

What predicts workplace self-paced e-learning outcomes? An exploratory study of  
motivation, self-regulated learning characteristics, and organisational contextual  
factors

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## **Abstract**

Organisations today are investing significant amounts of time, money, and resources on workplace self-paced e-learning, yet employees seem to be having problems even getting these e-learning courses completed, bringing into question the true value of workplace self-paced e-learning. In an attempt to improve understanding of factors contributing to success in workplace self-paced e-learning, this study investigated how employee learners' motivation, self-regulated learning, and organisational contextual factors affected outcomes in workplace self-paced e-learning. A quantitative study was conducted to investigate the research questions. Participants of the study were 119 employees enrolled in workplace self-paced e-learning courses provided by Hong Kong organisations. Data were collected using online questionnaires and analysed using the partial least squares structural equation modelling technique.

Findings revealed significant relationships between learners' motivation, self-regulated learning, organisational contextual factors, and training outcomes in workplace self-paced e-learning. Motivation to learn, time management, metacognitive self-regulation, perceived choice, workload, and organisational support were found to positively correlate with training outcomes as expressed in terms of course completion rate, learner satisfaction, and perceived learning performance in workplace self-paced e-learning. Findings also revealed learners' autonomy in learning participation, level of workload (negative), and supervisor support (negative)

moderate the relationship between learners' time management strategy use and completion rate of workplace self-paced e-learning courses. Unfortunately, the results failed to support the expected relationship between supervisor support and training outcomes. The significance of the findings is discussed, along with implications for researchers and practitioners, limitations of the current study, and opportunities for future research.

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## **Chapter 1 Introduction**

### **1.1 Overview**

With the promise to deliver cost-effective training anytime anywhere to any employee learners on-demand, e-learning has emerged as a promising means of enhancing employees' skills in organisations. Although organisations have invested significant amounts of time, money, and resources on e-learning (Association for Talent Development [ATD], 2016; Bersin, 2016; Training, 2016), the popular press has widely reported the poor perception, under-utilisation, and high dropout rates for e-learning courses in organisations. The anticipated outcomes and business benefits thought to be associated with e-learning have not seemed to materialise. This bring into question the true value of e-learning in organisations.

Past research has informed us that learner characteristics and work environment factors are key determinants of outcomes in traditional training environment (e.g., Baldwin & Ford, 1988; Colquitt et al., 2000). What remains unclear is if and how these factors also impact outcomes in workplace e-learning. A better understanding of the individual factors influencing e-learning outcomes in organisations will inform training and development professionals and enable them to plan appropriate measures to motivate and support employee e-learners. Likewise, a better understanding of the impact of organisational contextual factors on e-learning outcomes will inform training and development professionals on how to create a work environment that is conducive to e-learning success. With better strategies to support employee learners in workplace e-learning, the promise of anytime, anywhere e-learning will eventually materialise.

This thesis consists of five chapters. In chapter 1, the current problem of self-paced e-learning in organisations is introduced and the need for research justified. In chapter 2, the relevant literature from the field of training and development, industrial and organisational (I/O) psychology, and educational psychology is reviewed to identify what past research has done in related areas. This is followed by a discussion of the gaps identified in the literature, which then leads to the construction of the research framework and formulation of research questions in the current study. Research method, instruments, data collection, and analysis methods are discussed in chapter 3. Chapter 4 presents the data analysis process and the study results. In chapter 5, findings in the study are discussed, along with implications for practice, limitations of the current research, and suggestions for future research, followed by the conclusion.

In the next section, I shall review how training and development challenges facing organisations today have given rise to workplace e-learning and how the current problems of underutilisation and non-completion are impeding its success.

### **1.1.1 Training and development in organisations**

Training and development has been identified as a key strategic resource in today's workplaces that are dominated by knowledge-based work. But what exactly is training and development? What about learning? Without a clear understanding of the meaning of training, development, and learning, it would not be possible to have any meaningful discussion on how to make them better.

According to Goldstein and Ford (2002) and Aguinis and Kraiger (2009), training is systematic, planned, organised, time-framed activity with an organisational focus, usually for immediate application to improve performance on the current job. In other words, training is formal (i.e., planned and organised), short term, and with immediate benefit to the organisation. Participation in training may sometimes be mandated (i.e., as a job requirement) such that employees have no choice in engaging in it. Such mandatory participation is particularly common with the statutory regulatory compliance training typically found in the finance and related sectors.

A similar and related term is development. In organisation context, the key differences between training and development are that the latter is usually future oriented, open-ended, and long term. Development often focuses on growth of the individual employee and may not necessarily tie into an individual's current job.

In recent years, the term 'learning' has been increasingly used as a substitute for the term 'training' in the language of many organisations. Training and development (T&D) has thus become learning and development (L&D), and 'trainee' has become 'learner'. This change is probably intended to signal a shift in responsibility to the side of employees and to project a forward-looking orientation. However, for the purpose of this study, the terms 'training', 'learning', and 'development' will be treated synonymously.

### **1.1.2 Challenges in training and development**

The current training and development challenges for organisations are largely linked to

technological progression and globalisation in recent decades. According to the World Economic Forum (2017), the world economy is quickly transitioning from a manufacturing-based mass-production era to a knowledge-based economy. In the knowledge-based economy, production is based on cyber-physical production systems and economic value is increasingly derived from working with sources of knowledge (Pew Research Center, 2016).

As Drucker and Drucker (1993) put it:

*We know now that the source of wealth is something specifically human: knowledge. If we apply knowledge to tasks we already know how to do, we call it ‘productivity’. If we apply knowledge to tasks that are new and different we call it ‘innovation’. Only knowledge allows us to achieve these two goals.* (p. 23)

An increasing number of jobs are built around knowledge workers who use information to create original knowledge products (Pew Research Center, 2016). The key value of organisations thus lies in the knowledge and skills of their employees, otherwise known as human capital (Becker, 1964). However, knowledge in today's society changes exceedingly rapidly—minute by minute, if not second by second (Jarvis, 2007). New knowledge and novel work practices continuously evolve and change the ways in which people work (Littlejohn & Margaryan, 2014). For instance, recent advances in automation technologies are both replacing human operators on the factory floor and generating a new set of jobs that require different knowledge and skills (World Economic Forum, 2017). As knowledge is becoming more transient, Illeris (2011a) has suggested that the acquired knowledge and skills should be updated, developed, reorganised, and re-created constantly so that they can quickly and flexibly be adapted to emerging contexts that are yet to exist.

With a growing consensus that training and development is key to enhancing employees' productivity (Tam, 2014) and a means for organisations to gain competitive advantage (Noe et al., 2014), organisations have no choice but to put more emphasis on training and development. Given the fast pace of knowledge change, the ever-increasing demand for training, and limited resources, a key challenge for organisations today is to provide cost-efficient training and development opportunities to any employee learner who needs it, at exactly the moment when he or she wants it and where the employee learner requires it (Mohammadyari & Singh, 2015). Thus, cost-efficiency (i.e., business bottom line), responsiveness (i.e., timely and fast delivery), flexibility (i.e., available on demand), and accessibility (i.e., available to whoever needs it) are aspects of training and development success.

## **1.2 E-learning in organisations**

Traditionally, the primary means for training delivery in organisations is the instructor-led, live, face-to-face classroom-based training method (Anderson, 2014; Overton & Dixon, 2016). Instructor-led training (ILT) is an in-person, site-based, and synchronous delivery model involving a live instructor delivering authentic content in the form of lectures, presentations, or demonstrations in the front of a classroom. ILT is generally considered an effective means of training delivery, and it remains one of the most dominant delivery mechanisms for training courses, seminars, lectures, conferences, and private lessons in organisations (Backes-Gellner et al., 2014). Due to the growing importance of knowledge and skills as a source of productivity and competitive advantages, organisations are increasingly pressured to deliver more training, with limited resources, on demand, anytime and

anywhere. Cost-efficiency and flexibility thus become critical requirements for training delivery in organisations. Recent advances in digital technologies and development of the Internet make it possible to deliver out-of-class training experience through technology means. The proliferation of digital devices and fast development of the Internet have paved the way for e-learning in organisations. With the potential to deliver training and development opportunities to employee learners anytime, anywhere, e-learning has emerged as an alternative to ILT for training delivery in organisations.

In the following section, I shall first clarify what the term ‘e-learning’ means in the current study. This discussion is then followed by a detailed examination of the current status of e-learning in Hong Kong organisations so as to gain a better understanding of the nature of the problem central to the current study.

### **1.2.1 Definition of e-learning**

One of the first comprehensive reviews of the definition of e-learning was perhaps offered by Servage (2005). This author cited many e-learning definitions prevalent at the time and pointed out that the mere presence of the ‘e’ in front of the ‘learning’ portion of this term provoked a large volume of definitions and terminologies that are complex and confusing. On close examination, the various e-learning definitions can basically be divided into two major categories.

The first category emphasises the technology aspect of e-learning and often focuses on its capability in content distribution and collaboration. For instance, Welsh et al. (2003, p. 246)

defined e-learning as ‘the use of computer network technology, primarily over or through the internet, to deliver information and instruction to individuals’. A second category of e-learning definitions takes on a more learning focus—for example, ‘learning organized through any electronic medium or environment’ (Anohina, 2005, p. 96). Some other authors, however, have simply used the term ‘e-learning’ without first providing a definition (for examples, see Baldwin-Evans, 2004; Fisher et al., 2010; Lin, 2011; Lu & Chiou, 2010; Shvetts, 2011).

Regardless of whether researchers have reached a consensus on a common definition, it is important to understand that learning and technology (e.g., digital technology) are both key elements in e-learning. Hence, for the purpose of the current study, e-learning refers to the activity of learning whenever technological tools are involved to aid the learning process.

### **1.2.2 Self-paced e-learning in organisations**

E-learning can be applied in a variety of ways in organisational settings. For instance, e-learning courses can be offered in conjunction with ILT, otherwise known as blended learning. Most of the time, though, e-learning courses are offered entirely online and asynchronously in organisational settings. Learners usually proceed through this type of e-learning course independently at their own pace—hence the name ‘self-paced e-learning courses’.

Self-paced e-learning courses are essentially self-contained courseware packages with a structured curriculum purposefully designed to achieve a particular set of learning outcomes.

They usually exist in the form of multimedia instructional content to be delivered to learners on demand and asynchronously using technology means (Clark & Mayer, 2011). Learning time (i.e., the time it takes to finish studying the course material, also known as seat time) for a typical self-paced course can be as short as 30 minutes but is typically longer. The actual learning time of self-paced e-learning courses depends largely on the complexity of the underlying subject matter, amount of multimedia elements, amount of text, critical-thinking and problem-solving exercises, and so forth. Learners usually study self-paced e-learning courses solely on their own, at their own pace, anytime, anywhere. They also have the discretion to control how fast to learn, how much to learn, the sequence of learning, and more. A learner is usually deemed to have completed the self-paced e-learning course when he or she has visited all the learning material, participated in learning activities, and passed the end-of-course assessment.

Due to its potential to deliver on-demand training in a cost-efficient, timely, and flexible manner, adoption of self-paced e-learning in organisations is on the rise. Just to put things in perspective, the Association for Talent Development (ATD) has reported that self-paced e-learning accounted for 80% of all forms of online learning delivered in 2012 (Miller, 2013).

### **1.2.3 Strengths and weakness of ILT and e-learning in organisations**

In this section, the traditional ILT and the e-learning training delivery methods are reviewed for their strengths and weaknesses in helping organisations to meet the ever-increasing training challenges.

### **1.2.3.1 Cost-efficiency**

The instructor-led, live, face-to-face classroom-based training (ILT) method is traditionally the primary medium for training delivery in organisations (Anderson, 2014; Overton & Dixon, 2016). However, the in-person, site-based, and synchronous nature of ILT renders it a labour-intensive, and hence costly, way of training delivery (Scott, 2010). In addition to the cost of instructors, training facilities, and overhead, ILT entails a high cost of attendance (Webb et al., 2017) that potentially includes costs related to travel, logistics, and loss of productivity and opportunity as a result of employees' time spent away from their jobs attending training.

Notably, however, simultaneous physical presence of both the instructors and the learners is not normally required in e-learning. Thus, costs normally associated with ILT, such as live instructors, training sites and facilities, and travel and accommodation, are largely eliminated. In fact, Bersin et al. (2014) reported that McAfee has managed to compress its 80-hour-long new-hire orientation programme into an e-learning model, resulting in significant time savings for employees. This was due in part to the lesser need for 'training leave'. Such savings means e-learning is potentially a more cost-efficient training delivery option for organisations (Ellis & Kuznia, 2014).

As e-learning is delivered in digital formats, the tedious organisational process undertaken by the training administration can be automated using technology. This includes uncovering employees' training needs, enrolling target learners, delivering the required learning material in digital form, monitoring learners' progress, and finally reporting training results. This

potential for automation further increases the cost-efficiency of e-learning for organisations, in particular when a large number of employees from different regions or even countries are involved.

### **1.2.3.2 Flexibility and reach**

Business-critical training problems today are often time driven, so that corresponding training programmes must be delivered to thousands of participants within tight deadlines. A key benefit of e-learning is its inherent flexibility in meeting such challenge. Without the constraint of physical space and live instructors, e-learning courses can be made available 24 hours a day, 7 days a week, anywhere there is network connectivity. By leveraging the flexibility of e-learning, organisations can respond quickly to new and ever-changing training demand. Such absence of spatiotemporal constraints also means training opportunities are more accessible to employees on different shift schedules and at remote locations.

By contrast, the in-person and site-based nature of ILT requires such training to be planned (i.e., to ensure availability of an instructor, capacity of the venue, and other required resources) and scheduled (i.e., participants need to plan and make themselves available according to the schedule) well ahead of time. Such characteristics render ILT less flexible in terms of time and place, which may constrain organisations' ability to offer timely training opportunities to respond to business-critical issues. It may also preclude access to training opportunities by employees in remote areas or those who are too busy to attend training during normal workdays. As a result, timely training to those urgently in need of it cannot always be guaranteed.

### **1.2.3.3 Human interactions**

Although e-learning can be both cost-efficient and flexible, the lack of human touch is a common complaint. Without the presence of live instructors and peer learners, e-learning can be lonely. In addition, when the learners do not understand the concept being presented in an e-learning course, the instructor may not be readily available to help (Lambert & Yanson, 2017). In terms of content and instructional design, self-paced e-learning often adopts an instructivist, ‘telling’ approach and much of the pedagogy employed is ‘pedestrian’ and behaviouristic rather than interactive (Laurillard, 2008). Self-paced e-learners are hence limited to learning through watching and typing. As indicated by Dalziel (2003), self-paced e-learning is an isolated and solitary activity.

Conversely, a key strength of ILT is its emphasis on human interaction. ILT fosters a dynamic relationship between employee learners and the instructor. Employees can learn from each other as well as from the instructor. They can practice, collaborate, or even compete with guidance from the instructor. Availability of non-verbal cues such as responses and reactions is another key strength of the ILT method, which can be important in some learning situations. The entire ILT learning experience can not only be heard, but also seen and felt through behaviour and body language, including the participants’ emotions, mannerisms, gestures, tone, language, and volume of voice.

However, the reliance on the human instructor in the ILT format is not without its limitations, particularly for large-scale training initiatives involving a number of instructors. Given the

diverse background and experience of instructors, consistency of the training messages to be delivered by multiple instructors across different ILT sessions over time cannot always be guaranteed. This is problematic, as the requirement for consistency is of profound importance in safety, security, legal, compliance, and related training.

