves.

Reflecting similar results to the correlation analysis conducted, connectivity elements relating to strategy, role profiles, KPIs and PDPs were found to be poor predictors and in some cases negative contributors to e-Learning programme effectiveness. e-Learning content having clearly defined learning outcomes which are important for employees to determine the utility of specific content (MacLean, & Scott, 2011) for their development as well as the availability of collaboration opportunities between employees which as stated by Yu and Kuo (2012) is vital for learning programme success were found to be strong predictor variables in the second regression model as well which also supports existing literature.

6.3.4.4. Results of regression model three

Regression model three (Table 5.13) which used the corporate learning environment as a whole (components and interconnectivity) as a predictor of e-Learning programme effectiveness was also found to be statistically significant, explaining as much as 36% of the variability in e-Learning programme effectiveness. Although this model has weaker explanatory power than the previous two models which used employed the components and interconnectivity elements separately, in the field of human resources research this is still a respectable degree of explanatory power (Howell, 2008).

Supporting the results of the individual models discussed above, the combined environment predictor was found to be a strong predictor variable in this model confirming that the corporate learning environment as a whole is a strong predictor of e-Learning programme effectiveness.

6.3.4.5. Summary of regression analysis results

It can be concluded that the corporate learning environment is a significant and reliable predictor of e-Learning programme effectiveness. Both the individual components in the environment as well as their interconnectivity were found to be significant predictors of the outcome, effective e-Learning programmes.

The key findings from the regression analysis were similar to those of the findings of the correlation analysis, certain components and interconnectivity elements within the environment, specifically those with which employees are highly engaged have stronger predictive properties than those components and interconnectivity elements controlled by the organisation itself. Most importantly, the relationship between e-Learning content and its specific outcomes as well as employees' ability to collaborate in the environment were found to be significantly strong predictors of e-Learning programme effectiveness.

MacLean and Scott (2011) tell us that having clearly defined learning outcomes improves the organisation of the course and orientates learners but also facilitates the learning process and support the process of change. Collaboration as stated previously is a well-researched contributor to learning efficiency (Yu, & Kuo, 2012), effectiveness (Johnson, Hornik, & Salas, 2008) and satisfaction (Johnson, Hornik, & Salas, 2008) by enabling sharing of knowledge (Rodrigues, Sabino, & Zhou, 2011) and

experience (Kane, Robinson-Combre, & Berge, 2010), creating opportunities for behaviour observation (Chikh, & Berkani, 2010) and increasing engagement (Johnson, Hornik, & Salas, 2008). This finding therefore supports existing literature on the importance of learning outcome definition and collaboration in the context of learning.

The predictive power of individual environment elements is discussed in more detail in research question two of this research which introduces a focus on the specific levels of evaluation at which the predictors are significant.

6.3.5. Conclusion

The analysis conducted to determine the nature of the relationship between the corporate learning environment and e-Learning programme effectiveness revealed that, overall, there is a strong positive relationship between the environment and levels of e-Learning programme effectiveness and that increased attention to and alignment of elements within the environment is likely to result in improved results from e-Learning programmes for the organisation.

While there is still an important responsibility on learning and development practitioners to implement e-Learning programmes which develop relevant skills, an interconnected learning environment will greatly assist in driving behaviour change in individuals beyond mere reaction and learning. Importantly, the two factors which contribute most significantly to this task are ensuring that e-Learning content has clearly defined outcomes and that learners are provided with opportunities to collaborate and share their experience and what they have learned.

6.4. Research question two – Which of the learning environment elements are the strongest predictors of e-Learning programme effectiveness?

6.4.1. Introduction

Beyond the analysis conducted to answer research question one, which explored the relationship between the corporate learning environment and e-Learning programme effectiveness, this question was asked in order to pinpoint which environmental

components and interconnectivity elements are relevant and significant at the varying levels of e-Learning programme effectiveness.

6.4.2. Statistical analysis

The statistical analysis conducted to answer research question two was stepwise regression modelling. This statistical technique was used due its ability to identify the individual predictors which are most significant in the model (Albright, Winston, & Zappe, 2009). In the context of this research, this was the predictive power of individual elements of the corporate learning environment of e-Learning programme effectiveness in the organisation.

Ten stepwise regression models were constructed to determine which of the corporate learning environment elements were significant predictors of e-Learning programme effectiveness and at which level of effectiveness as defined by Kirkpatrick and Kirkpatrick (2006) and Phillips (2007) they were found to be significant. Two stepwise regression models were constructed for each of the five levels of e-Learning programme effectiveness, the first using the corporate learning environment components as predictors and the second using the interconnectivity elements of the corporate learning environment as predictors.

6.4.3. Interpretation of results

Table 6.1 below summarises the results of the ten regression models (Tables 5.14 – 5.23) constructed to determine which of the corporate learning environment elements are the strongest predictors of e-Learning programme effectiveness and at which levels.

Nine of the eighteen variables tested were found to be significant predictors at one or more of the levels of e-Learning programme effectiveness evaluation. An additional two were found to be marginally significant with a p value larger than 0.05 but smaller than 0.15 which was the entry criterion into the stepwise regression model. This additional range has been included in the Table 6.1 below due to the minor relevance of these predictors to practitioners.

Table 6.1 – Predictor Variables Summary (By Component / Interconnection)

Strongest Predictors	Level of significance (p<0.05)	Level of significance (0.05<p<0.15)
e-Learning content	II, III, IV	
Learning outcomes	I, V	
e-Learning content -Learning outcomes	I, II, V	
Learning outcomes-Competencies	IV	
Competencies	III	IV
Competencies-Org strategy	III	
Org Strategy		IV
Collaboration	I	II, V
Employees-Collaboration	I, III, V	II, IV
Role profiles		I, III
Role profiles-Employees	III	

e-Learning content was found to be significant at levels II, III and IV of evaluation measuring learning, behaviour change, and improved job performance. Having quality e-Learning content available in the corporate environment leads to employees acquiring knowledge and learning new skills, this new knowledge and skill leads to a change in employee behaviour which ultimately leads to improved job performance. Logically, the e-Learning content on its own does not lead to enjoyment and satisfaction (level I) or return on Investment (level V) for the organisation.

Learning outcomes were found to be significant at level I and V of evaluation measuring reaction and ROI. Learning outcomes make the intentions of the course explicit (MacLean, & Scott, 2011) which increase levels of enjoyment and satisfaction. Knowing what a learner is going to obtain from their investment of time and effort going through the material is a valuable form of expectation management, ensuring that learners are not disappointed by the experience. Learning transfer is more effective when learning outcomes are clear (Leimbach, 2010) and this effective knowledge acquisition explains the significance at level V of evaluation which translates to direct financial benefit for the organisation. Employees are able to select content based on specified outcomes which develop skills which are most desirable and lead to a financial benefit for the organisation.

The **link between e-Learning content and learning outcomes** in the environment was found to be significant at three levels, I, II and V. This reinforces the findings of the individual significant components mentioned above. Upfront knowledge of the

outcomes of the learning increases the degree of satisfaction, perceived knowledge gain from the learning activity as well as ultimate financial benefit for the organisation.