In e-learning programmes, employee learners receive exactly the same training message from the same courseware package no matter when and where the learning takes place. Hence, training consistency can always be assured. Such ability to deliver consistent training messages to a large group of audiences irrespective of time and space makes e-learning ideal for the delivery of regulatory and compliance types of training, which is prevalent in organisations today.

#### **1.2.3.4 Employee preference**

Another complaint cited against the use of e-learning in organisations is that many employees opt not to take advantage of e-learning opportunities, and prefer the traditional ILT format (CIPD, 2011). Many attribute this general preference for ILT to the lack of opportunities for immediate feedback and non-verbal cues as well as the reduced social and cultural interactions in e-learning. The lack of shared physical space with other e-learners largely eliminates opportunities for both social interactions between learners and peer-to-peer learning. Such lack of connectedness may contribute to a sense of isolation and loneliness in learning, which may help to explain why some employees opt not to take advantage of e-learning opportunities and still perceive face-to-face ILT classes more positively.

Another reason that might help to explain the general preference for ILT among employee learners is the popular perception of ILT as an unplanned reward (a day off). In addition to the learning, employee learners in ILT training gain the opportunity to network with other professionals as well as the added benefit of a day off from their busy work life. According to a survey conducted by UBS (Höfert et al., 2015), Hong Kong had the longest working hours in the world in 2015. It is hence no surprise that Hong Kong employees generally prefer the extra ‘day off’ as a result of participation in ILT class to the prospect of studying an e-learning programme, most probably using their own time.

### **1.2.3.5 Training effectiveness**

Training effectiveness is another concern for e-learning programmes in organisational settings. Sceptics regarding e-learning voice concerns that learners may perform worse in the e-learning format compared to the traditional ILT format. Research, however, has repeatedly found no significant differences in training effectiveness between the two training media. For instance, Russell (2001) reviewed more than 300 studies dating back from 1928 and detected no significant difference in student outcomes between traditional ILT and other learning medium. More recently, a major meta-analysis comparing e-learning with ILT by Means et al. (2010) found that the e-learning format has the potential to be even more effective than ILT. This well-respected meta-analysis used stringent criteria for selecting empirical studies that utilised a rigorous research design to compare e-learning with the traditional ILT format and quantitatively measured student learning outcomes. The authors found that students taking courses with an e-learning format actually performed modestly better than those taking courses in the traditional ILT format. More recently, Yang and Lin (2011) reported no

statistically significant differences in learning achievement and performance between employees who received computer-based training and employees who received the equivalent training in a traditional face-to-face mode. The consensus seems to be that e-learning is as effective as ILT and has the potential to be more effective in ILT in certain circumstances.

#### **1.2.3.6 Key roles of e-learning and ILT in organisations**

Clearly, the strengths of the traditional ILT method are that it is a proven, effective, widely accepted, and generally preferred training delivery mechanism. ILT generally emphasises the key role of the instructor as an authority and a source of knowledge. Both verbal and non-verbal communication techniques are typically employed in ILT, thus enabling learning through interaction between the instructor and learners as well as between learners. As a result, ILT seems to have an advantage when the subject matter is more complex and the instructor can easily confirm whether students are comfortable with the material. In addition, certain subject areas, particularly those focusing on soft-skills, benefit greatly from face-to-face delivery because non-verbal communication, such as gestures, body language, and facial expressions, is crucial in learning the subject matter. Hence, it is believed that the ILT method is particularly suitable to deliver soft-skills training in areas such as interpersonal communication, conflict resolution, and organisational communication in organisational settings.

By comparison, e-learning has the strength of being able to provide more training, delivered in more places and potentially at a lower cost, and with the learning being just as effective as, if not more effective than, traditional ILT. In terms of subject areas covered, Pailing (2002) noted

that e-learning is particularly popular in workplace safety, regulatory standards, and product knowledge training. Recently, CIPD (2011) also reported that e-learning is most commonly used for compliance (for example, health and safety, hygiene, and data protection). According to CIPD (2011), one-fifth of organisations now deliver all compliance training in the e-learning format and a further one-third deliver more than 50% of this training via e-learning. E-learning is also commonly used for induction and on-boarding and technology training.

Given this format's promise to achieve cost-efficiency, its offer of flexibility, and its lack of spatiotemporal constraints, it comes as no surprise to see that adoption of self-paced e-learning in organisations is on the rise. To put things in perspective, the American Society for Training and Development (ASTD) reported that self-paced e-learning accounted for 80% of all forms of online learning delivered in 2012 (Miller, 2013).

Although adoption of e-learning is on the rise, organisations seem to have problems attracting learners and keeping them engaged through completion of the course. Employee learners' negative perceptions (discussed in section 1.2.3.4) of e-learning remain a major challenges. This general preference for ILT, combined with the seemingly high e-learning non-completion rate (discussed in section 1.4.2), suggests that e-learning may be better in theory than it is in practice. The promise of e-learning to deliver cost-efficient, flexible, and effective training without the constraints of time and space may not inevitably materialise. Hence, there is an urgent need to gain a better awareness of how well e-learning can satisfy the ever-increasing training demand in organisations, which is central motivator of the current research.

Before diving into the main arguments of the study, it is important to contextualise e-learning

in the Hong Kong organisations in which the current research is situated. Contextualisation seeks to place the issue in a context, which aids in comprehension. It also helps to identify the research questions in preparation for a well-organised investigation. As such, a review of e-learning in Hong Kong organisations and a summary of the current problems are included in the following section to set the stage for further investigation.

### **1.3     Contextualising e-learning in Hong Kong organisations**

With a population of more than 7.3 million, Hong Kong is an autonomous territory located at the southeastern tip of China, a major port, a major service economy, a global financial hub, and the world's ninth largest trading economy. The majority of the businesses in Hong Kong are small and medium-sized enterprises (SMEs)<sup>1</sup>. Underpinned by forces of globalisation and technological developments, Hong Kong's occupational structure has undergone marked changes in recent decades. Demand for manual labour is declining. The shift towards knowledge-based activities has increased the demand for high-skilled workers. At the same time, the shelf life of employees' existing knowledge and skills has become shorter and requires frequent updating. One way for Hong Kong organisations to ensure an adequately skilled workforce so as to maintain their organisational competitiveness is to provide appropriate training. At the same time, the trend of lifetime employment is disappearing in Hong Kong. New management models mostly emphasise skills and competence. Higher levels of skills and competence are increasingly important for employees to avoid unemployment, low incomes, and job insecurity. To help them remain relevant in the highly

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<sup>1</sup> Manufacturing enterprises with fewer than 100 employees and non-manufacturing enterprises with fewer than 50 employees are regarded as SMEs in Hong Kong.

competitive job market, employees increasingly expect their employers to provide more training and development opportunities.

### **1.3.1 E-learning is gaining acceptance in Hong Kong organisations**

Historically, Hong Kong companies have not invested in employee training. Recently, Wadhwa (2009) noted that many companies—in particular, large organisations in Hong Kong—have become aware of the need to invest in employee training and development. In a survey conducted by the Hong Kong Institute of Human Resources Management (HKIHRM, 2017), 71% of the Hong Kong companies surveyed said that they have set aside a budget amounting to 3.4% of the total annual base salary for staff training and development. The same report also found that Hong Kong employers provided an average of 18.3 hours of training per employee in 2016. Although the amount of training hours provided per employee (i.e., 17.5 hours) may seem far below from that offered by US employers (i.e., 33.5 hours) (ATD, 2016), it does represent a big step forward.

Until recently, instructor-led, live, face-to-face classroom-based training was the primary means of training delivery in Hong Kong organisations. However, technological development and changes in economic structure are urging businesses towards a change of their learning environments. Hong Kong organisations are beginning to embrace e-learning as an alternative to ILT for training delivery. A recent survey of the Hong Kong hotel industry by Lee and Singh (2016) revealed that more than half of the respondents (55.9%) were in the midst of adopting e-learning. A more comprehensive survey by the Hong Kong Institute of Human Resource Management (2017) found that 60% of the organisations surveyed already

had e-learning programmes in place and confirmed a steady upward trend in e-learning adoption.

### **1.3.2 Driving forces for e-learning in Hong Kong organisations**

A related finding in the previously mentioned HKIHRM survey (HKIHRM, 2017) is that 80% of the Hong Kong pillar industries<sup>2</sup> have already implemented e-learning programmes. The survey also reported that e-learning is especially prevalent in the financial services industry, which employs more than 250,000 people and is a major contributor to Hong Kong's GDP (18% in 2016). A key reason for the popularity of e-learning in the financial services sector is probably the ever-increasing regulatory compliance requirements. Financial services institutions in Hong Kong are required to provide a variety of training to employees in areas such as regulatory compliance, business ethics, employee safety, sexual harassment, information security, cyber security, and anti-bribery and corruption.

With the introduction of a new anti-money laundering law<sup>3</sup> in Hong Kong in 2018, a need for regulatory and compliance training is also emerging in other sectors of the economy, including among solicitors, accountants, real estate agents, and trust and company service providers. A key impact of this new regulation is the need to update training materials to incorporate the new anti-money laundering and counter-terrorist financing measures and to provide timely training to relevant staff on the new regulation. To comply with the statutory regulatory requirement, on-going monitoring is also required to ensure employees have

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<sup>2</sup> The four pillar industries of Hong Kong are trading and logistics, financial services, professional services and other producer services, and tourism.

<sup>3</sup> Anti-Money Laundering and Counter-Terrorist Financing (Financial Institutions) (Amendment) Bill 2017.

successfully completed the required training.

The large learner population and the requirement for on-going monitoring renders regulatory and compliance training an ideal candidate for delivery using technology. This probably explains the high e-learning penetration in the local financial services industry and is also in line with global trends. According to the 2014 Towards Maturity Benchmark (Towards Maturity, 2015), 59% of a sample of more than 600 organisations across different countries were using e-learning for compliance training. The report also revealed that more than 85% of organisations surveyed were looking to technology to help them comply with new regulations and legal requirements that might arise in the future.

Another likely reason for the growing popularity of e-learning in Hong Kong is the busy working life of Hong Kong employees. Lack of time is a common complaint among Hong Kong employee learners. According to a survey conducted by UBS (Höfert et al., 2015), Hong Kong had the longest working hours in the world in 2015 (2,606 hours per year). It is hence no surprise to find time constraints are a major barrier for learning participation among Hong Kong adult learners (HKU SPACE, 2015). According to a recent report (Legislative Council Secretariat, 2017) from the Legislative Council (the law-making body in Hong Kong), such a time barrier to learning participation points to the need to design and tailor more flexible learning programmes. Clearly, the time constraints faced by Hong Kong employee learners warrant a more flexible learning environment. E-learning's distinctive characteristics of learning anytime, anywhere should, therefore, be of particular relevance to Hong Kong employee learners.

In sum, key drivers for e-learning in Hong Kong organisations are mainly economic, instrumental, and largely related to reasons such as cost containment, better access, and managerial control. In the next section, the application of workplace self-paced e-learning, which is a popular training option in Hong Kong organisations, is discussed.

### **1.3.3 WSPEL in Hong Kong organisations**

As discussed in section 1.2.2, e-learning can be offered entirely on its own or in conjunction with ILT courses. A type of e-learning implementation that is particularly popular in the Hong Kong workplace is self-paced e-learning, otherwise known as workplace self-paced e-learning (WSPEL). WSPEL courses are essentially self-learning multimedia instructional learning packages that are purposefully designed to address specific training needs of the organisation. To save time and money, WSPEL courses are often created by repurposing existing ILT course materials into the required digital format (Newton, 2011). Such an approach is particularly popular in the high-volume regulatory compliance e-learning arena (Majumdar, 2016; Vayuvegula, 2015). The time it takes employee learners to finish studying a WSPEL course is typically 2 to 3 hours, although this duration has been getting much shorter in recent years. WSPEL courses with a learning time of 30 minutes or less are not uncommon today. For administrative convenience and better managerial control (Lin, 2011; Wang & Hannafin, 2005), WSPEL courses are usually assigned to employee learners in groups according to a planned schedule.

Once enrolled, employee learners will study the assigned WSPEL course by themselves, at their chosen time and place, without the direct involvement of a live instructor or other

learners. While studying the WSPEL course, learners are usually required to visit all the learning content and participate in the underlying learning activities. Along the way, they have the discretion to decide what to learn, how fast to learn, as well as what sequence of learning to follow. Before the employee learner is deemed to have completed a WSPEL course, he or she is usually required to pass the end-of-course assessment. Only until then is completion of the course—a key WSPEL outcome—considered to have been achieved. When compared to the requirement for achieving completion status in traditional ILT training, which may just expect employees to sit passively through the training session, completion of WSPEL courses seems to require a great deal more effort and active participation on the side of the employee learners.

A key reason for the growing popularity of WSPEL in Hong Kong organisations is the ever-increasing regulatory requirements (discussed in section 1.3.2). To comply with the internal and external regulatory requirements, it is vital for organisations to ensure that all of their employees complete the required training in time. Course completion, therefore, is a critical outcome for training and development in organisations and is often the basis for organisations to justify their investment in WSPEL.

#### **1.4 Statement of the problem and the need to research**

According to a recent comprehensive study by HKIHRM (2017), e-learning in Hong Kong organisations is on the rise. Organisations are putting a lot of investment into e-learning in an effort to improve the performance and develop the skills of their workforces. Given the sizable e-learning investment, improved learning outcomes—in particular, course

completion—are the fundamental way to get the desired return on investment (ROI). Unfortunately, extensive investment does not necessarily guarantee positive learning outcomes. Under-utilisation and non-completion of WSPEL courses are currently major problems facing Hong Kong organisations.

#### **1.4.1 Underutilisation**

While organisations in Hong Kong are building and making available WSPEL courses to meet the learning needs of their workforces, employees seem to be failing to fully engage with the opportunities provided. More than a decade ago, Yeung and Jordan (2007) noted that Hong Kong corporations were facing the problem of poor utilisation of the e-learning solution. A possible cause of the low utilisation in WSPEL courses may be related to Hong Kong learners' poor perceptions of e-learning. The School of Professional and Continuing Education of the University of Hong Kong conducts bi-annual surveys on the demand for continuing education by Hong Kong adult learners (Young et al., 2012). Its findings reveal more than 50% of survey respondents gave definite negative answers when asked if they would like to try an e-learning course (the figures were 50.1%, 60.3%, and 51.5% in 2008, 2010, and 2012, respectively). Fewer than 44% of the survey respondents showed positive attitudes towards e-learning. This pointed to a general negative perception of e-learning by Hong Kong adult learners. Although the primary purpose of this series of studies was to understand the demand for continuing education of Hong Kong adult learners, its findings are also relevant to our understanding of the attitudes towards e-learning by employee learners, as these adult learners are also employees in Hong Kong organisations.

### **1.4.2 Non-completion/dropout**

Perhaps an even bigger problem for organisations is non-completion of WSPEL courses. The well-known problem of high dropout rates in online education (Stiller & Köster, 2016) also applies to organisations. High non-completion rates in e-learning are overwhelmingly reported in the literature. For instance, Matsuo et al. (2008) noted that many learners simply drop out of e-learning courses before they are able to complete them, leading to high overall dropout rates. Annansingh and Bright (2010) noted from past literature that e-learning rarely has been successful in continued use. Orr et al. (2010) reported a completion rate of 27% in an e-learning study conducted in China. While a corresponding figure is not available in Hong Kong, low e-learning completion rates, in particular for self-paced e-learning, in organisations are widely circulated within the local training and development community.

Although non-completion is a major concern in e-learning, some argue that it is not the same as the concept of dropout in ILT and should not be treated the same way (e.g., Baldwin-Evans, 2004). The key argument for this school of thought is that while most learners participate in an e-learning course from the beginning to the end to learn a certain subject, others might just want to use the e-learning course as a reference resource, perhaps for problem-solving purposes. Since these learners never have the intention to complete the e-learning course, they should not be considered non-completers. A similar and parallel argument can be found in recent literature when explaining the low completion rates for massive online open courses (MOOCs), which, according to Jordan (2015), range from 0.7% to 52.1%.

While this argument may help to explain the non-completion phenomenon for a small group of learners who may just dip in to the e-learning course to satisfy their own curiosity or simply use it as a problem-solving tool, the problem is that such use is never the intent of organisations. As discussed in section 1.3.2, many of these e-learning courses are created with a purpose, such as to meet certain statutory regulatory compliance requirements. The key outcome expected is course completion, which is also the basis for justifying the financial investment in e-learning. Irrespective of the underlying reason, non-completion is definitely undesirable and hence a major concern for organisations. Undoubtedly, if employees have problems even completing WSPEL courses, other expected outcomes of WSPEL—such as satisfaction, learning, and positive changes in workplace behaviours—may not eventually materialise. The value of workplace self-paced e-learning in Hong Kong organisations is seriously questioned.

### **1.4.3 The need for research**

The accelerating pace of knowledge growth and technological progress have given rise to e-learning in organisations. WSPEL is an innovative approach to deliver learning material electronically to a large group of learners asynchronously, anytime, anywhere, in a self-paced manner and on demand, without the involvement of a live instructor. Such a training approach brings to organisations the benefits of cost-efficiency, flexibility, accessibility, and better managerial control, which are not possible using the traditional ILT training delivery method. Yet, the mere availability of WSPEL does not automatically confer its benefits.

Although adoption of e-learning in Hong Kong organisations is on the rise, negative perceptions and non-completion of the courses remain major challenges. Organisations seem to have problems attracting learners to WSPEL and keeping them engaged until course completion. The overall results of workplace self-paced e-learning appear disappointing. The seemingly high non-completion rate for WSPEL courses, coupled with low take-up (utilisation) and even lower return rate (continuance), suggests that e-learning may be better in theory than it is in practice. Concerns have thus emerged that WSPEL may not always live up to its promise of delivering the expected outcomes of cost-efficiency, responsiveness, flexibility, and accessibility.

The rush to e-learning has left many questions about what makes WSPEL effective and successful, and how. Technology in and of itself does not create learning. We need to know more about what works and why. What makes certain employee learners more successful in WSPEL, and why do they flourish while others fail? Is there any measure that organisations can put in place to better support employee learners to make their WSPEL endeavours more successful? With these questions answered, both employee learners and organisations will be better informed in planning and choosing the right strategies and measures to capitalise on the long-anticipated benefits of WSPEL. A study to enhance our understanding of how organisation might potentially make WSPEL successful is thus warranted.

## **1.5 Purpose of the study**

The problems of low completion and under-utilisation in WSPEL raise the question of how to support employee learners to achieve the desired outcomes in such learning environments.

Before effective support measures can be designed, it is necessary to gain a better awareness of the fit of WSPEL with the ecology of the Hong Kong workplace, particularly the way that learning outcomes are shaped in WSPEL, which is central motivator of the current research.

Since WSPEL extends the horizons of learning in both time and space, additional forces not normally at play within the confined environment of the site-based synchronous ILT delivery model may facilitate or hinder the achievement of learning outcomes in WSPEL. Given the fact that WSPEL is essentially self-paced training based on technology use in the workplace context, it shares many of the key aspects with traditional ILT training. This includes the purposes of training, training content and material, and, most importantly, the training participants. Past research has informed us that motivation of training participants is a key determinant of outcomes in traditional ILT training environment (e.g., Baldwin & Ford, 1988; Bell et al., 2017; Colquitt et al., 2000). It is therefore possible that motivation might play a similar role in contributing to outcomes in WSPEL.

WSPEL is also about self-paced learning. In the absence of support and guidance from an instructor, WSPEL learners are required to take charge of the learning process and to learn independently. Furthermore, WSPEL is technology based, so learners are required to manage the underlying technology in addition to the learning itself. In such a highly autonomous and technology-oriented learning environment, employee learners should plan ahead, use appropriate learning strategies, and exercise greater self-management to achieve the desired learning outcomes (Bol & Garner, 2011).

Another key characteristic of WSPEL is that it takes place in the context of work and in the flow of work. Given that the primary function of the workplace is production and not

learning, WSPEL is highly susceptible to the influence of competing forces in the workplace environment. Organisational contextual factors not usually considered relevant in traditional ILT training can potentially influence outcomes in WSPEL and, therefore, should not be neglected.

Given the growing importance of WSPEL in Hong Kong organisations, it is important to gain a better awareness of how WSPEL learning outcomes are shaped by these principal forces. Therefore, the objective of the current study is to develop an empirically based conceptual framework incorporating these principal themes to explain how outcomes are shaped in WSPEL to inform practice.

## **1.6 Significance of the study**

Technology in and of itself does not create learning. Rather, learning is shaped by the diverse ways in which individual employee learners elect to engage in the learning process. With a better understanding of what makes employee learners more successful in WSPEL, it is possible to design the right measures to support employee learners and to inform them regarding the appropriate learning strategies and practices to increase their chances of success. A better understanding of the impact of organisational context factors on WSPEL outcomes is also critical in providing insight for organisations as they seek to formulate the right policies for implementing and managing WSPEL. Given the growing importance of WSPEL in today's organisations, the findings of this study should inform organisations, practitioners, and employee learners about possible measures to better plan, design, and study WSPEL courses so as to increase the chance of success. With better strategies and measures

to support employee learners and a work environment that is conducive to WSPEL success, the anytime, anywhere learning promised by WSPEL will eventually materialise.

## **1.7 Summary**

This chapter has presented an overview of training, e-learning, and self-paced e-learning in the workplace. The current problems of e-learning in organisations were discussed, along with purpose of the research and its significance.

Following is the structure of the remaining chapters in this thesis:

- Chapter 2 reviews recent literature on motivation, self-regulated learning, and organisational contextual factors for their potential relevance to workplace self-paced e-learning outcomes. Gaps in the literature are identified. A conceptual framework for the study and research questions are developed and the main study variables identified.
- Chapter 3 discusses the research strategy and reasons for using the selected study method. The chapter also provides a layout of how the research was conducted and includes information on the sources of the data, the data collection procedure, and the analysis of the data.
- Chapter 4 details results of the study.

- Chapter 5 provides a summary of the research. The findings are discussed and interpretation of the findings is provided. The impact of the conclusions on workplace self-paced e-learning is discussed.

## **Chapter 2 Literature review**

Section 1.4 described how Hong Kong organisations are investing significant amounts of time, money, and resources in WSPEL but appear to be having problems keeping employee learners engaged to achieve the desired outcomes. Hence there is an urgent need to identify the principal forces behind workplace self-paced e-learning (WSPEL) as well as to understand how these forces interact to shape WSPEL outcomes. By answering these important questions, both organisations and employee learners will be better informed to choose the right strategies and measures to make their WSPEL endeavours more successful.

To begin the exploration, a conceptualisation of WSPEL is included in section 2.1. The learner's motivation, self-regulated learning, and organisational context are identified as forces that may operate behind WSPEL outcomes. An initial conceptual framework is constructed to describe the potential relationships between these principal forces and WSPEL outcomes.

In section 2.2, the key roles of learner characteristics in determining training outcomes are reviewed. Motivation to learn, a key learner characteristic, is examined for its potential relevance in influencing WSPEL outcomes.

In section 2.3, self-regulated learning (SRL) characteristics—in particular, the use of SRL strategies—is reviewed for its potential influence on outcomes in WSPEL.

In section 2.4, the relevance of organisation context in affecting WSPEL outcomes is considered. Perceived choice, organisational support, supervisor support, and workload are identified as potential organisational forces shaping WSEPL outcomes.

Section 2.5 outlines gaps in the current WSPEL research. After an extensive literature review, the conceptual framework is refined and research questions are developed.

Section 2.6 presents a summary of this chapter.

## **2.1 Conceptualising workplace self-paced e-learning (WSPEL)**

As discussed in section 1.5, a key goal of the current research is to develop an empirically based conceptual framework of principal forces that operate behind key WSPEL outcomes to inform practice. Before the conceptual framework can be constructed and tested empirically, it is necessary to gain an in-depth understanding of the key outcomes expected of WSPEL as well as to identify prospective forces that operate behind these outcomes in organisations. In the next section, key outcomes of WSPEL are discussed which is then followed by an exploration of the prospective forces that operate behind these outcomes.

### **2.1.1 WSPEL outcomes**

### **2.1.1.1 Course completion as a key outcome in WSPEL**

As discussed in section 1.3, a key reason for the growing popularity of WSPEL in Hong Kong organisations is the ever increasing internal and external regulatory requirements. To comply with these requirements, organisations need to ensure all employees complete the required training in a timely manner. Course completion is thus a critical outcome in WSPEL. In addition, course completion is also the basis for organisations to justify their investment in WSPEL programmes that are non-compliance in nature.

To achieve completion status in a typical WSPEL course, employee learners are required to visit all the learning material, participate in learning activities and pass the end of course assessment (Competition and Markets Authority, 2017). Only until then, completion of the course – a key WSPEL outcome, is attained. When compare to the requirement for achieving completion status in traditional ILT training, which may simply require employees to sit passively through the training session, completion of WSPEL courses seems to require a great deal more effort and active participation on the side of the employee learners.

### **2.1.1.2 Learner satisfaction and learning as key outcomes in WSPEL**

In addition to course completion, WSPEL courses are often evaluated for other outcomes to justify the investment. The basis for such evaluation is usually the Kirkpatrick Four-Level Training Evaluation Model (Kirkpatrick, 1959), which is a widely accepted training evaluation framework in organisations world-wide (Marshall, 2018; Paull et al., 2016).

The Kirkpatrick's evaluation framework is composed of a hierarchy of four levels of evaluation and each level's importance is greater than the previous level. The first level of evaluation is learner's reaction to the course. This refers to learner's levels of satisfaction with the training course including the degree to which the learner think the training was worth their time, favourable and successful. Surveys and questionnaires are mainly employed by organisations to measure this outcome. The second level of evaluation is learning, which refers to the degree to which learners acquire the intended knowledge, skills, attitude in the learning process. A typical way for organisations to measure learning is to test the learners to determine their knowledge, skill levels and attitudes once the training is completed. The third level of evaluation in the Kirkpatrick framework is behaviour. This refers to the extent to which learners apply what they learned during training back to their job. Due to resource constraint, evaluation at level 3 may not be practical for high volume training, such as in WSPEL. Finally, the fourth level of evaluation is the degree to which targeted outcomes (i.e., organisational results) occur as a result of enhanced learner's behaviours due to training. The task of linking organisational result to learners' enhanced behaviour due to training can be highly challenging, time-consuming and resource intensive. Hence, evaluation at level 4 is not practical for most organisations and situations.

Perhaps due to resource constraint, most Hong Kong organisations tend to limit their evaluation to the first two levels (i.e., learner satisfaction and learning). This is consistent with survey result by Sugrue (2004) who found US organisations reported using mostly the lower levels evaluation, measures of reaction (78%) and learning (32%). This is probably related to the complexity involves in measuring the higher-level outcomes as discussed above.

In sum, course completion, learner satisfaction and learning are key outcomes expected of WSPEL in Hong Kong organisations. Recall that key goal of the current research is to develop an empirically based conceptual framework of principal forces that operate behind key WSPEL outcomes to inform practice. Course completion, learner satisfaction and learning thus become the WSPEL outcomes that are of interest in the current study.

### **2.1.2 Principal forces that operate behind key WSPEL outcomes**

After reviewing the key outcomes expected of WSPEL, prospective forces, which operate behind these WSPEL outcomes, are identified in the following sections. An initial conceptual framework to describe the potential relationship between these principal forces and WSPEL outcomes is then proposed.

#### **2.1.2.1 Motivation**

Training theory and research widely recognises that learner characteristics are having direct and indirect effects on learning outcomes. One such learner characteristic that can potentially influence learning outcomes is the learner's motivation. Motivation refers to any force that energises and directs behaviour (Reeve, 2009). While energy gives behaviour its strength, intensity, and persistence (Maehr, 1984), direction gives behaviour its purpose and goal-directedness (Dweck & Elliott, 1983). In a training situation, motivation influences the willingness of an employee to attend training in the first place (Maurer & Tarulli, 1994; Noe

& Wilk, 1993). It also affects a learner's decision to exert energy towards engaging in and completing the training programme (Ryman & Biersner, 1975).

In a WSPEL environment, learners are given additional freedom to make decisions on the degree of involvement, the time spent on the course, and, most importantly, whether to persist or drop out of the course. Employee learners with a higher level of motivation should be more willing to attend WSPEL training in the first place, and that factor should also positively affect the learner's decision to devote energy to the WSPEL program. Therefore, motivated learners should have more opportunities to thrive than do unmotivated learners in WSPEL environment. As such, motivation should be a key driving force, which has the potential to influence outcomes in WSPEL. It is examined further in section 2.2.

### **2.1.2.2 Self-regulated learning (SRL)**

WSPEL is a technology-oriented learning environment that promotes a more active role on the part of learners in the construction of their own knowledge (Goulão, 2010). At the same time, WSPEL affords low levels of support and guidance to learners. Such learning conditions do not have the same level of structure and support as what learners have typically experienced in traditional learning environments.(Gasevic et al., 2014). In the absence of social support and external pressure to make progress, motivation alone may not be sufficient for learning persistence. As a consequence, the attainment of learning outcomes in WSPEL requires more effort from the learners, who may need to take on a more active role to engage in the learning. Strategies that prepare learners for the challenges of studying in such a technology-oriented and highly autonomous learning environment must be put into practice

to increase the probability of success. According to Sitzmann and Ely (2011), one way to enable learners to learn effectively in this kind of learning environment is self-regulated learning (SRL). Hence, there is a need to explore the potential of applying self-regulated learning to WSPEL.

A review of the literature found numerous theories of self-regulated learning (Boekaerts, 1997; Pintrich, 2000b; Winne, 1996; Zimmerman, 2000). Most of these models agree that self-regulated learning is an active and constructive process whereby students regulate different cognitive, metacognitive, motivational, and behavioural processes during their learning. Characterised by the ability to initiate these processes during learning, self-regulated learners are able to guide and anticipate their learning goals, select courses of action, and monitor their learning progress (Bandura, 2001). Kizilcec et al. (2017) have argued that such self-regulated learning skills is critical for learning in environments that afford low levels of support and guidance, such as in WSPEL. It follows that learners with stronger self-regulated learning skills should stand a higher chance of succeeding in WSPEL. As such, self-regulated learning should also influence outcomes in WSPEL. This issue is examined further in section 2.3.

### **2.1.2.3 Organisational context**

Since training occurs within a larger organisational context, it is inextricably linked to contextual factors that evolve out of the work environment. For instance, Berge (2007) identified conflicting priorities between workplace demands and learning as a common issue in organisations. Likewise, Thomson et al. (2017) found that getting employees to carve time

for learning out of their busy working life is a key challenge for US organisations. This situation is understandable, as doing the job is always the priority in the workplace, not learning.