The **link between learning outcomes and competencies** in the environment was found to be significant at level IV where improved job performance is measured. Competencies allow organisations to translate their needs into self-directed learning plans (Draganidis, Chamopoulou, & Mentzas, 2008) and through clear learning outcomes, employees become aware of which specific competencies are developed by which learning material (MacLean, & Scott, 2011). This allows improved job performance to be achieved through acquisition of appropriate knowledge and skills.

Defined **competencies** in the environment were found to be significant in predicting level III of e-Learning programme effectiveness. Organisations knowing and documenting the key competencies which employees are required to perform leads to a meaningful change in the behaviour of employees (García-Barriocanal, Sicilia, & Sánchez-Alonso, 2012) and enables organisations to be more agile and adaptive to business environment changes (Draganidis, Chamopoulou, & Mentzas, 2008).

The **link between competencies and organisational strategy** was also found to be significant at level III of e-Learning programme effectiveness where behaviour change is measured. Congruence between the organisational strategy and the competencies and skills which employees are required to develop leads to a positive change in behaviour and adoption of the required competencies. Work-integrated competency driven learning has been previously proven to lead to meaningful behaviour change (Cheng, *et al*., 2011) and this finding support the literature.

Collaboration as a component on its own was only a significant predictor of level I of e-Learning programme evaluation where reaction is measured. The existence of collaboration opportunities in the environment contribute positively towards satisfaction derived from e-Learning programmes (Johnson, Hornik, & Salas, 2008; Yu, & Kuo, 2012) but does not necessarily lead to learning, behaviour change, improved job performance or ROI. Collaboration is an enabler but needs to happen within a purposeful context in order for participants to gain meaningful value from the interaction. When intentionally aligned to a learning intervention, collaboration is more likely to lead to learning, behaviour change, improved job performance and ROI. This is discussed in the next section.

The act of **collaboration between employees** in the context of e-Learning programmes was found to be significant at level I where reaction is measured and also levels III and V where behaviour change and ROI are measured. This finding supports existing literature which states that collaboration and knowledge exchange is essential to success, both for individuals and the organisation itself (Chikh, & Berkani, 2010; Li, Dong, & Huang, 2009). Meaningful collaborative interactions contribute towards not only satisfaction and enjoyment but also employees changing their behaviour as a result of e-Learning programmes. While e-Learning is full of useful information, it lacks the element of tacit information sharing (Chikh, & Berkani, 2010) which is typically possible and encouraged in classroom settings (Sbihi, & El Kadiri, 2010). These collaborative learning opportunities where learners are able to contextualise what they have learned, share their experiences and learn from each other are critical components of moving beyond satisfaction and learning to actual change in behaviour (Kane, Robinson-Combre, & Berge, 2010; Rodrigues, Sabino, & Zhou, 2011; Yu, & Kuo, 2012). Johnson, Hornik, and Salas (2008) specifically mention social presence in learning as a driver of improved reaction and increased satisfaction. Once in a collaborative setting, individuals are able to observe behaviour which leads to the modification of their own behaviour (Chikh, & Berkani, 2010). This intended change in behaviour also leads to financial benefits for the organisation, explaining why collaboration amongst employees is a significant predictor of level V of evaluation where return on investment is measured. Employees collaborating was found to be the only predictor which was strong at all levels of e-Learning programme effectiveness evaluation supporting various research papers which have suggested that collaboration in the context of e-Learning improves cognitive capability, efficiency and effectiveness (Johnson, Hornik, & Salas, 2008; Yu, & Kuo, 2012) and should therefore be included in future e-Learning models (Johnson, Hornik, & Salas, 2008).

Employees having role profiles was found to be a significant predictor of level III of evaluation where behaviour change is measured. A clear knowledge of an employee's role and responsibilities contributes positively to the effectiveness of e-Learning programmes and specifically behaviour change because having a clear role profile means employees know what is expected of them (Armstrong, 2009), both in the area of the skills they are required to have and therefore develop as well as the job which they are required to perform. Behaviour change occurs as a result of e-Learning because learners understand the knowledge and competencies they need to obtain from the learning intervention in order to perform the role which they are required to fulfil (Armstrong, 2009). In addition, many research papers have highlighted the need

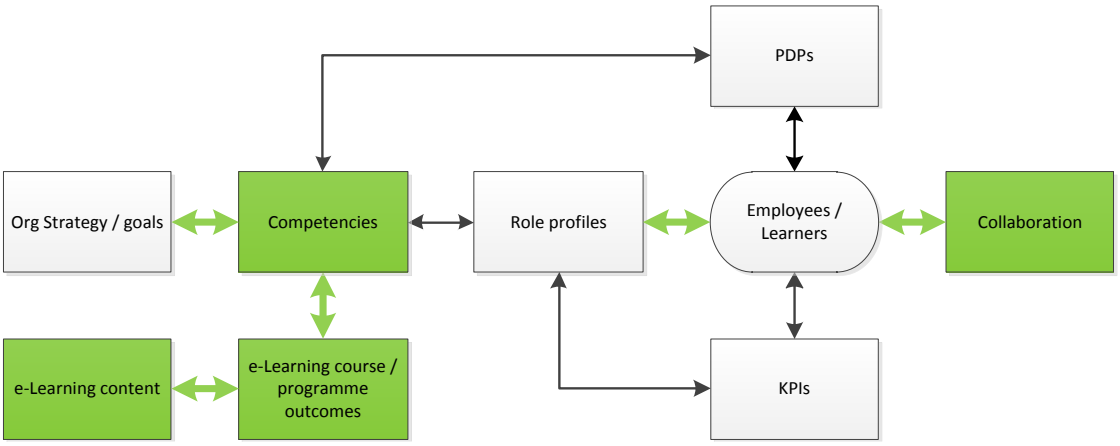
for e-Learning systems to “know” the role of users in order to serve relevant and contextual content (Ferreira-Satler, 2012; Gaeta, Orciuoli, & Ritrovato, 2009; Jeong, Choi, & Song, 2012; Klašnja-Milićević, Vesin, Ivanović, & Budimac, 2011; Kritikou, Demestichas, Adamopoulou, Demestichas, Theologoub, & Paradia, 2008; Tzouveli, Mylonas, & Kollias, 2008). This alignment of roles to learning needs at a system level serves to enable a more effective transfer of information.

It is important to note that five of the nine significant predictors were found to be significant at level III of evaluation where behaviour change is measured which is where the environment was previously found to be highly correlated to e-Learning programme effectiveness in the findings of research question one. Two of these five are individual learning environment components (e-Learning content and competencies). The other three are interconnectivity elements (Competencies being aligned to organisational strategy, Employees collaborating and Employees having role profiles). This explains the strong predictive power of the environment at this level of evaluation. This is strong evidence that in order to achieve a change in behaviour through e-Learning programmes, it is not enough to merely have the individual components in the learning environment, they must be interconnected and interrelated.

6.4.4. Conclusion

The analysis conducted to determine which of the corporate learning environment elements are the strongest predictors of e-Learning programme effectiveness revealed that nine of the eighteen elements tested were found to be significant at one or more of the e-Learning programme effectiveness levels of evaluation. Figure 6.1 below highlights (in green shading) the significant drivers of e-Learning programme effectiveness identified in the proposed corporate learning environment interconnectedness model:

Figure 6.1 – Corporate Learning Environment Interconnectedness Significance



There appear to be two strong predictive clusters in the model, the first is the relationship and interconnectivity between organisational strategy and e-Learning content where (a) strategy drives required competencies, (b) competencies are directly linked to learning outcomes, (c) clear learning outcomes are available for e-Learning content and (d) relevant e-Learning content is available. These were all found to be strong predictors. The second evident cluster is the relationship between employees, their (a) role profiles and (b) collaboration. This highlights the importance of the structured aspect of job performance and the vital importance of social learning through collaboration in the organisation.