The context of workplace learning encompasses a broad set of factors including reward and feedback systems, climate in the organisation, supervisor support, opportunity to perform, job autonomy, and job design. According to Goldstein (1980), such organisational contextual factors may have a substantial influence on training outcomes. When Baldwin and Ford (1988) conducted one of the first comprehensive reviews of training transfer research, they concluded that organisational contextual factors, along with learner characteristics and training design, affect learning and transfer performance. Numerous other authors have since found that organisations' contextual factors affect different aspects of learning in the workplace (e.g., Baeten et al., 2010; Delva et al., 2004; Kirby et al., 2003). Clearly, learning at work cannot be separated from the workplace context in which that learning occurs. In WSPEL, the employee learners must take on the additional responsibility of managing their own learning within the constraints afforded by their work role in the flow of work. Thus, the organisational context should exert forces influencing outcomes in WSPEL. This issue is discussed further in section 2.4.

### **2.1.3 Conceptual framework of forces influencing WSPEL outcomes**

Prior work has established the foundation for understanding how motivation, self-regulated learning, and organisational context affect training outcomes in traditional ILT settings. In WSPEL, employee learners are required to shoulder additional responsibilities as part of the

learning process. Motivation should affects the learner's decision to exert energy towards the WSPEL learning process and, therefore, should influence WSPEL outcomes. In addition, WSPEL is a technology-oriented learning environment, which affords low levels of support and guidance to learners. For learners to succeed and achieve the desired outcomes in such a loosely structured learning environment, factors related to self-regulated learning should be important. Finally, WSPEL often takes place in the immediate work environment and in the flow of work. As such, it is inextricably linked to contextual factors that evolve out of the work environment. Thus, organisation context should also directly or indirectly exert forces influencing outcomes in WSPEL.

In sum, motivation, self-regulated learning, and organisation context are identified as forces that may potentially influence outcomes in WSPEL. An initial conceptual framework to describe the relationships among these forces and WSPEL outcomes is shown in Figure 1. The potential links joining motivation, self-regulatory learning, organisational context, and WSPEL outcomes are examined further in the sections that follow.

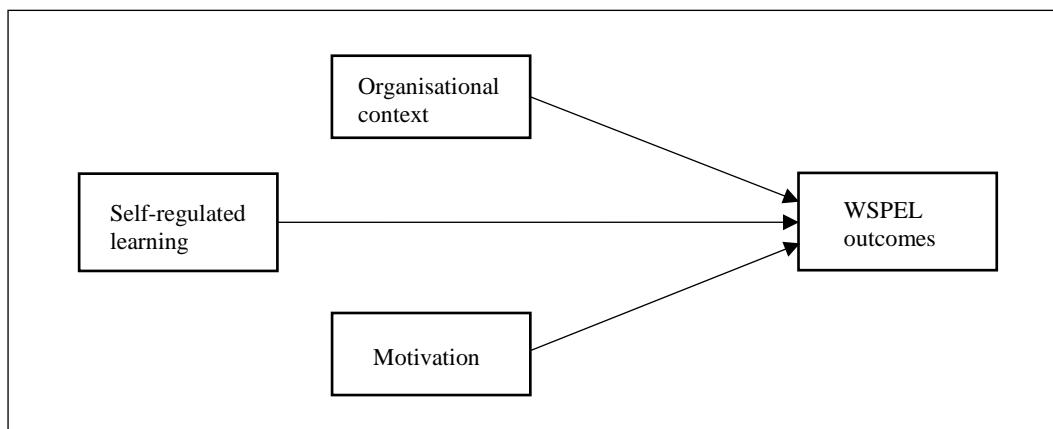


Figure 1: Initial conceptual framework of forces influencing WSPEL outcomes

## **2.2 Motivation and WSPEL outcomes**

As discussed in section 2.1.2.1, motivation is identified as a potential force behind WSPEL outcomes. Hence, the concept of motivation and its relationship with WSPEL outcomes are reviewed further in this section. To begin, the relationship between motivation and outcomes in traditional training environment is considered.

### **2.2.1 Learner characteristics and training outcomes**

It was Baldwin and Ford (1988) who first suggested that a training ‘system’ includes three major components that can influence overall effectiveness—namely, instructional design and training methods, learner characteristics, and organisational conditions. Empirical evidence has since provided good support for Baldwin and Ford’s model and further established the important role of learner characteristics in affecting training outcomes. Learner characteristic variables identified as influencing training outcomes include motivation to learn, locus of control, conscientiousness, anxiety, age, cognitive ability, self-efficacy, valence, and job involvement, among others. This growing body of research has given rise to a learner-centric view of learning and led researchers to pay more attention to learner characteristics as important determinants of training outcomes. Among the vast array of learner characteristics, past research has confirmed motivation to learn as one of the key determinants of training outcomes (Bell et al., 2017); this factor is examined next.

### **2.2.2 The construct of motivation to learn**

Motivation arises from many different sources, such as needs, cognitions, emotions, and environmental events, and is generally regarded as a driving force for the initiation, direction, and persistence of goal-oriented behaviour. In an attempt to establish a link between motivation and training outcomes, Noe (1986) developed the motivation to learn (MTL) construct based on Vroom's (1964) expectancy theory. Motivation to learn was described as the specific desire of the trainee to learn the content of the training programme (Noe, 1986, p. 743). It encompasses employee learners' interest in and desire for new job-related knowledge and skills (Noe, 1986; Noe & Schmitt, 1986). In particular, it reflects employee learners' willingness to engage in and to learn the training content, and to participate in the learning activities so as to achieve learning-oriented goals (Robbins et al., 2013).

### **2.2.3 Motivation to learn and training outcomes**

A substantial body of research has identified the learner's motivation as a key determinant of training outcomes (Mathieu et al., 1992a; Noe & Schmitt, 1986; Tracey et al., 2001; Tsai & Tai, 2003) in traditional training environments. Meta-analytic support for the positive relationship between motivation to learn and outcomes in traditional training settings can be found in the work of Colquitt et al. (2000), Blume et al. (2010), and Gegenfurtner (2011). In the seminal meta-analysis by Colquitt et al. (2000), which summarised more than 25 years of research, motivation to learn was found to be significantly related to declarative knowledge and skill acquisition. Subsequent meta-analysis by Blume et al. (2010) and Gegenfurtner (2011) also demonstrated that trainee motivation was positively and significantly predictive of learning and transfer of learning on the job.

Empirically, a considerable number of single studies have consistently shown a predictive relationship between motivation to learn and learners' reactions (Mathieu et al., 1992a; Tannenbaum et al., 1991), learning (Baldwin et al., 1991; Mathieu et al., 1992b), and performance (Hicks & Klimoski, 1987). Further support for the positive relationship between motivation to learn and measures of satisfaction and learning was also found in the work of Tracey et al. (2001) and Klein et al. (2006). Together, empirical and meta-analytic results support the influence of motivation to learn on the effectiveness of training outcomes in the traditional training process.

#### **2.2.4 The relationship between motivation to learn and WSPEL outcomes**

A key characteristic of WSPEL is the lack of a shared physical space between learners and the instructor. Such lack of connectedness in WSPEL may contribute to a sense of isolation and loneliness (see section 1.2.3.3). In the absence of an instructor, WSPEL learners are also required to take charge of the learning process and to learn independently. Furthermore, they often need to do so at work, which is full of competing priorities. Hence, WSPEL requires a great deal of effort on the part of employee learners.

Motivation to learn (MTL) reflects employee learners' willingness to engage in and to learn the training content. It influences the direction, effort, interest, and persistence that employee learners display in regard to the learning process (discussed in section 2.2.2). Therefore, motivation to learn should play an important role in guiding and energising employee learners to take charge of and to 'stick with' the highly autonomous WSPEL process in today's dynamic workplace. Nevertheless, little empirical research has investigated the

relationship between MTL and outcomes in WSPEL. Indeed, the relative extent to which MTL influence outcomes in WSPEL environments is yet to be researched.

After considering motivation to learn as a potential force influencing WSPEL outcomes, self-regulated learning is considered next.

## **2.3 Self-regulated learning and WSPEL outcomes**

A key feature of WSPEL is that it places a variety of demands on employee learners that exceed those typically experienced in traditional ILT courses. Thus, providing employee learners with opportunities to learn anytime, anywhere through WSPEL may not be effective if those employees lack the skills needed to manage their learning effectively. As discussed in section 2.1.2.2, one way to enable learners to learn effectively in the highly autonomous WSPEL learning environment is self-regulated learning (SRL).

### **2.3.1 Self-regulated learning**

Self-regulation has been widely recognised in recent years as a key predictor of a variety of outcomes, including school readiness (Morrison et al., 2010), academic achievement in adolescence (Duckworth et al., 2012), and long-term educational outcomes (McClelland et al., 2013). Before the potential relationship between SRL and WSPEL outcomes is considered here, characteristics of self-regulated learning are first presented in section 2.3.1.1. This is followed by a review of two influential SRL frameworks (sections 2.3.1.3 and 2.3.1.4) to

identify key motivational process and learning strategies underlying self-regulated learning (section 2.3.1.5). Finally, the relationships between employee learners' self-regulated learning strategy use (section 2.3.2), motivational beliefs (section 2.3.3), and outcomes in different learning environments are explored and their potential relevance to WSPEL considered.

### **2.3.1.1 Characteristics of self-regulated learning**

In the last two decades, a significant body of research has advanced our understanding of how learners regulate their own learning (e.g., Pintrich, 2000b; Winne & Hadwin, 1998; Zimmerman, 2000; Zimmerman & Schunk, 2001). It is generally agreed that self-regulated learning involves many goal-related skills—notably, goal setting, the use of appropriate learning strategies for achieving the learning goals, and monitoring and self-evaluation of one's performance toward goal attainment. Self-regulated learners are mostly portrayed as active constructive participants in the learning process (Pintrich & Zusho, 2002, p. 250).

They set standards or goals to strive for in their learning. They see knowledge acquisition as a systematic and controllable process, and take greater responsibility for the achievement of their learning goals (Bramucci, 2013). Throughout the learning process, they 'inspect and, as they are able, strive to improve how they go about learning' (Winne, 2018, p. 11). They plan ahead, and consistently monitor their progress towards these goals. This is done to assess whether the process should continue as is or whether the learners should adapt and regulate their cognition, motivation, and behaviour so as to reach their learning goals (Zimmerman, 1989). Self-regulated learners also develop better learning strategies and demonstrate better academic performance than those who lack self-regulation (Zimmerman & Kitsantas, 2014). They effectively manage their time and learning resources (Pintrich, 2004). Consequently,

self-regulated learners are more likely to persist in a challenging learning context, such as in WSPEL.

### **2.3.1.2 Definition of self-regulated learning**

Over the years, researchers have offered several competing perspectives on how learning is self-regulated. For instance, self-regulated learning is seen as ‘processes that learners use to systematically focus their thoughts, feelings, and actions on the attainment of their goals’ Schunk (2012, p. 441). It is also referred to as ‘an active, constructive process whereby learners set goals for their learning and then attempt to monitor, regulate and control their cognition, intentions and behaviour, guided and constrained by their goals and the contextual features of the environment’ (Pintrich, 2000b). More recently, Sitzmann and Ely (2011) described SRL as ‘the modulation of affective, cognitive, and behavioural processes throughout a learning experience to reach a desired level of achievement’ (p. 421).

Out of the many models of self-regulated learning, Kizilcec et al. (2017) noted that two established models of SRL from Pintrich (2000b) and Zimmerman (2000) stand out in the literature as distinct approaches that largely explain the same process of self-regulated learning. In a recent comparison of six influential SRL models, Panadero (2017) noted that the combined model from Pintrich and Zimmerman is more widely used and has received the highest number of citations among the six influential SRL models that the author reviewed. Zimmerman and Pintrich’s SRL models are reviewed next for their potential relevance in affecting WSPEL outcomes.

### **2.3.1.3 Zimmerman's SRL model**

Zimmerman developed a social cognitive model of SRL known as the triadic analysis of SRL (Zimmerman, 1989) in an attempt to understand students' willingness to assume personal responsibility for their academic learning and performance (Zimmerman, 2013). In Zimmerman's model, internal personal variables (e.g., cognitive, affective) of the learner are affected reciprocally by the environment in which the learner is operating (e.g., the work environment). This relationship, in turn, affects the effort the learner applies to the learning task (e.g., learning behaviour).

Underlying Zimmerman's model is the assumption of active self-regulated learners who are metacognitively, motivationally, and behaviourally active participants in their own learning. Metacognitively, self-regulated learners plan, set goals, organise, self-monitor, and self-evaluate. Behaviourally, such learners select, structure, and create environments that optimise learning (Zimmerman, 1990b). Motivationally, the learners report high intrinsic task interest, self-efficacy, and self-attributions. Zimmerman further asserted that self-regulated learners will systematically select and use learning strategies to achieve desired learning outcomes. Learning strategies, as defined by Zimmerman (1990b), are 'actions and processes directed at acquisition of information or skills that involve agency, purpose, and instrumentality perceptions by learners' (p. 5). When these points are put together, Zimmerman (1990b) argued that learners' responsiveness to self-oriented feedback, systematic use of metacognitive and behavioural strategies, and interdependent motivational processes are key aspects of self-regulated learning.

#### **2.3.1.4 Pintrich's SRL model**

Another influential SRL theoretical framework was developed by Pintrich (2000b). This author also developed the Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich et al., 1993), which remains the most widely used instrument for measuring SRL (Broadbent & Poon, 2015; Panadero, 2017; Roth et al., 2016) and self-efficacy (Honicke & Broadbent, 2016).

According to Pintrich and De Groot (1990), self-regulated learning includes three key components. The first component involves learners' metacognitive strategies for planning, monitoring, and modifying their cognition. The second component comprises learners' management and control of their effort. Finally, the third component consists of the actual cognitive strategies that learners use to learn, remember, and understand the material (p. 33).

Pintrich (2000b) argued that motivational variables interact with cognitive, behavioural, and contextual factors to affect self-regulation. Hence, self-regulated learners must also be motivated to use motivational strategies purposefully to regulate their cognition and effort in reaching their learning goals. Drawing on the general expectancy-value model of motivation (Eccles, 1983; Wigfield & Eccles, 2000), Pintrich (2000b) further asserted that a learner's expectancy for success, along with the value the learner assigns to such success, influences self-regulated learning. Hence, there is an inherent linkage between motivational beliefs (e.g., self-efficacy and goal orientation) and self-regulated learning.

### **2.3.1.5 Motivational belief, SRL strategy use, and learning outcomes**

Although these two models of self-regulated learning focus on different aspects of self-regulation, they share many of the basic components. First, both models emphasise the systematic use of self-regulated learning strategies (e.g., metacognitive strategies, cognitive strategies). Second, an interdependent motivational process underlies both models. Third, a relationship exists between motivational beliefs (e.g., self-efficacy and goal orientation) and self-regulated learning strategy use (e.g., metacognitive strategies, cognitive strategies), such that learners will be motivated to use self-regulated learning strategies. Finally, the use of self-regulated learning strategies gives learners better control over learning, which in turn influences their outcomes.

Based on the preceding review, the central idea underlying self-regulated learning deals with the motivational beliefs and learning strategies that students utilise to achieve their learning goals. Accordingly, the next section further reviews the potential relationship between self-regulated learning strategy use, learners' motivational belief and WSPEL outcomes.