As stated by Leimbach (2010) in his research, activities and structures which enhance the transfer of learning into workplace performance will improve the entire organisation's performance and can significantly improve the ROI from training and development.

6.5. Research question three – To what degree do corporate organisations perceive e-Learning programmes to be effective?

6.5.1. Introduction

This question was asked in order to determine the current perceived level of e-Learning programme effectiveness in corporate organisations and to motivate for the increased focus on e-Learning as a means of achieving measurable returns and improved business performance.

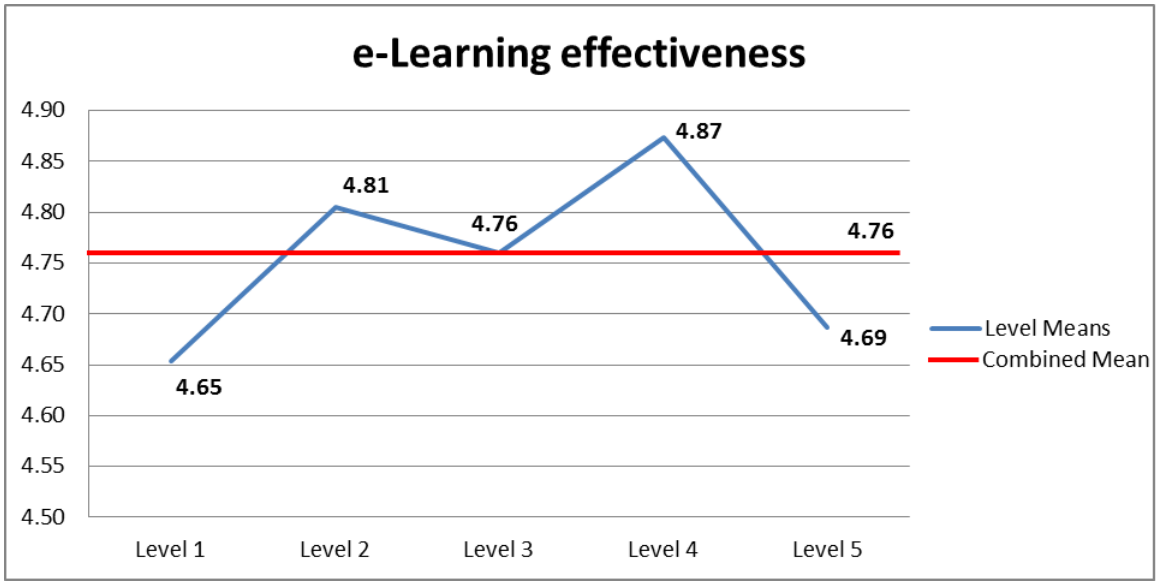
6.5.2. Statistical analysis

The statistical analysis conducted to answer research question three was analysis of the statistical means of the e-Learning programme effectiveness scales constructed. This statistical technique was used due its ability to reveal the degree to which respondents believed (Hatcher, 2003) e-Learning programmes were effective at the various levels of evaluation.

6.5.3. Interpretation of results

Figure 6.2 below is a graph representation of Table 5.25 in chapter five which revealed the observed means of each of the e-Learning effectiveness scales (Levels I, II, III, IV and V) as well as the combined effectiveness scale from the survey conducted. The scales constructed reflect the levels of learning programme effectiveness described by Kirkpatrick and Kirkpatrick (2006) and Phillips (2007).

Figure 6.2 – e-Learning Programme Effectiveness Chart



The means observed reveal how effective respondents believe e-Learning programmes in their organisations are at the various levels. A mean of 4.65 was observed at reaction level (Level I) which measures learner satisfaction and enjoyment (Kirkpatrick, & Kirkpatrick, 2006) of the e-Learning programme. This score represents the higher end of the “neither agree nor disagree” descriptor in the seven point scale. This mean was the lowest of the scales. This relatively low level of enjoyment is understandable as e-Learning is not always the most engaging or entertaining mode of

skills development. Learners often prefer the participation and collaborative nature of instructor led programmes.

A mean of 4.81 was observed at learning level (Level II) which measures improvement in knowledge, skill or attitude (Kirkpatrick, & Kirkpatrick, 2006) brought about by the e-Learning programme. This score represents the higher end of the “neither agree nor disagree” descriptor in the seven point scale. This is a positive sign that respondents are nearing agreement on e-Learning being successful in transferring knowledge and improving skill. Level II is expected to be the highest of the five levels as although employees may not always enjoy e-Learning, learning as a result does occur but this learning is not always translated into behaviour change, improved job performance and ultimately ROI which are the next three levels of evaluation discussed.

A mean of 4.76 was observed at behaviour level (Level III) which measures whether an observable change in behaviour has taken place (Kirkpatrick, & Kirkpatrick, 2006) as a result of the e-Learning programme. This score represents the higher end of the “neither agree nor disagree” descriptor in the seven point scale. This mean is slightly lower than that achieved for learning which is appropriate due to the fact that not all that is learned via e-Learning will translate to an observable change in behaviour.

A mean of 4.87 was observed at results level (Level IV) which measures whether an e-Learning programme participants’ job performance improved (Kirkpatrick, & Kirkpatrick, 2006) as a result of the e-Learning programme. This score represents the higher end of the “neither agree nor disagree” descriptor in the seven point scale. This scale returned the highest mean score. This means that respondents believe that e-Learning programmes are most effective at delivering improved job performance which is their primary intention in a corporate environment.

A mean of 4.69 was achieved at ROI level (Level V) which measures financial return on the investment (Phillips, 2007) in e-Learning programmes. This score represents the higher end of the “neither agree nor disagree” descriptor in the seven point scale. This result reveals that respondents do not believe they are seeing as much direct financial return as they are seeing improved job performance, behaviour change and knowledge gain. This means that not all the learning, behaviour change and improved job performance achieved from e-Learning programmes is translating to bottom line returns for the business. This may be due to improper measurement of returns or misaligned learning objectives. It may also be due to the small number of responding

organisations measuring ROI. Only 34% of organisations indicated that they measure ROI.

Overall, a mean of 4.76 was achieved for e-Learning programme effectiveness. This score, as with all the individual level results, represents the higher end of the "neither agree nor disagree" descriptor in the seven point scale. This result was affected negatively by Level I of evaluation but overall reveals that e-Learning programmes are nearing a level of agreement that they are effective in an organisational context. A positive finding is that results are the highest with regards to improving job performance. There is however a lot of room for improvement, justifying the need for increased attention on the environment and other e-Learning programme effectiveness drivers.

6.5.4. Additional findings

Below are additional specific findings from the frequency analysis conducted on various questions in the survey (Tables 5.5 and 5.7). Frequency distribution is used to reveal the frequency of response occurrence in the data set (Howell, 2008).

While 72% of respondents agree that e-Learning provides knowledge of the behaviour change required of employees and 64% of working environments are believed to be conducive to the behaviour change required, only 58% of respondents agree that behaviour change ultimately occurs as a result of e-Learning programmes. This means that in 14% of cases, relevant knowledge gained does not translate to desired behaviour change.

Interestingly, while 62% of respondents agree that knowledge gain can be demonstrated as a result of e-Learning programmes, 6% more of respondents believe that skills are directly acquired or improved through the same e-Learning programmes meaning that respondents believe e-Learning develops skills more so than it does knowledge.

The results revealed that although as many as 70% of respondents agree that knowledge gained from e-Learning leads to improved job performance, only 52% and 58% respectively believe that knowledge gained from e-Learning leads to a positive change in behaviour and improved attitude or motivation indicating that e-Learning is

not the best tool to achieve those outcomes although it is effective in more than two thirds of cases in improving job performance.

In alignment with existing literature, while a high 80% of respondents implemented e-Learning programmes with the intention of achieving financial benefits for the organisation, only 34% actually went on to measure financial benefits directly attributed to e-Learning programmes. 54% of respondents believe financial benefits for the organisation can be directly attributed to e-Learning programmes undertaken.

6.5.5. Conclusion

The analysis conducted on current perceived e-Learning programme effectiveness revealed that e-Learning programmes are not perceived to be effective in an organisational context but are on the cusp of agreement with regards to effectiveness at all levels. This finding reveals that more effort is required to derive value from e-Learning programmes in corporations. This finding supports the purpose for this research which is to identify the corporate learning environment as a key contributor to e-Learning programme effectiveness and to provide learning and development practitioners with the tools to diagnose and elevate their learning environments to yield more effective e-Learning programmes which improve organisational performance.

6.6. Research question four - Is the proposed corporate learning environment interconnectedness model valid?

6.6.1. Introduction

The data obtained in the survey also serves as a means to attempt to validate the proposed model of corporate learning environment interconnectedness. To increase the validity and reliability of the research, the proposed model was tested in relation to the data obtained to determine whether the components and relationships between them did in fact exist in corporate learning environments surveyed.

6.6.2. Statistical analysis

The statistical techniques used to validate the model were correlation analysis and descriptive statistics. Correlation analysis was used to determine whether a positive

relationship existed between the individual components of the model and descriptive statistics was used to validate the links between employees and the learning environment components defined.

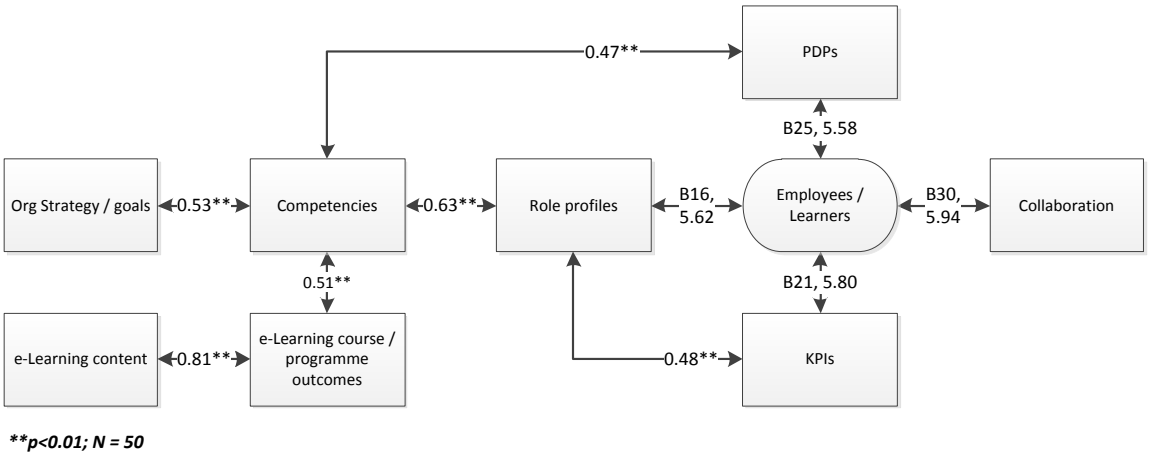
6.6.3. Interpretation of results

Overall, all proposed components were found to be highly correlated with each other indicating that the existence of each of the components was likely to be combined with the existence of the other model components. As can be seen in Figure 5.26 in chapter five, all but one of the relationships between the components was found to be significant at the 95% significance level with correlation coefficients higher than 0.31. The only non-significant relationship was between the existence of e-Learning content and role profiles which was not a relationship proposed by the model.

With specific reference to the proposed corporate learning environment interconnectedness model (Figure 4.1), the components and interconnections which were proposed were; e-Learning content linked to learning outcomes (A), learning outcomes linked to competencies (B), competencies linked to organisational strategy (C), competencies linked to role profiles (D), role profiles linked to employees (E), employees linked to KPIs (F), role profiles linked to KPIs (G), employees linked to PDPs (H), competencies linked to PDPs (I) and finally employees linked to collaboration (J).

Figure 6.3 below reflects the results of the correlation analysis between the individual model components (Table 5.26) for these interconnections and reveals that all proposed interconnection correlations between the components were significant at the 99% confidence level and had moderate to strong relationships with correlation coefficients between 0.47 and 0.81. The relationships between employees and related components are represented by the reported statistical means for the specific questions in the survey which queried these connections (Table 5.27). For all four relationships, the mean reported was between 5.58 and 5.94 which is equivalent to a description on the higher end between “somewhat agree” and “agree” on the seven point scale of the questionnaire. A correlation coefficient could not be obtained because organisations having employees was confirmed through a categorical variable in construct A of the survey asking the number of employees in the organisation and was not calculated as a continuous variable which is one of the criteria for correlation analysis (Pallant, 2011).

Figure 6.3 – Corporate Learning Environment Interconnectedness Validation



6.6.4. Conclusion

It can be concluded from this analysis that the proposed model is a reasonable representation of the components and interconnections which exist in corporate learning environments. Although it cannot, from the scope of this research be determined whether additional components and interconnections exist in the environment which were not included in the model, it can be confirmed that those vital components and relationships proposed, are in fact valid and representative. An area of future research is recommended to further validate this model through a qualitative analysis of corporate learning environments.

6.7. Summary of findings

In this chapter, all four research questions were answered and key findings and learnings from the research undertaken were presented. These findings are summarised below and serve as the input into chapter seven which will discuss the possible impact of these findings on stakeholders as well as make recommendations to key stakeholders.

6.7.1. Research question one – What is the relationship between learning environment interconnectedness and the effectiveness of e-Learning programmes?

Research question one set out to answer whether there is a positive relationship between e-Learning programme effectiveness and corporate learning environment

interconnectedness. Using correlation analysis and regression modelling, it was proven that there is in fact a positive relationship between the two. This was evident at a component level as well as an interconnectedness level. The components and interconnections which employees engage with directly were found to be the most highly correlated and overall, the corporate learning environment was found to be especially significant in enabling a behaviour change (evaluation level III) as a result of e-Learning programmes.

Using regression analysis, it was found that the corporate learning environment was not only significantly correlated to e-Learning programme effectiveness, it was also found to be a reliable predictor of effectiveness. Within the environment, in a similar outcome to the correlation analysis, the strongest predictors were found to be the components of e-Learning content, learning outcomes and their relationship as well as collaboration within the environment.