### **2.3.2 Self-regulated learning strategies and training outcomes**

According to Pintrich (1999), cognitive, metacognitive, and resource management strategies are three categories of SRL strategies that learners apply to regulate their learning. Self-regulated learners use cognitive strategies in the acquisition, storage, and retrieval of information. They use metacognitive strategies to monitor, plan, and regulate learning to accomplish a goal. Finally, resource management strategies are employed by SRL learners to

manage the learning environment and external resources. For the purposes of this study, I shall focus on the potential influence of metacognitive strategies and resource management strategies on WSPEL outcomes; they are explored further in section 2.3.2.1 and section 2.3.2.2, respectively.

### **2.3.2.1 Metacognitive self-regulation**

Metacognitive self-regulation is a learner's use of metacognitive strategies to complete learning tasks. 'Metacognition', a term coined by Flavell (1979), refers to our ability to think about how we think and reflect on our own thought processes. It is our awareness and self-regulation of our cognitive strategies and can be considered a specific kind of cognitive strategy (Randi & Corno, 2005). Following the arguments made by Pintrich et al. (1991), metacognitive strategies generally include strategies for planning, monitoring, and regulating. Planning strategies usually involves task analysis and setting goals. Monitoring strategies include tracking one's attention, testing one's understanding of content, and monitoring time and pacing. Finally, regulating strategies allow learners to re-focus and correct their behaviour, such as adjusting the pace or reviewing course material that has not been fully grasped.

Numerous researchers (Abar & Loken, 2010; Cho & Shen, 2013; Pintrich, 1999; Zimmerman & Martinez-Pons, 1988) have found that skilful self-regulated students used metacognitive learning strategies more often than do less skilful self-regulated students. The extant literature has shown that students' use of metacognitive strategies in a traditional face-to-face learning environment is strongly associated with positive learning outcomes (Richardson et al., 2012).

In the area of second/foreign language learning, Schunk and Pajares (2002) and Vrugt and Oort (2008) also noted from research in educational psychology that the use of metacognitive self-regulation strategies has profound effects on academic performance and the development of proficiency.

Prior work in e-learning has amply demonstrated the relationship between metacognition strategies use and improvement in academic achievement (Azevedo & Aleven, 2013; Broadbent & Poon, 2015; Niemi et al., 2003). Wilson and Narayan (2016) studied 96 undergraduate students in a blended learning environment and found that learning strategy use had a significant positive effect on performance. Azevedo et al. (2008) found that students who used more metacognitive strategies, such as monitoring their thinking process, performed significantly better than did students who used fewer metacognitive strategies in web-based learning environments. A systematic review of research from 2004 to 2014 on self-regulated learning strategies and academic achievement in online higher education learning environments also revealed positive correlations between the three factors of metacognition, effort regulation, and time management and academic outcomes (Broadbent & Poon, 2015).

Overall, the extant literature has shown that students' use of metacognitive strategies in both traditional learning and e-learning contexts is associated with positive learning outcomes. Nevertheless, such research has not looked into the role of metacognitive self-regulation in affecting WSPEL outcomes. Given that metacognitive self-regulation has been shown to influence outcomes in any learning context that requires learners to assume the main responsibility for directing and adapting their own learning, there is reason to believe that metacognitive self-regulation should also influence outcomes in the highly autonomous

WSPEL environment.

### **2.3.2.2 Resource management strategies**

Resource management strategies, according to Boekaerts (1999), refer to activities that self-regulated learners employ to manage and control the educational material, and internal and external resources they apply to reach their learning goals. In essence, these strategies encompass the learners' regulatory strategies for controlling other resources besides their own cognition, such as the effective use of time, environmental control, and help seeking (Pintrich et al., 1993). The use of resource management strategies, in general, is significantly associated with students' academic achievement (Duncan & McKeachie, 2005). Out of the many resource management strategies identified in the literature, I will focus on time management and environment management because of their relevance to learning in the workplace context.

#### **2.3.2.2.1 Time management**

Lack of time is a common complaint in modern society (Hellsten, 2012) and, in turn, has prompted researchers to pay special attention to time management. Time management generally involves both the awareness of time and a person's control over time. It includes the ability to plan study time and tasks (Effeney et al., 2013), the ability to use time to get things done when they should be done (Thomack, 2012) and the ability to prioritise learning tasks, allocate time to sub-tasks, and revise plans as necessary (Lynch & Dembo, 2004).

In learning situations, typical time management activities include preparing a study schedule and allocating time for different learning tasks. This is believed to be beneficial in assisting learners to accomplish their learning goals and, in turn, may influence their achievement (Dabbagh & Kitsantas, 2005). In an academic setting, Zimmerman et al. (1994) noted there is clear evidence showing that students' awareness of and efforts to manage study time effectively make a difference in academic achievement.

Empirically, van Den Hurk (2006) found that students who managed their time and self-monitored were more efficient in allocating their individual study time, prepared more appropriately for a tutorial group meeting, and achieved higher scores on cognitive tests. Karim and Kandy (2011) also found that time management and proper administration of time were key factors in academic success. Recently, Hellsten (2012) reviewed 27 studies, mostly conducted with university and college student populations, to examine the relationship between time management and other variables such as academic achievement, stress, and creativity. This author found that self-reports of time management behaviours were often related to academic achievement. From another perspective, Prevatt et al. (2006) found that students who did not use time management strategies had significantly lower grade-point averages (GPAs) compared to students who did use time management strategies. More recently, Broadbent and Poon (2015) conducted a meta-analysis to understand how students can best apply self-regulated learning strategies to achieve academic success in online settings. The authors found the use of time management was significantly, albeit weakly, associated with academic achievement.

Similarly, time management is related to learning outcomes in workplace learning settings. It

must be emphasised that the primary function of the workplace is for work. Hence, the priority for employee learners in the workplace is the production of goods and services, not learning. A natural tension, then, exists between work and learning in the workplace. Eidson (2009) provided a vivid example of such tension in a qualitative study that explored barriers to successful online job learning among US federal government employees. This author reported a situation of learning at work in which higher-priority work tasks constantly usurped learning as the focus of employees' attention until the deadline approached, triggering an upwards shift in priority in which learning displaced other higher-priority work tasks. The author noted, 'For some students, priority triggers may be necessary for the learning process to commence, since without them, no compelling reason exists to make learning a priority over other work tasks' (p. 43). To make things worse, work tasks in today's workplace are dynamic and ever changing. One can imagine the constant interruptions that occur as learners constantly adjust their priorities and time use in an attempt to meet the competing demands for their scarce time in the workplace.

Overall, the extant literature reveals a relationship between use of time management strategies and learning outcomes (i.e., academic achievement) in academic settings. As WSPEL learners are in the usual situation of being involved in both their study and their job at the same time, their success in WSPEL should depend on the efficient use of a given amount of time. The ability to plan, prioritise different learning tasks and work tasks, allocate time for learning, and adjust to the unexpected is conducive to WSPEL success. Yet, to date little research has looked into the important role of time management in affecting WSPEL outcomes. Based on the preceding review, there is reason to believe that time management should influence WSPEL outcomes.

Having reviewed the influence of time management in WSPEL, the potential relationship between environment management strategy and WSPEL outcomes is considered next.

### **2.3.2.2.2 Environment management**

A key benefit of WSPEL is the ability for the learner to choose the place to study. This could be at the desk in the workplace or at home. While the flexibility of WSPEL allows for learning to take place almost anywhere and anytime, there is also significant physical contextual variability during learning. As revealed in Eidson's (2009) study (discussed in section 2.3.2.2.1), although most learners completed their e-learning in the office, 70% indicated that their learning was highly impacted by continuous workplace interruptions. The types of continuous interruptions reported include phone calls, email new message signals, and presence of new email messages. Workplace interruptions were also cited by employee learners in Baldwin-Evans's (2004) study as one of the most common reasons for failing to complete an e-learning course in one attempt (the other major reason was time constraints, as discussed in the previous section).

When an employee learner studying a WSPEL course encounters an externally generated event (e.g., a ringing phone, notification of arrival of email or message), an interruption occurs. This event breaks the continuity of cognitive focus and impedes progress on the primary WSPEL learning task (Jett & George, 2003). Interruptions should make it harder for WSPEL learners to concentrate on the course material and pursue learning goals. When learners are interrupted, they have to modify their action plan to accommodate the interruption.

According to action regulation theory (Frese & Zapf, 1994; Hacker, 1982), interruptions make it more difficult to pursue a goal and regulate progress towards that goal. While employee learners are studying WSPEL courses, interruptions are expected to draw their attention away from the primary learning task, redirecting learners' attention towards the interruption. The result is cognitive interference and increased information processing demands, which can lead to the processing of fewer information cues, memory loss, and an increase in stress (Jett & George, 2003; Speier et al., 2003). Research examining the effects of interruptions on performance also suggests that interruptions decrease task efficiency by increasing processing time and errors (Cellier & Eyrolle, 1992; Gillie & Broadbent, 1989; Monk et al., 2004; Zijlstra et al., 1999). Hence, the increase in information processing demand, stress, memory loss, and confusion as a result of workplace interruptions will likely affect the WSPEL learning process.

Environment management involves selecting environments in which the learner has control over possible interruptions (Lynch & Dembo, 2004; Miltiadou & Savenye, 2003). It lessens the risk of off-task behaviour by reducing the probability of encountering interruptions or by reducing the intensity of interruptions that do occur (Wolters, 2003). Given the unusual environment in which employee learners study WSPEL courses, the ability of the learner to select a place to study WSPEL courses in which the learner has control to lessen the probability of encountering interruptions or to reduce the intensity of interruptions that do occur should contribute to WSPEL success.

### **2.3.3 Motivational belief and self-regulated learning strategy use**

As discussed in section 2.3.1.5, motivational aspects of self-regulated learning are important because they affect why learners do what they do or why they are or are not inclined to do what is expected of them (Rozendaal et al., 2003). Motivational belief also affect how and why learners choose to utilise learning strategies (Zimmerman, 1990a, 2001). Wolters et al. (2017) have argued that ‘motivation is required to energize and facilitate students’ execution of the effortful strategies that control when, where, and for how long they engage in academic work’ (p. 383). These author further suggest that the process of time management is dependent on learners’ motivational beliefs, along with their attitudes.

According to Pintrich and De Groot (1990), expectancy, value, and affect are three motivational components that may be linked to learners’ use of self-regulated learning strategies. The expectancy component includes learners’ belief about their ability to perform a task and their acceptance that they are responsible for their own performance (e.g., self-efficacy). The value component consists of motivational beliefs about learners’ reasons for doing a task, their goals, and their beliefs about the importance and interest of the task (e.g., intrinsic/extrinsic goal orientation). Finally, the affective component is proposed by Pintrich and De Groot to tap into learners’ worry and concern over taking exams in a school learning context—a concept that is less applicable to workplace learning.

Out of the many motivational beliefs thought to affect use of self-regulated learning strategies, the current study focuses on the effect of intrinsic/extrinsic goal orientation and self-efficacy on learners’ use of SRL strategies.

### **2.3.3.1 Intrinsic and extrinsic goal orientation and SRL strategy use**

Goal orientation refers to the learner's perception of the reasons why he or she is engaged in learning tasks. It describes differences in interpretation, experiences, and responses to achievement situations (Dweck, 1986; Nicholls et al., 1989). Goal orientation is also conceptualised as consisting of intrinsic goal orientation (IGO) and extrinsic goal orientation (EGO) as part of the value component in Pintrich and De Groot (1990)'s model of self-regulated learning.

According to Pintrich and De Groot (1990), learners operating with an IGO approach the task with a focus on learning and mastery, which is similar to a learning or mastery goal orientation in nature. They perceive learning tasks as opportunities to increase their knowledge, possess real interest and desire to master understanding, and perceive task engagement as an end in itself and not as a means to an end. Learners with a higher level of IGO are expected to complete more of the available practice than learners with a lower level of IG and tend to expend more effort when encountering challenges. In contrast, according to Pintrich and Schrauben (1992), learners operating with an EGO approach are assumed to approach the task with a focus on performance or grades or pleasing others, which is analogous to a performance goal orientation. Learners with an EGO focus participate in learning tasks for the reason that it is a means to an end such as performance, rewards, promotion, or approval from others (Lynch & Dembo, 2004), and they are perceived to prefer less challenging tasks and lack strong efficacy beliefs. Consequently, extrinsic goal-oriented learners may withdraw their effort following negative feedback or avoid difficult tasks altogether.

According to Pintrich (1999), learners with different goal orientations will use different SRL strategies to meet the specific standards by which they judge their own performance or success (Pintrich, 2000a; Wigfield & Eccles, 2000; Wolters, 2004). Learners with a higher level of IGO will engage in more metacognitive activities, use more cognitive strategies, and have more effective effort management (Ames & Archer, 1988; Eccles, 1983). Employee learners in WSPEL learning environments are afforded a high level of control over their learning. Those high in IGO should better utilise the control available in WSPEL to increase their exposure to new or difficult content while also decreasing their exposure to familiar or easier content. Hence, goal orientation should contribute to variability in what learners will attend to in WSPEL and how they will interact with training features in WSPEL. Therefore, intrinsic goal orientation and extrinsic goal orientation should have significant roles as predictors of learning strategy use in WSPEL.

### **2.3.3.2 Self-efficacy and SRL strategy use**

Self-efficacy is another motivational belief that is crucial to self-regulated learning. From a learning perspective, self-efficacy represents a learner's judgement of his or her capabilities to perform successfully in learning situations (Guthrie & Schwoerer, 1994). Learners high in self-efficacy are more open to and more likely to participate in learning, work harder and persist longer, and respond less negatively to challenges and difficulties encountered during the learning process (Bandura, 1997; Phan, 2011). They tend to develop, accept, and commit to difficult goals while demonstrating a stronger commitment and generally have better attitudes towards the task, which enhances motivation and accomplishing of the task

(Bandura, 1997).

In academic settings, self-efficacy has been found to positively influence task effort, persistence (Gist & Mitchell, 1992; Halper & Vancouver, 2016), academic performance (Bandura, 1997; DiBenedetto & Bembenutty, 2013; Richardson et al., 2012), and learning achievement (Hsieh et al., 2007; Kitsantas & Chow, 2007; Merchant et al., 2012; Sins et al., 2008). In addition, self-efficacy has been found to be related to outcomes in online settings (Bong, 2001; DeTure, 2004; Wang & Newlin, 2002; Wang et al., 2013; Yukselturk & Bulut, 2007).

Self-efficacy should also influence the use of learning strategies (Brunstein & Glaser, 2011; Hong & Park, 2012; Wu et al., 2012; Zimmerman & Martinez-Pons, 1990). According to Schunk and Usher (2011), students who believe that their learning should be efficacious are expected to engage in self-regulation (e.g., set goals, use effective learning strategies, monitor their comprehension, evaluate their goal progress) and create effective environments for learning (e.g., eliminate or minimise distractions, find effective study partners).

Research has shown that college students with more adaptive motivational beliefs, such as greater self-efficacy, tend to show increased management of their time and study environment (Bembenutty, 2009; Burlison et al., 2009; Park & Sperling, 2012). Early studies by Schunk (1985) and by Zimmerman and Martinez-Pons (1990) demonstrated that learners with high efficacy are likely to use more cognitive and metacognitive strategies and stay engaged in those tasks more thoughtfully and longer than those with low efficacy. Recently, Wu et al. (2012) studied 78 second-year university Chinese English-as-second-language (ESL) students. These authors also found a strong correlation between self-efficacy and students'

use of learning strategies. Research within academic settings generally agrees that the degree to which students adopt self-regulation strategies is dependent on their motivational drives (Sierens et al., 2009; Vanthournout, 2011).