6.7.2. Research question two – Which of the learning environment elements are the strongest predictors of e-Learning programme effectiveness?

Research question two set out to answer which of the corporate learning environment elements were strong predictors of e-Learning programme effectiveness and at which levels. Using stepwise regression models, the two or three strongest component and interconnectivity elements for each level of evaluation were identified. Two clusters of elements were identified as being strong predictors at the various levels. These were the sequence of links between organisational strategy and e-Learning content passing through competencies and learning outcomes and the relationships between employees, their role profiles and collaboration opportunities.

6.7.3. Research question three – To what degree do corporate organisations perceive e-Learning programmes to be effective?

Research question three set out to answer whether corporate organisations currently perceive their e-Learning programmes to be effective. By analysing the statistical means of the effectiveness scales constructed, it was identified that organisations do not yet conclusively believe that their e-Learning programmes are effective, however results show that organisations are very close to this point. e-Learning programmes

were found to be most effective at level IV of evaluation meaning that they are improving individual work performance, which is what they are primarily intended to do.

6.7.4. Research question four – Is the proposed corporate learning environment interconnectedness model valid?

Research question four set out to determine whether the model of corporate learning environment interconnectedness proposed by this research is valid. By using correlation analysis and investigating the statistical means of certain questions in the survey, it was found that all components and interconnections proposed in the model do in fact exist in the corporate learning environments surveyed. The model still cannot be said to be conclusive as it was not tested for omissions, however, results revealed that the model and therefore the results of the analysis can be trusted.

7. Chapter Seven – Conclusion

7.1. Introduction

Chapters five and six of this research presented the results and discussion of the findings of this study undertaken with reference to the purpose of the research and relevant literature. This final chapter discusses the possible impact of the key findings of the research on business stakeholders, makes recommendations to them and proposes areas of further academic research in the area.

7.2. Summary of key findings

The findings of this study support existing literature on learning and e-Learning implementation and measurement in corporate organisations and also supports the drivers and structures which have already been identified to improve efficiency and effectiveness of such programmes. The contribution which this research makes is the consolidation of these fragmented research areas into a consolidated model and tool for practitioners to diagnose and enhance their environments and also makes a contribution towards the evolution of understanding of the links between organisational performance and e-Learning programmes.

In general, this research found that the learning environment in which e-Learning programmes are deployed is a significant predictor of e-Learning programme effectiveness and that it is specifically effective at achieving results in the form of behaviour change in employees and return on investment from e-Learning. The most significant predictors of this success are e-Learning content having clearly defined learning outcomes which can be linked and aligned to various performance development and management structures and the opportunity for employees to collaborate within the context of these learning programmes being available in the organisation allowing employees to share knowledge and experiences. These independent findings will be discussed in more detail below, in the context of the research question which they answered.

A practical contribution of this research is the proposed model for corporate learning environment interconnectedness (Figure 4.1) which has been tested and validated in this research. This model can evolve and be used to guide practitioners in aligning e-Learning programmes with organisational priorities.

7.2.1. Finding one – Corporate learning environment configuration is significantly correlated with e-Learning programme effectiveness

Using correlation analysis between learning environment elements and e-Learning programme effectiveness, the corporate learning environment was found to be significantly correlated with e-Learning programme effectiveness. The learning environment and its interconnectedness is especially important in driving higher order benefits of e-Learning programmes, being behaviour change and ROI. 17 of the 18 environmental elements were found to be significantly correlated with behaviour change based results of e-Learning programmes while 16 of the 18 elements were found to be significantly correlated with ROI derived from e-Learning programmes.

This finding indicates that where corporate learning environments contain the proposed components and they are interconnected in the manner discussed, more effective e-Learning programmes are likely to result for the organisation. Learning and development practitioners should therefore investigate, diagnose and take the necessary steps to ensure that e-Learning interventions are aligned with business objectives and performance drivers.

7.2.2. Finding two – Learning outcomes and collaboration are the most significant predictors of e-Learning programme effectiveness

Using regression models constructed to determine the predictive properties of components and interconnectivity in the corporate learning environment, it was found that existence of clear learning outcomes and opportunities for collaboration being available are the most significant predictors of e-Learning programme effectiveness.

This finding tells us that when specific learning outcomes of e-Learning programmes are well documented and linked to performance development and management structures and when collaboration opportunities are available in the environment to support e-Learning content, more effective programmes will result. Learning and development practitioners should therefore ensure that all e-Learning content has clearly documented outcomes which can be linked to the desired competencies of the organisation. They should also design and implement e-Learning programmes with a collaborative element which brings employees together with the aim of sharing knowledge and experiences and reinforcing the learning experience, leading to higher order benefits.

7.2.3. Finding three – e-Learning programmes are not yet believed to be effective in corporate environments

Using statistical analysis of the responses obtained in the learning and development practitioner survey, it was discovered that respondents are currently undecided when it comes to e-Learning programme effectiveness. Levels I to V of e-Learning programme evaluation scales returned statistical mean scores between 4.6 and 4.8 out of 7. This rating corresponds to a “Neither agree nor disagree” response which is between "Somewhat disagree" and “Somewhat agree”. Although this is already close to agreement, it is hoped that closer attention to and better alignment of corporate learning environments in these learning practitioners’ organisations will create a tipping point towards e-Learning programmes being seen as effective and delivering better results to organisations.

What this finding tells us is that although significant investment of time and money is made in e-Learning, practitioners are not convinced that they are delivering solutions which are effectively delivering against the various evaluation levels and ultimately translating to real value for the organisation. Organisations may in future recognise the importance and benefits that can be realised from the broader learning environment in delivering effective e-Learning programmes if it successfully aligns organisational and individual goals.

7.2.4. Finding four – The proposed corporate learning environment model is valid

Using correlation and descriptive statistical analysis, it was discovered that the proposed corporate learning environment interconnectedness model is valid. Correlation between the components proposed and the relationship between employees and various components were all proven to be significant and moderately strong.

This finding proves that the configuration of the model is reliable and that the proposed interactions between the components do in fact exist in corporate organisations. Learning and development practitioners can therefore use this model to diagnose and enhance their learning environment as well as take guidance from it in terms of the relationships which should exist to drive e-Learning programme effectiveness in the organisational performance context.

7.3. Theoretical contribution of the research – A preliminary model for interconnected corporate learning environments

Finding four discussed above makes up the theoretical and academic contribution of this research which is what could potentially be the starting point or contributor to a more detailed and integrated model of workplace learning which can be further evolved and validated to become a reliable benchmark for interconnected corporate learning environments. This type of model could ultimately present an ideal or recommended configuration of corporate learning environments which links organisational goals with individual learning needs. This model will require additional testing and validation before it can be universally accepted but the principles of interconnectivity and alignment which it proposes are common and required in any organisation in order for e-Learning programmes to succeed in driving true value for organisations.

7.4. Recommendations

7.4.1. Recommendations to business

“The development of human capital through training and development may be one of the most important means for an organization to gain a competitive advantage” (Noe, & Tews, 2012, p. 101). e-Learning is a viable and cost effective method of skills development (Biech, 2008; Nokes, & Sappington, 2010; Tai, 2008) which drives business performance (Aguinis, & Kraiger, 2009; Castillo, & del Valle, 2009; Chang, *et al*., 2009; Ferguson, & Reio, 2010) and is capable of creating a sustainable competitive advantage (Castillo, & del Valle, 2009; Noe, & Tews, 2012). The primary recommendation to business is therefore that business has a critical role to play in sharing goals and strategy with learning and development practitioners. Business leaders need to initiate and maintain a dialogue with learning and development functions regarding competencies which are required to execute on strategic objectives (Gray, 2011a). An effective way of doing this is to place learning and development at the executive table and not just on the table (Lea, 2009). Learning and development practitioners need to be in the executive boardroom to hear the challenges and opportunities which the business faces and contribute in their ability to produce human capital with the required knowledge and skills to capitalise on opportunities and overcome challenges.

Business should also commit to measurement of e-Learning programme effectiveness (Cross, 2009; Gray, 2011b; Mallon, 2011; Stutt, 2010) which requires input from executives, line managers, business leaders and speciality functions such as finance. This will ensure learning and development efforts are continuously adapted and their performance improved.

7.4.2. Recommendations to learning and development practitioners

Learning and development practitioners can positively influence firm performance through the implementation of e-Learning programmes in the workplace (Ferguson, & Reio, 2010). This view appears not to have materialised in the corporate learning environments surveyed in this research. e-Learning programmes are not yet convincingly delivering the value for which they are being implemented. This is potentially due to lack of alignment with the broader learning environment and the insufficient enablement of key components in the workplace learning ecosystem.

Although there are multiple drivers of e-Learning effectiveness, learning practitioners need to be aware that successful e-Learning is not just about good quality materials being made available to employees but also about the environment in which they are deployed and that the context of the organisation needs to be understood and incorporated in order to achieve true returns.

Learning and development practitioners need to be aware of the links and levers in the environment which drive e-Learning programme effectiveness and facilitate the enhancement of significant predictors such as documentation and alignment of learning outcomes and creating opportunities for collaboration in the context of learning.

Learning and development departments also need to proactively and consistently measure and report on the success of deployed programmes in order to identify poor performing programmes, learn from these instances and adapt the approach accordingly in future.

The corporate learning environment interconnectedness model derived from this research (Figure 4.1) is most specifically relevant and intended for use by learning and development practitioners in corporate organisations. It is hoped that practitioners will use the model to interrogate the existence of components and interconnections within

their own corporate learning environments and take the necessary steps to better align their e-Learning programmes with their organisational context.

7.4.3. Recommendations for South African organisations

South Africa has a severe skills shortage (Jones, 2011; Sharp, 2011). There are currently over 800,000 unfilled positions for high-skilled workers across a range of occupations in South Africa (Jones, 2011). This skills shortage poses a significant limitation on South Africa's long-term economic growth potential (Sharp, 2011). e-Learning offers a great opportunity for corporate organisations to economically develop generic and specialist skills in their workforce (Levin, & Shippel, 2010). e-Learning can specifically be used to develop scarce technical and managerial skills (Levin, & Shippel, 2010) which are critical for business success. e-Learning is also effective in developing PC literacy and competence in the use of word processing, presentation and spreadsheet applications which are valuable in entry level positions in organisations and have the potential of absorbing the approximately three million unemployed youths aged 15 – 34 (SABC News Research, 2012).

"Private enterprises are increasingly being called upon to help bridge the skills gap and develop their employees" (Deloitte & Touche, 2009, p9). This investment in human capital development through e-Learning not only improves company competitiveness but also the country's competitiveness (Aguinis, & Kraiger, 2009).

South Africa's National Skills Fund is financed by a 1% payroll tax which is used to enable the skills development structures (Republic of South Africa Department of Labour, 2011). South African organisations however, spend approximately 1.5% of payroll on skills development. This is still 3.5% less than the international best practice of 5% (Goldberg, 2010) which is the least South African organisations would need to spend is in order to maintain its current level of competitiveness (Goldberg, 2010). The third national skills development strategy outlines the government's aims relating to skills development over the next five years between 2010 and 2015. The strategy enables 21 Sector Education and Training Authorities (SETAs) to support organisations in skills development, specifically focusing on integrating theoretical learning and workplace training to develop sufficient technological skills in the workforce and to support economic growth and development through viable skills development (Republic of South Africa, Department of Higher Education and Training, 2011). E-Learning has an important role to play in transforming businesses and

producing knowledge retention and financial benefits (Levin, & Shippel, 2010). There is also an evident increase in e-Learning expenditure in South African Organisations occupying 33% of skills development spend in 2010, up significantly from 17% in 2003 and 26% in 2006 (Deloitte & Touche, 2009). Organisations should therefore be investing in the alignment of their environments to extract maximum value from this growing e-Learning investment, not only for themselves but also for the benefit of their employees and country.

7.4.4. Recommendations for future research

The research undertaken served as an adequate preliminary investigation of the corporate learning environment's impact on e-Learning programme effectiveness, however, additional work is required to develop a comprehensive and reliable model of environment and e-Learning programme alignment. The first and most highly recommended area of future research is a further qualitative investigation of the corporate learning environment model which has been proposed in organisations which have been successful at deploying e-Learning programmes. This recommended research should conduct in-depth interviews with learning and development managers and / or human resources managers to discuss the configuration and alignment of organisational priorities and e-Learning programmes deployed. Although varying configurations may exist, practitioners would benefit from a reliable model on which to base their environment.

The second recommendation is to gain additional responses to the research questionnaire developed which will provide additional degrees of freedom required to analyse the data statistically at a more granular level, looking at the individual variables and scales constructed and the intergroup variability. For example, an area which was identified in the study is that employees having PDPs was only found to be significantly correlated with e-Learning programme effectiveness at level V, potentially due to the fact that only 56% of organisations specifically place e-Learning content on employee performance development plans. Having a sufficiently large sample will allow for the splitting of the sample between those who do place e-Learning on PDPs and those that do not and conducting a more detailed comparative analysis.

The third recommendation is to approach the topic of e-Learning programme effectiveness in corporate learning environment using a case study approach where rather than perceptions of effectiveness and learning environment configuration being

obtained from learning and development practitioners, effectiveness levels could be measured directly with participants and configuration can be analysed accurately. This will allow any bias to be eliminated from responses.

The final recommendation is to conduct an experimental design study where an underperforming e-Learning programme exists in an organisation and begin to re-configure the learning environment as proposed by the corporate learning environment interconnectedness model. As this is taking place, the effectiveness of the e-Learning programme should be monitored to identify a causal relationship between the configuration of the environment and e-Learning programme effectiveness.

7.5. Conclusion

Findings of this research hold specific relevance for high performance seeking organisations and their learning and development practitioners. A conscious partnership is necessary between business executives and the learning and development function in order to drive organisational performance objectives. To achieve this, organisational goals need to be aligned with individual learning needs and ultimately appropriate e-Learning programmes need to be deployed. Each party has a role to play to extract maximum value from investment in e-Learning programmes. The first is for organisational executives to recognise the importance of the learning and development function in achieving organisational goals and providing this function with the necessary context and information to align their initiatives. The second is the responsibility of learning and development practitioners to diagnose and enhance the corporate learning environment to enable effective e-Learning programmes and measure and report on the ultimate success of these programmes.