Empirical research has largely supported the contention that the relationship between motivational beliefs (e.g., self-efficacy) and performance is mediated by SRL strategy use in academic settings. For instance, in Pintrich and De Groot's (1990) study, self-efficacy was correlated with self-regulation, and self-regulation (along with self-efficacy) was a significant predictor of academic achievement. In yet another study, Wang and Pape (2005) found learners with high self-efficacy reported more SRL strategies and experienced more success in learning English than those with comparatively lower self-efficacy.

An important aspect of self-efficacy is that it is domain, context, and task specific. Bandura (2006) asserted that people judge their capability based on the particular domain of functioning. He further suggested that self-efficacy beliefs are multidimensional and should be measured within a given activity domain, and under different situational circumstances. To date, however, very few studies have defined and addressed various types of self-efficacy for e-learning. In particular, studies defining and addressing self-efficacy for workplace self-paced e-learning are largely absent.

In contrast, an abundant body of literature has studied the relationship between SRL processes and learning outcomes. Research has shown that both self-efficacy and goal orientation (Bong, 2001, 2004) are associated with SRL strategy use, and that the use of SRL strategies is strongly associated with positive learning outcomes. However, most researchers have used students in academic settings such as in higher education (Richardson, Abraham, &

Bond, 2012) rather than working adults as their samples. Generalisation of the findings to employee learners in WSPEL has yet to be researched. As noted earlier, a distinctive characteristic of the self-efficacy construct is that self-efficacy perceptions are domain, context, and task specific. WSPEL involves the effective use of computer technology, the capability to plan and manage the WSPEL learning process, and the capability to learn the content in WSPEL courses. It is doubtful whether the current self-efficacy construct accurately measures self-efficacy in a WSPEL environment.

## **2.4 Organisational context and WSPEL outcomes**

WSPEL occurs within a larger organisational context and is very much intertwined with the workplace. However, the workplace functions within the boundaries of its own organisational systems, policies, and procedures. As Lewin's (1951) force-field theory suggests, behaviour is a function of both the individual and the situation. Conditions related to the workplace and the wider organisational context can affect how employees think, feel, learn, and behave, which has important implications for training outcomes. It follows that organisational contextual factors should influence training outcome (Nijman et al., 2006; Noe, 1986; Orpen, 1999; Rouiller & Goldstein, 1993; Saks et al., 2010). Some researchers even argue that the absence of a favourable organisational environment will have a negative effect on employee learners' efforts to learn the skills and apply them to the work context (Awoniyi et al., 2002; Clarke, 2002; Seyler et al., 1998).

Empirically, research has shown that organisational contextual factors can affect learning in the workplace (e.g., Baeten et al., 2010; Delva et al., 2004; Kirby et al., 2003). Research by

Mathieu and colleagues (Mathieu et al., 1993; Mathieu et al., 1992a), who examined situational constraints, and by Tracey et al. (2001), who studied work environment characteristics, has also confirmed that contextual factors impact training outcomes in specific ways. By proactively managing these organisational contextual factors to create environments that are conducive to learning, organisations can shape how workplace learning is perceived by employees, which will in turn influence employees' learning in the workplace. To gain a better understanding of potential organisational contextual factors at play behind WSPEL outcomes, the concept of context is explored next.

Context, as summarised broadly by Johns (2006), is 'situational opportunities and constraints that affect the occurrences and meaning of organizational behaviour as well as the functional relationship between variables' (p. 386). Johns (2006) further identifies discrete context as 'particular contextual variables or levers that shape behaviour or attitude' (p. 391). Such a conceptualisation offers us the opportunity to influence behaviour and attitude through manipulation of these contextual variables. According to Johns (2006), task context and social context are two key components of the discrete concept. While social context includes factors such as social density, social structure, and direct social influence, examples of task context include autonomy, uncertainty, accountability, and resources. In this section, I explore the climate for learning (section 2.4.1) as part of the social context and consider the degree of autonomy employees have in training participation (section 2.4.4) as well as their workload condition (section 2.4.5) as part of the task context. These organisational contextual factors are identified as having potential influence on training outcomes.

### **2.4.1 Climate for learning**

Climate, according to Schneider et al. (2013 p. 362), refers to ‘the shared perceptions of and meaning attached to the policies, practices, and procedures employees experience and the behaviours they observe getting rewarded and that are supported and expected’. Following Kraiger (2017), an employee’s perception of the organisational climate, together with norms for cooperation and knowledge sharing, affects learning decisions. In the context of workplace learning, learning climate is generally viewed as support, opportunities, and ‘space’ for learning (Marsick & Watkins, 2003) as well as appreciation (material and non-material rewards) for the valued behaviour and outcomes. It also encompasses employees’ perception of organisational policies and practices aimed at supporting employees’ learning behaviours (Nikolova et al., 2014, 2016).

Research has shown that learning climate is a precursor of valuable outcomes, such as employees’ learning intentions, positive attitudes towards learning, and participation in learning activities (Armstrong-Stassen & Schlosser, 2008; Govaerts, Kyndt, Dochy, & Baert, 2011; Hauer et al., 2012). Learning climate has also been found to counteract negative employee outcomes, such as turnover intentions and work stress, and to increase positive outcomes such as job satisfaction (Govaerts et al., 2011). Nikolova et al. (2014) suggested that a facilitation-of-learning climate, an appreciation-of-learning climate, and an error-avoidance climate are three aspects of a learning climate. Nikolova et al. (2016) further found a facilitation-of-learning climate and an appreciation-of-learning climate can serve as an important promoter of employee learning and result in the acquisition of new knowledge and skills. Nikolova et al.’s (2016) findings support prior studies’ conclusion that a learning-supportive environment can stimulate employee learning (Crouse et al., 2011; Ellinger &

Cseh, 2007; Maurer et al., 2003). Other researchers, such as Tracey and Tews (2005), have suggested that learning climate as a construct is best described by three dimensions: organisational, managerial, and job.

An early study by Kozlowski and Doherty (1989) found organisational support, supervisor support, feedback, rewards, and resources to be important variables contributing to a climate of support for skills updating. Using face-to-face interviews with human resource management (HRM) practitioners, Crouse et al. (2011) also found that organisational and managerial support were mentioned as some of the strongest facilitators of workplace learning. In the current study, I follow this line of research and further consider the role of supervisor (managerial) support (section 2.4.2) and organisational support (section 2.4.3) in affecting WSPEL outcomes.

#### **2.4.2 Supervisor support**

The supervisor's role is a critical organisational contextual variable that may support or dissuade employees in terms of their willingness to enter and participate in training programmes (Blanchard & Thacker, 2007). In the context of training and development, supervisor support includes supervisors' encouragement of participation in training, providing time support or allowing the employee to study during work hours, and providing positive recognition of employees involved in these activities (Tracey & Tews, 2005). It also includes behaviours such as working with learners to set goals to apply learning, giving assistance, and providing a model of the trained behaviours to use the learned skills on the job (Russ-Eft, 2001).

Evidence to support the relationship between supervisory support and training effectiveness was found in a meta-analysis by Blume et al. (2010). In addition, research has revealed that the effect of the supervisor's role in training programmes on job performance is indirectly affected by the motivation. For instance, Cohen (1990) reported that trainees with more supportive supervisors attended training programmes with stronger beliefs in the programmes' usefulness, which is an important factor in employee motivation (e.g., Tharenou, 2001). Two other studies based on samples of 45 trainees in UK organisations (Axtell et al., 1997) and 100 technical employees in North Kuching City Hall, Malaysia (Ismail et al., 2010), also revealed that a supervisor's role in training programmes should be to promote employees' motivation to learn up-to-date knowledge and skills. Furthermore, supervisor support has been found to influence learners' satisfaction. For instance, Weng et al. (2015) noted that social support from supervisors has a significant effect on trainees' learning satisfaction, including explaining the value of self-development and identifying/recommending activities to subordinates.

Overall, the literature suggests that when employees perceive that their supervisors support the application of newly developed knowledge and skills, they are more motivated and are more likely to learn and transfer these competencies back to the job (Brinkerhoff & Montesino, 1995; Clark et al., 1993; Colquitt et al., 2000; Noe, 1986; Tracey & Tews, 2005). Regardless of the nature of support provided, supervisor support is cited within the literature as a key factor in workplace learning. Hence, there is reason to believe that supervisor support should have a similar effect on WSPEL.

### **2.4.3 Organisational support**

Organisational support refers to organisational policies, practices, norms, and procedures that constitute a climate for learning. It represents the organisation's commitment to learning and development and is regarded as one of the most prevalent mechanisms through which organisations provide support for employees to learn (Schneider et al., 2013). It also represents the degree to which employees perceive that their employers support and value their participation in training activities through supportive organisational policies (Kozlowski & Farr, 1988; Tharenou, 2001; Tracey & Tews, 2005).

According to Tracey et al. (2001), organisational support is important in preparing individuals for learning activities. It also influences employees' participation in learning activities (Armstrong et al., 2010; Govaerts et al., 2011; Hauer et al., 2012) and is closely related to the effectiveness of the training (Noe & Wilk, 1993). In addition, organisational support affects the transfer of newly acquired knowledge and skills to the workplace (Rouiller & Goldstein, 1993).

Furthermore, organisational support influences e-learning in the workplace. For instance, Wang (2010) suggested that completion of an e-learning course is influenced by organisational, individual, and learning process factors and variables. This idea is in agreement with findings from a recent review of the e-learning literature performed by Brown and Charlier (2013). These authors found that support from organisations, including employer mandates for training utilisation and the climate surrounding the use of learning initiatives, influences workplace e-learning outcomes—in particular, utilisation, which is a precondition for learning and performance in e-learning.

Empirical evidence for the important role of organisational support in workplace e-learning can be found in Eidson's (2009) study of 30 US federal government employees. The author quoted one employee as expressing feelings of guilt or reluctance to use work time for learning: 'I kind of felt guilty doing [coursework] at work even though my boss said I could' (p. 50). The author commented that 'in an organizational environment perceived to devalue learning, employees may be conditioned to believe that learning in the workplace is inappropriate and that they bear little responsibility for learning' (p. 51).

Along the same lines, Chuo et al. (2011) found that organisational support has an indirect influence on e-learning usage intention, another precondition for learning and performance. The literature suggests that organisational support is a predictor of learners' satisfaction and performance as well. Similarly, Sawang et al. (2013) found organisational support can lead to greater satisfaction in e-learning, and it is a significant predictor of learners' satisfaction with corporate e-learning (Ryu, 2007).

Overall, researchers have demonstrated that a climate for learning including supervisor support and organisational support matters in training outcomes (e.g., Baldwin et al., 2009; Grossman & Salas, 2011; Kozlowski & Salas, 1997; Kraiger, 2003; Salas et al., 2012). The provision of development activities, such as WSPEL, coupled with an organisational environment that facilitates learning, should encourage employee involvement in WSPEL. A supportive organisational context is critical for WSPEL to be maximally effective. Some of the key factors are quite clearly organisational and supervisor support in the learning environment, and these factors should, in turn, influence WSPEL success.

#### **2.4.4 Degree of autonomy**

According to Johns (2006), context comprises those situational opportunities and constraints that affect organisational behaviour. As part of the task context (discussed in section 2.4), the degree of autonomy employees have in training participation can potentially either facilitate or hinder the achievement of training outcomes.

Employees' participation in employer-provided training opportunities may be either mandatory or voluntary. Mandatory training refers to training that is often a part of employees' job assignment, which is compulsory in nature (Baldwin et al., 1991; Machin & Treloar, 2004; Tsai & Tai, 2003). Employees thus have no choice but to attend mandatory training. In contrast, voluntary training is typically employed as a part of an organisation's strategy to improve employees' knowledge, skills, and job performance. Participation in voluntary training is largely the employees' own choice and dictated by their perceived needs and desires (Hicks & Klimoski, 1987; Nikandrou et al., 2009). Prior research has found that employees who have a choice about attendance at such training tend to show more enthusiasm and commitment. Employees who have autonomy in training decisions consider the training as something useful, resulting in higher motivation to learn (Hicks & Klimoski, 1987; Nikandrou et al., 2009; Tharenou, 2001) and better subsequent performance (Mathieu et al., 1992b).

An established theory to understand the role of choice in human motivation is the self-determination theory (SDT) of motivation (Deci & Ryan, 2000). According to SDT, the more an individual attains the basic psychological needs of autonomy (i.e., a sense of choice,

control, and personal agency), competence (i.e., the desire to feel effective), and relatedness (i.e., the desire to be social connected), the more his or her behaviour is self-determined.

When people are self-determined, they are intrinsically motivated. Following the rationale posited by Deci and Ryan (2008), intrinsic motivation is generally associated with more positive performance, relational, and well-being outcomes.

SDT emphasises the role of autonomy in promoting intrinsic motivation. Autonomy is the perception of choice (Deci & Ryan, 1985)—that is, the perception that one has flexibility or freedom in making decisions, has opportunities to choose among different options, and has the capacity to freely alter or regulate one's behaviour in an activity (Deci & Ryan, 1987). It follows that when employee learners have a sense of choice, control, and personal agency, they perceive that they have higher level of autonomy. Thus, the more employee learners' participation in WSPEL is self-initiated and voluntary, the more the learners will satisfy their need for autonomy and the more their behaviour will be self-determined. When employee learners are self-determined, they are intrinsically motivated—a characteristic that is generally associated with positive outcomes such as satisfaction.

Support for the relationship between choice and outcomes was found in a meta-analysis of 41 studies by Patall et al. (2008). These authors examined the effect of choice on intrinsic motivation and related outcomes in a variety of settings and found that providing choice enhanced intrinsic motivation, effort, task performance, and perceived competence. Subsequently, Beier and Kanfer (2010) remarked that freedom or autonomy in training decision making can be crucial in employees' behaviour during and after training.

On the contrary, when WSPEL courses are compulsory, the decision to participate may be

perceived by employee learners as external, influenced by pressure and demands, or even as involving coercion to behave in particular ways (Vansteenkiste et al., 2010). Under such circumstances, control is perceived as coming from an external source and autonomy is reduced. According to Deci et al. (1989), when there is a lack of autonomy or the environment is experienced as controlling, self-determination and intrinsic motivation diminish. Pursuing the same vein of research, Machin and Treloar (2004) commented that when employee learners are pressured to attend training and are given no choice, they are more likely to have lower levels of motivation than those who attend the training voluntarily.

There seems to be a consensus on the positive influences of behaviour for voluntary participation. Hence, a relationship should exist between employee learners' autonomy in WSPEL participation and learning outcomes.

#### **2.4.5 Workload**

As discussed in section 2.4, workload is another contextual factor that may potentially influence the workplace learning process. Workload refers to the extent to which an individual must work at a rapid pace or work very hard to complete a high volume of work. Learning takes time, and the employee's workload may place practical constraints on how much time is available for that employee to learn. When employees are experiencing high workloads, they perceive that they do not have the time available for critical learning activities (van Ruysseveldt & van Dijke, 2011). Employees with heavy workloads should have less time available in general and, therefore, have less time for learning behaviours such as reflecting and exploring. Conversely, employees with lighter workloads should have more

time available and, therefore, be likely to have more time to engage in learning activities.