This research has revealed that current investment in e-Learning is not yet delivering the intended results and it has also delivered a reliable model around which value adding engagement can take place to change this reality by providing pointers towards high priority areas for attention. It is up to business leaders and learning and development practitioners to diagnose their broad learning environment and take the necessary steps elevate the environment in order to extract maximum value from their investments.

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9. Appendices

9.1. Appendix A - Informed consent letter

Good day.

My name is Omri Yaari, I am a student at the Gordon Institute of Business Science (GIBS) studying towards a Masters of Business Administration.

My thesis topic is on the effectiveness of e-Learning in corporate organisations.

This research will develop our understanding of what makes e-Learning programmes successful and effective in achieving organisational goals. To that end, you are asked to complete a questionnaire about your organisation's learning environment and e-Learning programme.

The questionnaire should take no more than 15 minutes to complete.

Your participation is voluntary and you can withdraw at any time without penalty. Of course, all data will be kept confidential. By completing the survey, you indicate that you voluntarily participate in this research. If you have any concerns, please contact me or my supervisor. Our details are provided below:

Researcher:
Omri Yaari
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Research Supervisor:
Kevin Lubbe
kevin.lubbe@eoh.co.za
+27 83 287 2631

Thank you for your time and participation!

9.2. Appendix B – Questionnaire

Section One: Descriptive Information	
A1. In what principal industry is your organisation?	( ) Academic ( ) Agriculture ( ) Communications ( ) Construction ( ) Consulting ( ) Financial Services ( ) Government ( ) Healthcare ( ) Hospitality ( ) Information Technology ( ) Manufacturing ( ) Medical ( ) Mining ( ) Non-profit ( ) Retail ( ) Services ( ) Transportation ( ) Other, Please specify_____
A2. What is your role level?	( ) Executive ( ) Senior Management ( ) Middle Management ( ) Supervisory ( ) Non-Management / Technical / Professional
A3. How many employees work in your organisation?	( ) 1 – 100 ( ) 101 - 500 ( ) 501 – 1,000 ( ) 1,001 – 5,000 ( ) 5,001 – 10,000 ( ) 10,001 - 50,000 ( ) over 50,000
A4. What is your organisation's annual revenue?	( ) under R5 million ( ) R5-49 million ( ) R50-200 million ( ) R201 million-R1 billion ( ) R1-10 billion ( ) over R10 billion ( ) don't know

Section Two: Learning environment

	Strongly Disagree (1)	Disagree (2)	Somewhat Disagree (3)	Neither Agree nor Disagree (4)	Somewhat Agree (5)	Agree (6)	Strongly Agree (7)
B1.Your organisational strategy and goals are clearly defined.							
B2.Your organisational strategy and goals are clearly communicated.							
B3.There is a clear link between organisational objectives and job competencies.							
B4.The development of organisational strategy and definition of organisational competencies are aligned.							
B5.The organisation provides learning interventions to develop individual knowledge and skills.							
B6.e-Learning is used in learning interventions.							
B7.Outcomes or specific objectives of the e-Learning content are known.							
B8.Learners are made aware of the outcomes of the e-Learning content.							
B9.Learning outcomes are displayed in the e-Learning material.							
B10.e-Learning is easily accessible to those who have e-Learning content available for them.							
B11.e-Learning available is of good instructional design and quality.							
B12.The organisation has documented competencies required to fulfil specific job functions.							
B13.Learners are aware of the competencies required for their role / job profile.							
B14.e-Learning outcomes are aligned to individual competencies.							
B15.e-Learning is used to develop individual competencies in the organisations.							
B16.Each individual in the organisation has a documented role / job profile.							
B17.Employees know and understand their role / job profile.							
B18.Role / job profiles are based on a combination of individual competencies.							
B19.The organisation makes use of Key Performance Indicators at a business unit / division level.							
B20.The organisation makes use of Key Performance Indicators at an individual level.							
B21.Each individual in the organisation has documented Key Performance Indicators.							
B22.Individual Key Performance Indicators are based on the role / job profile which each individual performs.							
B23.Individual performance against Key Performance Indicators is reviewed at least annually.							
B24.The organisation makes use of Performance Development Plans / Contracts to drive knowledge and skills development.							
B25.Each individual in the organisation has a Performance Development Plan / Contract.							
B26.Performance Development Plans / Contracts contain individual competencies which need to be developed.							
B27.e-Learning content is placed on Performance Development Plans / Contracts to develop competencies.							
B28.Individuals' performance is reviewed at least annually against their Performance Development Plan / Contract.							
B29.e-Learning programmes are blended with opportunities to collaborate and discuss the subject matter with others.							
B30.The organisation provides opportunities for collaborative learning face to face.							
B31.The organisation provides opportunities for collaborative learning electronically.							

Section Three: e-Learning effectiveness							
	Strongly Disagree (1)	Disagree (2)	Somewhat Disagree (3)	Neither Agree nor Disagree (4)	Somewhat Agree (5)	Agree (6)	Strongly Agree (7)
C1.Learner reactions to e-Learning content / programmes are measured.							
C2.Learners enjoy e-Learning content / programmes.							
C3.Learners provide positive feedback about e-Learning content / programmes.							
C4.Learner knowledge is assessed before (pre) e-Learning takes place.							
C5.Learner knowledge is assessed after (post) e-Learning takes place.							
C6.Individual learning / knowledge gain can be demonstrated as a result of e-Learning undertaken.							
C7.Skills are acquired or improved through the use of e-Learning.							
C8.e-Learning provides learners with knowledge of the behavioural changes required of them.							
C9.Learners change their behaviour as a result of the e-Learning.							
C10. The learners' working environment is conducive to behaviour change required to improve performance.							
C11.Knowledge / skills gained from e-Learning lead to improved job performance.							
C12.Knowledge / skills gained from e-Learning lead to improved attitude or motivation.							
C13. Knowledge / skills gained from e-Learning lead to a positive change in behaviour.							
C14.e-Learning interventions are implemented with the intention of achieving financial saving or reward for the organisation.							
C15.A Financial saving or reward for the organisation can be directly attributed to e-Learning interventions undertaken.							
C16.Financial saving or reward directly attributed to e-Learning interventions undertaken is measured.							

9.3. Appendix C – Raw questionnaire response data

RespondentID	A1	A1 (Other, specified)	A2	A3	A4
1957799776	6		2	4	5
1956660936	0	Education	2	2	2
1955978290	6		2	3	5
1955961388	3		3	6	5
1955938953	0	Downstream Petroleum	3	4	5
1955193036	0	Telecommunications	2	2	7
1954840102	11		3	5	7
1954630229	0	FMCG	1	5	5
1954621722	10		3	3	4
1954618603	6		5	6	5
1954610407	10		5	4	5
1954609902	6		2	6	5
1954562129	10		5	5	7
1954542402	10		3	4	4
1952021407	13		2	5	5
1951990651	13		5	4	7
1951631148	6		2	7	6
1950922544	6		3	4	6
1950794994	16		1	2	3
1950779801	6		3	5	6
1950704703	6		4	3	4
1950618505	13		2	7	5
1950607966	17		2	2	4
1950599012	6		2	6	5
1950596754	10		2	6	6
1949593920	5		5	4	7
1949557188	0	Media and Entertainment	2	5	5
1949448183	0	Management Consulting	5	1	2
1949365565	15		5	6	3
1949322668	6		2	2	2
1948112467	15		1	4	4
1947977168	10		2	6	6
1947940609	11		5	3	4
1946890276	6		1	4	6
1946862143	5		3	4	4
1946858438	17		2	6	3
1946842150	10		3	4	5
1946674485	6		2	5	6
1944560954	6		3	6	6
1944535637	13		3	4	6
1941826123	6		3	6	5
1941810755	0	Energy	3	4	7
1941775139	0	Gaming	2	5	4
1941757061	6		4	4	7
1941120041	3		3	5	6
1940614527	8		2	4	4
1940572507	11		2	5	7
1940473179	5		2	2	4
1939567342	6		3	6	6
1939309714	5		3	2	2