Empirical support for the negative relationship between workload and learning can be found from the work of Brown (2005). This author examined 311 employees in an organisation regarding their decisions on time spent in e-learning courses and found that employees with greater workloads spent less time in e-learning, a precondition for course completion and performance gains. In another study, Wang (2010) surveyed 398 US-based human resources development professionals on their e-learning usage. As expected, the amount of workload (negatively) predicted completion rates (other predictors found were presence of an organisational policy for completion and the perception that more people complete online courses at their organisation). In yet another study, Long et al. (2009) examined the use of e-learning by employees in a company and found a 21% e-learning completion rate. Subsequent analysis found work overload to be the main cause of attrition.

Empirical results, however, are not always clear-cut regarding the workload–outcome relationship (Raemdonck et al., 2014). Wielenga-Meijer et al. (2010) quantitatively reviewed 85 studies published between 1969 and 2005 that investigated the relationship between job characteristics and learning consequences. These authors found moderately strong evidence for a positive relationship between job demands and job control on the one hand and learning consequences on the other hand. The authors subsequently proposed that job demands along with other job characteristics such as variety, autonomy, and feedback should affect learning consequences positively. Along the same lines, Raemdonck et al. (2014) examined a total of 837 workers, between 18 and 65 years of age, from different sectors and with different educational levels. Their analysis revealed that job demands, along with self-directed learning orientation, constitute significant and positive predictors of workplace learning behaviour.

Attempting to close the gap, some scholars have suggested that the relationship between job demands and learning might be non-linear (Wielenga-Meijer et al., 2010). Job demands that are challenging will likely prompt learning, whereas job demands that are hindrances or stressors are likely to inhibit learning because the employee's resources are depleted (Parker, 2017).

Clearly, workload has the potential to influence workplace learning outcomes. This is particularly important in WSPEL, as employee learners are studying WSPEL courses at work and often in the flow of work. Hence, more research is needed to fully understand the workload–WSPEL outcome relationship.

## **2.5 Gaps in the literature and research questions**

Despite the existence of an extensive research base in e-learning, a clear limitation of the extent data is obvious: The large majority of studies of e-learning have been conducted among students or instructors in educational institutions (Pynoo et al., 2011). Šumak et al. (2011) performed a systematic literature review of 42 independent studies published in major journals and found that the subjects in most studies of e-learning were students in an academic environment. While these studies are certainly useful, they will not help organisations and employee learners reap the benefits of WSPEL. Conversely, there is a dearth of research specifically devoted to work-related e-learning. Systematic examinations of success factors in workplace e-learning have been limited in scope (Sitzmann & Ely, 2010). The important role of employee learners in the WSPEL learning process appears to

have been largely overlooked in the existing e-learning research.

WSPEL is highly autonomous and characterised by a high degree of learner control. Research has previously established that systematic differences among learners in training outcomes are exacerbated by offering greater learner control (Tennyson, 1980). Thus, there is reason to believe that the influence of learner characteristics on WSPEL outcomes may be even more powerful than those identified in the literature. Nevertheless, only limited research has focused on the psychological processes used by learners that improve or limit their e-learning outcomes (Wan et al., 2012), particularly in WSPEL environments. Based on the previous literature review, the following gaps related to our current understanding of WSPEL in organisations warrant further investigation.

### **2.5.1 Motivation to learn and WSPEL outcomes**

The first gap concerns our understanding of the relationship between motivation and outcomes in WSPEL. As shown in section 2.2, past research has found learner characteristics to be a key determinant of training outcomes. Motivation to learn (MTL), a construct originating from Noe (1986) and Noe and Schmitt (1986), stands out as one of the key predictors of training outcomes. It has been established that a positive relationship exists between MTL and outcomes in traditional training environments (Colquitt et al., 2000; Noe, 1986). However, the learning ‘game’ and its ‘rules’ in WSPEL are somewhat different from those observed in previous experiences (Wang, 2011). To date, little empirical research has looked into the relationship between MTL and WSPEL outcomes in terms of course completion, learner satisfaction, and perceived learning performance.

In WSPEL, employee learners need to manage both their learning and the technology at the same time while they are at work. They often need to do so in a flow of work full of distractions and competing priorities. A higher level of motivation to learn should facilitate the direction of effort and persistence that employee learners put forth to study in such a highly autonomous and technology-oriented learning environment. It is thus reasonable to believe that MTL should influence WSPEL outcomes. This leads to the following research question:

*Research question 1:* To what extent, if any, is there a relationship between motivation to learn and WSPEL outcomes in terms of course completion, learner satisfaction, and perceived learning performance?

### **2.5.2 Self-regulated learning and WSPEL outcomes**

The second gap concerns our understanding of the relation between self-regulated learning and outcomes in WSPEL. Self-regulation involves creating and achieving goals. As reviewed in section 2.3, prior work from academic settings has suggested that goal orientation and self-efficacy related to the specific learning context are major antecedents of self-regulated learning. Research has shown that goal orientation and self-efficacy affect the degree to which learners adopt self-regulation strategies (i.e., metacognitive self-regulation, time and environment management) (discussed in section 2.3.3). Research has also established the relationship between the use of self-regulated learning strategy and outcomes in various academic settings (discussed in section 2.3.2). Clearly, learners' motivational beliefs have

effects on learning strategy use, which in turn influences learning outcomes.

Whilst self-regulated learning has been intensively researched in school and academic contexts (Winne, 2013; Yamada et al., 2016; Zimmerman & Schunk, 2011), much less research has been dedicated to the study of self-regulated learning in the workplace (Littlejohn et al., 2012; Milligan et al., 2015). The nature and objective of learning is noticeably different between academic and workplace environments. In academic settings, learning is a goal in itself. Learning requirements and processes are typically well structured and formally defined, and students are often guided by instructors. In contrast, in organisation settings, the actual goal of employee learners is task performance. Learning is a by-product of work and mainly a means to achieve task performance goals (Illeris, 2011b; Margaryan et al., 2009).

Although some general principles may apply between the academic setting and organisation context, the natures of these two contexts and opportunities for provision and support of learning are different (Littlejohn et al., 2012; Margaryan et al., 2009). Generalisation of the findings from the academic context to the workplace, and specifically to the WSPEL environments, has yet to be researched. The question remains if and how the motivational beliefs of employee learners—in particular, self-efficacy and goal orientation—affect their self-regulated learning strategy use and how their use of self-regulated learning strategies (i.e., metacognitive self-regulation, time and environment management) influence outcomes in the WSPEL environment. This leads to the following research questions:

*Research question 2:* To what extent, if any, are there relationships between employee learners' goal orientation, self-efficacy belief, and use of self-regulated learning

strategy (i.e., metacognitive self-regulation, time and environment) in WSPEL?

*Research question 3:* To what extent, if any, is there a relationship between employee learners' use of self-regulated learning strategies (i.e., metacognitive self-regulation, time and environment management) and WSPEL outcomes in terms of course completion, learner satisfaction, and perceived learning performance?

### **2.5.3 Organisational contextual factors and WSPEL outcomes**

The third gap concerns our understanding of the relationship between organisational contextual factors and training outcomes in WSPEL. WSPEL occurs within an organisational context. Conditions related to the workplace and the wider organisational context not usually considered relevant in academic settings can affect how employees think, feel, learn, and behave, which in turn has important implications for training outcomes.

Research has found supervisor support and organisational support are crucial learning climate factors that are linked to training outcomes (discussed in section 2.4.1). Traditionally, participation in training programmes by employees has been either voluntary or mandatory. The degree of autonomy (or perceived choice) that employees have when entering into training courses also likely influences their learning (discussed in section 2.4.4). Furthermore, learning takes time and the employee's workload may place practical constraints on how much time is available for the employee to learn. The level of workload will also likely influence training outcomes (discussed in section 2.4.5).

While prior work has laid the foundation for understanding how organisational contextual factors affect learning outcomes in traditional training, Chiu and Tsai (2014) noted that recent research on web-based workplace learning has not paid sufficient attention to organisational contextual factors. In fact, Noesgaard and Ørnsgreen (2014) argue that contextual factors may be more critical to e-learning effectiveness than to the effectiveness of learning in a traditional setting. Hence, more research is needed to fill the gap. The following research question is posited:

*Research question 4:* To what extent, if any, is there a relationship between organisational contextual factors (i.e., organisational support, supervisor support, perceived choice, and workload) and WSPEL outcomes in terms of course completion, learner satisfaction, and perceived learning performance?

#### **2.5.4 Conceptual framework and research questions for the current study**

Recall that a key goal of the current research is to develop an empirically based conceptual framework of the principal forces that operate behind key WSPEL outcomes to inform practice. Based on the literature review, the conceptual framework as shown in Figure 1 can be refined to include constructs identified from the literature that can potentially influence WSPEL outcomes (see Figure 2). This conceptual framework will be empirically tested to answer the research questions.

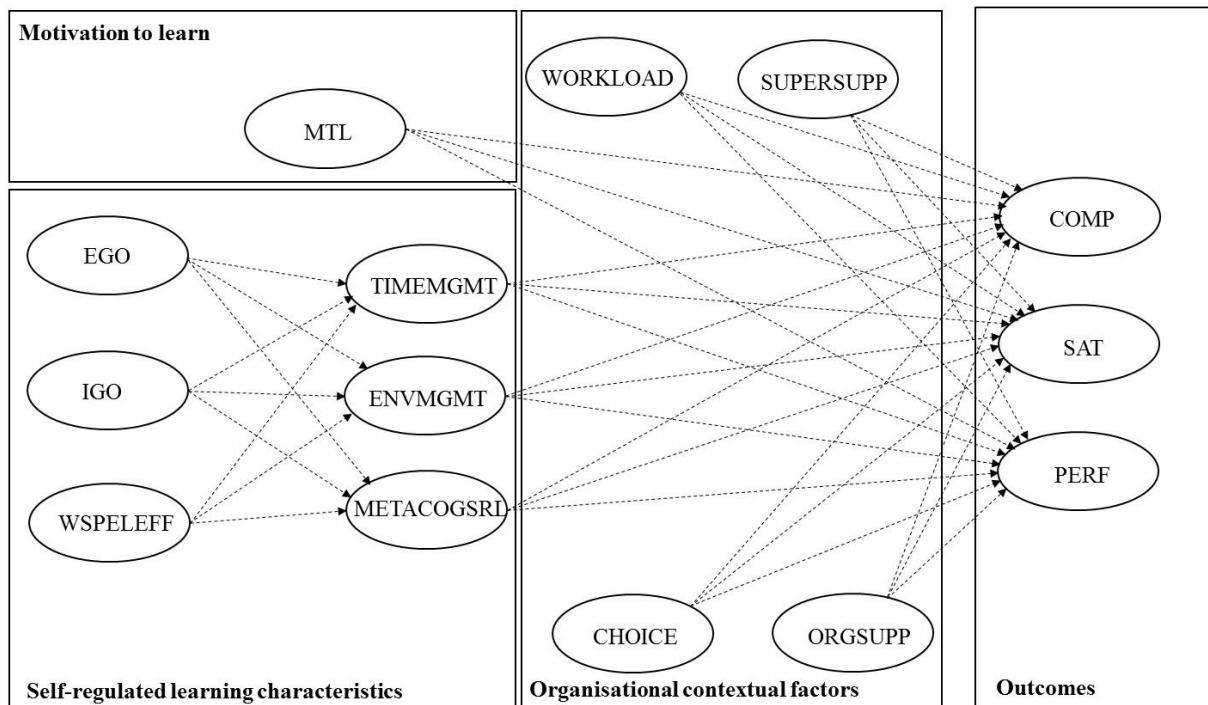


Figure 2: Conceptual framework for the current study

*Research question 1:* To what extent, if any, is there a relationship between motivation to learn and WSPEL outcomes in terms of course completion, learner satisfaction, and perceived learning performance?

*Research question 2:* To what extent, if any, are there relationships between employee learners' goal orientation, self-efficacy belief, and use of self-regulated learning strategy (i.e., metacognitive self-regulation, time and environment) in WSPEL?

*Research question 3:* To what extent, if any, is there a relationship between employee learners' use of self-regulated learning strategies (i.e., metacognitive self-regulation, time and environment management) and WSPEL outcomes in terms of course completion, learner satisfaction, and perceived learning performance?

*Research question 4:* To what extent, if any, is there a relationship between organisational contextual factors (i.e., organisational support, supervisor support, perceived choice, and workload) and WSPEL outcomes in terms of course completion, learner satisfaction, and perceived learning performance?

## **2.6 Summary**

WSPEL is not delivering the expected outcomes. Thus, there is a need to understand why some learners and organisations are more successful in implementing WSPEL. A better understanding of the relationships among learner characteristics, organisational contextual factors, and training outcomes in WSPEL will help to make this type of learning more successful.

The review of literature points to the learner's motivation, self-regulated learning, and organisational contextual factors as having influence over outcomes in learning. Potential variables identified in the review include motivation to learn, intrinsic/extrinsic goal orientation, self-efficacy, time management, environment management, metacognitive self-regulation, supervisor support, organisational support, perceived choice, and workload.

While the relationships among most of these variables and learning outcomes have previously been studied in academic settings, past research has not investigated the relationship between these variables and WSPEL outcomes. Although some general principles may apply in both the academic setting and workplace contexts (i.e., formal education versus the workplace),

the natures of these two contexts and the opportunities for provision and support of learning that they proffer are different. Generalisation of the findings from the academic context to the workplace, and specifically to the WSPEL environment, has yet to be researched. Hence, a study is needed to clarify the relationships among these variables and outcomes in WSPEL and, thereby allow practitioners to improve the WSPEL process to make it a success.

The methodology and approach used to empirically test the conceptual framework are discussed next.

## **Chapter 3 Method**

The purpose of this chapter is to elucidate and justify the methodology and approach to collecting and analysing the data used to empirically test the conceptual framework as developed in section 2.5.4.

Section 3.1 revisits the purpose of the study.

Sections 3.2 and 3.3 discuss why this research is positioned from the perspective of positivism and justifies the selection of a quantitative research method (surveys) for this study. The overall research design, type of investigation, extent of researcher interference, and time horizon are also discussed.

Section 3.4 discusses the selection of the sample for the present research.

Section 3.5 discusses the survey questionnaire development process, scale adoption, content, wording and the pilot study.

Sections 3.6 and 3.7 discuss the data collection procedures and the data analysis technique, which relies on structural equation modelling (SEM) using PLS-SEM.

Finally, sections 3.8, 3.9, 3.10, and 3.11 consider the internal validity, external validity, methodological assumptions, limitations and delimitations, and ethical issues arising from this study, with a summary being provided at the end of the chapter.

### **3.1 Purpose of the study**

It was established in the introduction chapter that workplace self-paced e-learning is not delivering the expected outcomes, which raises concerns about why some learners and organisations are more successful in WSPEL (discussed in section 1.4). This study seeks to gain a better understanding of how employee learners' motivation, self-regulated learning characteristics, and organisational contextual factors are shaping workplace self-paced e-learning outcomes by empirically testing a conceptual framework developed in section 2.5.4 to answer the research questions. With these questions answered, appropriate strategies and support measures can be employed by both employee learners and organisations to make WSPEL a success and the true benefits of WSPEL can be fully materialised.

### **3.2 Research methodology**

In this section, the research methods and the procedures employed to carry out the study are presented systematically (see Figure 3). This discussion outlines the research philosophy, research methodology, research approach, research strategy, research design, sampling design, data collection methods, questionnaire development, data collection process, and data analysis methods. An overview of the research methodology is shown in Figure 3. Details of individual component are provided in the sections that follow.