RespondentID	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15
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1956660936	6	5	6	6	5	6	6	6	6	5	4	5	6	4	4
1955978290	5	6	2	2	7	3	3	3	3	3	3	2	5	3	3
1955961388	7	6	7	6	7	7	7	7	7	7	7	6	6	7	7
1955938953	7	7	6	5	7	7	6	6	6	7	5	5	5	5	7
1955193036	7	7	6	6	6	6	6	6	6	6	6	6	6	5	6
1954840102	6	6	5	4	6	6	6	6	5	6	6	5	3	5	5
1954630229	7	6	7	7	7	6	6	6	6	6	6	7	6	6	5
1954621722	2	1	1	1	6	6	6	5	2	7	6	1	2	1	3
1954618603	7	7	7	6	7	6	7	7	7	7	7	6	6	5	6
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1954609902	7	7	7	7	7	7	7	7	7	7	6	5	5	5	5
1954562129	6	5	4	4	7	6	7	7	7	7	7	7	5	6	6
1954542402	6	5	3	4	7	6	6	6	7	7	6	5	5	4	6
1952021407	7	7	6	6	7	7	7	7	7	7	7	6	6	4	6
1951990651	6	6	5	5	7	6	7	7	7	7	7	6	6	5	6
1951631148	6	5	5	5	6	5	5	2	2	5	4	5	3	3	3
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1950779801	7	7	6	7	7	6	7	7	7	7	7	6	5	5	5
1950704703	7	6	5	3	6	5	3	5	7	3	6	2	2	1	1
1950618505	5	6	5	4	7	5	5	4	6	5	5	5	4	6	4
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1950599012	7	7	7	7	7	7	7	7	7	6	3	7	7	7	6
1950596754	7	5	6	6	6	7	7	6	6	6	6	7	6	7	7
1949593920	6	6	6	6	6	6	6	6	6	6	6	5	5	5	5
1949557188	7	7	6	5	7	7	7	7	7	7	7	7	6	6	7
1949448183	7	7	7	7	7	6	6	6	6	6	6	6	6	5	6
1949365565	3	3	2	4	4	4	5	4	4	2	2	4	4	3	3
1949322668	6	5	5	6	6	7	7	7	7	7	7	6	5	6	6
1948112467	7	5	5	5	5	6	6	6	6	6	5	4	5	2	2
1947977168	7	7	7	6	7	7	7	7	7	7	7	7	7	6	7
1947940609	6	6	5	5	5	3	3	6	6	5	6	6	3	2	2
1946890276	6	6	6	5	6	6	6	6	6	6	5	5	5	4	5
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1946858438	5	6	6	6	7	7	7	7	7	7	7	5	4	6	7
1946842150	7	7	6	6	6	5	5	5	5	6	6	3	5	5	5
1946674485	6	6	7	7	6	7	7	7	7	7	7	6	6	6	6
1944560954	7	7	7	5	6	6	6	6	6	6	6	5	5	5	5
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1941826123	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
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1939309714	5	6	5	4	7	7	6	5	5	4	3	2	4	6	6

RespondentID	B16	B17	B18	B19	B20	B21	B22	B23	B24	B25	B26	B27	B28	B29	B30	B31
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1955193036	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
1954840102	3	5	3	6	3	2	2	5	5	3	3	3	4	4	7	5
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1954610407	6	6	6	6	6	7	7	7	7	7	7	7	7	1	7	5
1954609902	7	7	5	7	7	7	7	7	7	7	5	5	7	3	3	1
1954562129	5	5	6	6	6	6	5	7	6	6	6	6	6	2	5	2
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1952021407	4	5	5	7	7	6	6	7	7	6	6	6	7	6	7	5
1951990651	5	5	6	5	5	5	5	6	6	7	6	6	5	6	7	6
1951631148	5	4	3	5	5	3	3	5	6	5	4	3	3	3	5	3
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1950704703	6	6	2	7	7	7	7	7	7	7	3	1	2	1	1	1
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1941757061	7	7	6	6	6	6	6	7	7	7	7	5	6	7	6	6
1941120041	7	5	6	5	5	5	6	6	6	6	6	5	5	7	7	5
1940614527	7	6	4	4	7	7	7	7	5	7	7	4	7	5	5	5
1940572507	7	6	7	6	6	6	7	6	6	7	6	7	6	7	7	6
1940473179	6	5	5	7	7	7	6	7	7	6	7	5	7	7	7	7
1939567342	5	6	5	7	7	7	6	7	7	7	7	6	7	6	6	6
1939309714	7	6	5	6	6	6	6	6	7	6	6	6	6	6	5	6

RespondentID	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16
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1956660936	2	6	6	5	5	6	6	6	6	5	6	6	6	5	6	4
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1955938953	2	2	3	1	1	3	6	6	4	5	4	4	4	5	4	3
1955193036	5	5	5	5	5	5	5	5	4	4	4	4	4	4	4	4
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1950794994	2	4	4	4	4	5	6	6	6	6	6	6	6	6	3	2
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1948112467	7	5	5	2	2	2	4	2	1	1	4	1	1	7	5	1
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1947940609	2	4	5	2	2	3	4	3	2	4	5	2	2	4	3	3
1946890276	2	3	4	2	2	5	6	3	5	5	5	4	4	6	5	2
1946862143	3	4	3	3	3	5	5	5	3	5	5	4	5	6	4	3
1946858438	7	6	7	5	6	6	7	6	6	4	6	6	4	6	6	6
1946842150	2	5	4	6	6	2	3	4	4	3	6	6	5	3	2	2
1946674485	6	6	6	4	7	6	7	7	5	6	6	6	6	7	6	5
1944560954	6	6	5	5	6	6	5	6	5	5	4	4	4	6	4	3
1944535637	6	6	7	5	6	5	7	5	5	4	5	6	6	5	7	7
1941826123	7	6	6	5	6	6	6	6	5	5	5	5	5	4	5	5
1941810755	5	5	5	5	5	5	3	5	5	6	4	4	4	5	3	3
1941775139	2	4	3	3	3	3	4	4	3	3	4	4	4	3	3	3
1941757061	6	6	6	6	7	6	6	6	6	6	5	6	5	7	7	7
1941120041	5	5	6	7	7	7	7	6	6	5	6	6	6	7	6	6
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1940572507	6	6	6	7	6	7	6	6	6	7	6	6	7	7	6	6
1940473179	7	6	6	6	7	7	7	7	5	6	7	6	7	7	6	6
1939567342	6	6	6	6	6	6	6	5	6	6	6	6	6	6	6	5
1939309714	5	4	4	3	5	5	5	5	4	3	3	3	3	2	4	4