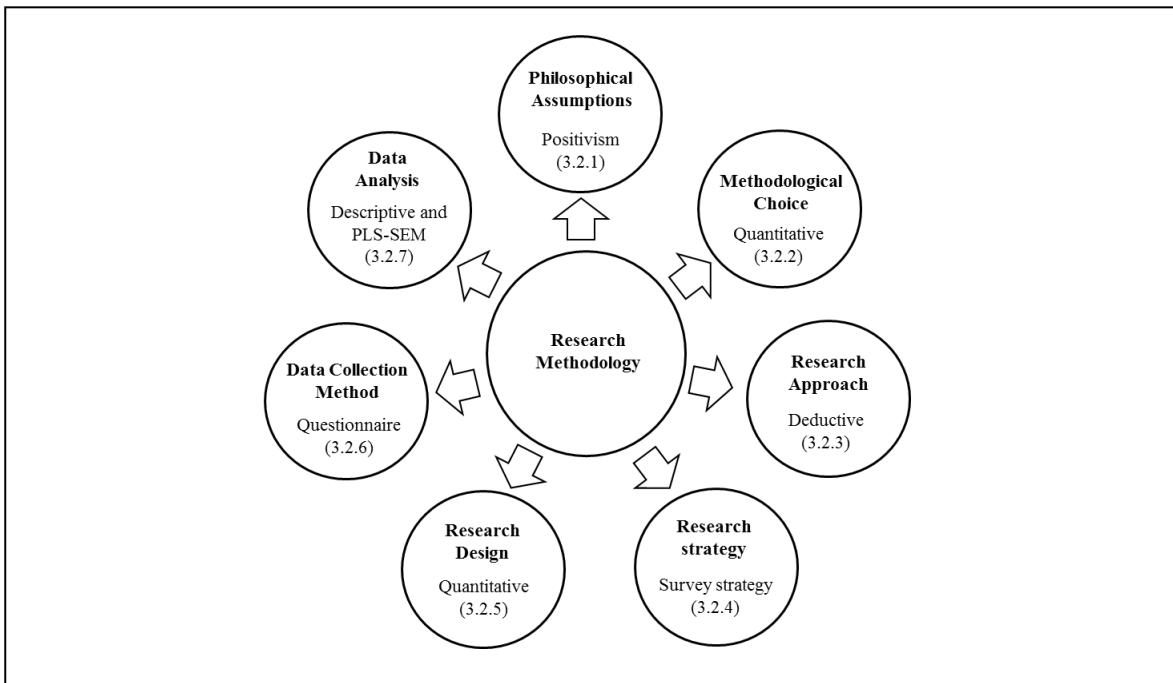


Figure 3: Overview of research methodology

### 3.2.1 Philosophical assumptions

Research philosophy is a method of knowledge development in a specific domain (Saunders, 2011). Related terms are ‘worldview’ (Creswell, 2014), ‘paradigm’ (Lincoln et al., 2011), and ‘epistemology’ and ‘ontology’ (Crotty, 1998). A research philosophy is a belief about the way in which data about a phenomenon should be gathered, analysed, and used. Positivism, interpretivism, realism, and pragmatism are four types of research philosophies that are reviewed in section 3.2.1.1. The positive philosophical position of the current study is justified in section 3.2.1.2.

### **3.2.1.1 Positivism, interpretivism, realism, and pragmatism**

The positivist paradigm of exploring social reality is based on the philosophical ideas of August Comte, who emphasised observation and reason as means of understanding human behaviour. For positivists, empirical facts exist apart from personal ideas or thoughts; patterns of social reality are stable and governed by laws of cause and effect (Crotty, 1998; Marczyk et al., 2005; Neuman, 2014). A researcher is independent of the subject of the research, neither affecting it nor being affected by it (Remenyi & Williams, 1998). In this paradigm, genuine, real, and factual happenings can be studied and observed scientifically and empirically from an objective viewpoint without interfering with the phenomena being studied. It follows that knowledge, for positivists, can be discovered by collecting data through observation, measurement, and analysis.

Interpretivism adopts the position that our knowledge of reality is a social construction by human actors. In keeping with this view, value-free data cannot be obtained, because the reality can only be fully understood through the subjective interpretation of and intervention by the enquirer (Walsham, 1995). Interpretivists admit that there may be many interpretations of reality, but maintain that these interpretations are themselves a part of the scientific knowledge they are pursuing (Saunders, 2011).

Realism assumes a scientific approach to the development of knowledge. The philosophical position of realism is that there is a reality quite independent of the mind, such that what the senses show us as reality is the truth. Realism can be divided into two factions: direct and critical. Direct realism portrays the world through personal human senses and suggests that the world is relatively unchanging. Critical realism argues that what we experience is

sensations—that is, the images of the things in the real world rather than the things directly. It follows that our knowledge of reality is a result of social conditioning (Saunders, 2011).

Pragmatism is a philosophical position that arises out of actions, situations, and consequences rather than antecedent conditions. Truth is not based on a duality between reality independent of the mind or within the mind, but instead on what works at the time (Creswell, 2014).

Hence, any knowledge ‘produced’ through research is relative rather than absolute. Even if there are causal relationships, they are ‘transitory and hard to identify’ (Teddlie & Tashakkori, 2009, p. 93). Pragmatism advocates that the most important question is not about adopting a qualitative versus quantitative approach to research, but rather whether the research has helped ‘to find out what [the researcher] want[s] to know’ (Hanson, 2008, p. 109).

### **3.2.1.2 Positive paradigm for the current study**

This research seeks to develop an empirically based conceptual framework of the principal forces that operate behind WSPEL outcomes. Based on working concepts identified from theories and previous studies, a conceptual framework is developed to explain WSPEL outcomes based on identified constructs in motivation, self-regulated learning, and organisational context (see section 2.5.4). To answer the research question on whether motivation to learn, self-regulated learning characteristics, and organisational contextual factors explain variability in WSPEL outcomes, the proposed conceptual framework is empirically assessed to uncover relationships that are significant to inform practice.

Thus, the current research emphasises how variables interact, shape events, and cause outcomes, with measurable data being collected to inform practice—an focus that lends itself to the positivistic paradigm. Premised on the belief that reality is stable, comprising discrete, observable elements and a priori fixed relationships that exist within the WSPEL phenomena, relationships among the different variables identified in the conceptual framework can thus be discovered by data collection through observation, data measurement, and data analysis. The positivist approach enables the researcher to assess the conceptual framework against a unique sample of observations that enables the findings to be more generalisable to the entire population and make a true contribution to both research and practice.

### **3.2.2 Methodological choice**

Having justified the positivist position of the current study, the methodological choice is discussed next.

#### **3.2.2.1 Qualitative and qualitative methods**

Quantitative and qualitative approaches are two methods commonly employed in social sciences research. Qualitative research is based on interpretivism and is associated with a philosophical position that reality is socially constructed through individual or collective definitions of the situation. Qualitative methods thus presuppose that there are multiple realities or multiple truths based on one's construction of reality, and that those truths are constantly changing. The emphasis of qualitative research is usually on understanding a social phenomenon, a process, and meanings (Sale et al., 2002). Qualitative studies typically

utilise strategies such as in-depth and focus group interviews, case studies, ethnography, action research, and grounded theory, with the goal being to study the interpretations of the respondents and relationships between them. Small, purposeful samples of articulate respondents are usually employed in qualitative research because they can provide important information, rather than because they are representative of a larger group (Reid, 1996).

On the assumption that there are social facts with an objective reality independent of the beliefs of individuals, quantitative research seeks to explain the causes of changes in social facts, primarily through objective measurement and quantitative analysis. Quantitative researchers typically employ strategies of inquiry, such as surveys and experiments, to examine the relationships between variables by collecting information numerically and analysing those data using statistical techniques. This process yields an understanding of the phenomenon such that the researcher can explain the relationship as well as make certain predictions about the relationship (Creswell, 2012).

### **3.2.2.2 Quantitative method for the current study**

Researchers who work from a positivist perspective generally explain in quantitative terms how variables interact, shape events, and cause outcomes. They assign greater importance to quantitative research methods focusing on quantitative analysis, surveys, experiments, and other techniques (Creswell, 2012; Tashakkori & Teddlie, 1998). Such quantitative methods help to examine the relationships among quantifiable observations and express the relationships among variables using statistical techniques. Hence, quantitative approaches are more suitable to examine characteristics of a population of interest with the intention of

establishing causal relationships and providing explanations of predictions across populations (Szyjka, 2012).

As the current research is positioned in the positivist paradigm, a key goal is to empirically test the underlying relationship between variables in the conceptual framework developed in section 2.5.4 using measurable data. Owing to its ability to examine relationships among quantifiable observations and to express these relationships using statistical techniques, a quantitative method is the most appropriate approach for the current research. A quantitative method also allows for a broader study, involving a greater number of subjects and enhancing the generalisation of the results to inform practice.

### **3.2.3 Research approach**

Two research approaches are possible: deductive and inductive. The deductive approach is generally associated with positivist and quantitative research. It involves the development of an idea, or hypothesis, from existing theory, which can then be tested through the collection of data, mostly using quantitative methods (Saunders, 2011). It is based on the premise that theory is the first source of knowledge, so that deduction proceeds from theory to empirical investigation (Eriksson & Kovalainen, 2008). Such an approach is usually employed in explaining the relationships among variables suggested by quantitative data obtained from large sample sizes.

In contrast, the inductive approach involves exploring data collected to develop theory, which is subsequently linked to the literature. The researcher begins by collecting data for the

purpose of understanding the nature of the investigated phenomenon (Saunders, 2011) so as to develop theoretical findings (Eriksson & Kovalainen, 2008). The result of this analysis is the formulation of a theory. Research adopting an inductive approach is more likely to be concerned with the context in which the event being studied is taking place; hence, a small sample of subjects is usually involved.

The deductive approach is generally associated with positivist and quantitative approach. The current study involves the collection of quantitative data from a wide audience of employee learners so as to explore the relationships among those learners' motivation, self-regulated learning strategy use, organisational contextual factors, and outcomes in workplace self-paced e-learning. The data collected can be analysed using statistical techniques—an approach that is generally related to the use of deductive reasoning. Hence, the deductive approach is adopted in the current study.

### **3.2.4 Research strategy**

A research strategy is a general plan that researchers follow to perform their research study, and to answer their research questions (Saunders, 2011). Some commonly used research strategies are the experiment, survey, case study, action research, grounded theory, and ethnography. Research strategies are also closely related to methods. A method comprises the techniques and procedures used to collect and analyse research data gleaned from such sources as questionnaires, observations, and interviews (Saunders, 2011).

The survey strategy usually involves the researcher collecting quantitative, numerical data

using questionnaires. The quantitative data collected can be analysed quantitatively using descriptive and inferential statistics to test research questions or hypotheses. Other data collection techniques associated with the survey strategy include structured observations and structured interviews, among others.

The current study involved the collection of quantitative data from a large number of employee learners to explore the relationships among the study variables. According to Saunders (2011), the survey strategy is a popular and commonly used strategy in social sciences research, and it tends to be used for exploratory and descriptive research. The survey strategy also makes possible the collection of a large amount of data from a sizeable population in a highly economical way. The quantitative data collected using the survey strategy can further be analysed using descriptive and inferential statistics to suggest possible reasons for particular relationships between variables and to produce models of these relationships that are aligned with the purpose of the current study. For these reasons, the survey strategy was adopted in the current study.

The survey study undertaken in the current research was non-experimental. That is, there was no manipulation of treatments or random assignment of participants to a group. In organisational settings, like those used in the current study, an experimental research design can be problematic. True experimental designs allow the researcher to have full control over the context and to assign subjects randomly to groups. However, it is neither practical nor possible to manipulate the predictor variables of motivation and self-regulated learning characteristics of employee learners across multiple organisations, as would be required by an experimental design. Likewise, a single group of employee learners was already in existence

(i.e., learners were already enrolled in WSPEL courses), and it was not possible to assign subjects randomly to groups; thus, a comparative analysis could not be performed.

### **3.2.5 Research design**

Research designs are procedures of inquiry (Creswell, 2014) that constitute the blueprint for the collection, measurement, and analysis of data. Saunders (2011) called this concept ‘research choice’ (p. 151). A single method (i.e., mono method) or multiple methods can be employed by a research design to answer research questions (Tashakkori & Teddlie, 2003). The term ‘multi-method’ refers to the use of a combination of more than one data collection technique and associated analysis techniques. A single research study may use quantitative and qualitative techniques and procedures in combination as well as both primary and secondary data. When both quantitative and qualitative data collection techniques and analysis procedures are employed either in parallel or sequentially in a research design, it is referred to as a mixed-methods design.

The current study consisted of two parts. The first part of the study sought to examine how motivation, self-regulated learning characteristics, and organisational contextual factors affect learning outcomes in workplace self-paced e-learning, as expressed in terms of course completion, learner satisfaction, and learning performance. It was exploratory in nature, and had the purpose of identifying effects and relationships. Its nature demanded a quantitative approach, which gave the researcher access to information regarding the relationships among measured variables that enabled the research to explain the relationships and make certain predictions about them.

The second part of the study was intended to augment and enhance the findings of the initial quantitative strand by obtaining in-depth insights into the lived experiences of workplace self-paced e-learners using a qualitative approach. Therefore, the purpose of the original study and the nature of the research questions demanded both quantitative and qualitative measures. Such a mixed-methods research design should allow a more complete understanding of the research problem (Creswell & Plano Clark, 2011; Teddlie & Tashakkori, 2003).

Ultimately, due to time and resource constraints, it was decided to focus only on investigating the relationships among learners' motivation, self-regulated learning characteristics, organisational context factors, and workplace self-paced e-learning outcomes. Exploration of workplace learning practices that may promote the learning outcomes in WSPEL will be left for future research.

### **3.2.6 Data collection method**

In terms of timing of data collection, research can be classified as cross-sectional or longitudinal. Cross-sectional research involves collecting data at a single point in time (i.e., a single 'snapshot'). The lack of a time dimension, reliance on existing differences rather than on change following intervention, and groups based on existing differences rather than random allocation are three distinctive characteristics of cross-sectional design (Saunders, 2011). By contrast, a longitudinal research design collects data over a given period in a series

of ‘snapshots’; this type of design yields more powerful results but is usually more complicated and costly to conduct (Neuman, 2014).

A cross-sectional design is employed in the current study, as it is relatively inexpensive and simple to conduct. According to Neuman (2014), this approach is suitable for an exploratory study in which the focus is on finding relationships between variables from existing differences between people, subjects, or phenomena at one point in time, as is the case in the current study. Although cross-sectional designs do not uncover causal relationships and do not provide much information about how individuals change over time, this was never the intent of the current study. A cross-sectional survey research was thus appropriate for the current study.

### **3.2.7 Data analysis**

Data analysis is the process of transforming raw data collected into usable information. It usually involves a series of processes such as inspecting, cleansing, transforming, and modelling data. To answer the research questions, descriptive and inferential statistics (i.e., PLS-SEM) were employed in the current study (to be discussed in section 3.7); the results are presented in Chapter 4.

## **3.3 Overall research process**

In section 3.2, it was established that a non-experimental cross-sectional survey design with questionnaire is most appropriate for the current study. The overall research process is discussed next (see Figure 4). Details of each sub-process are presented in sections 3.4 through 3.7.

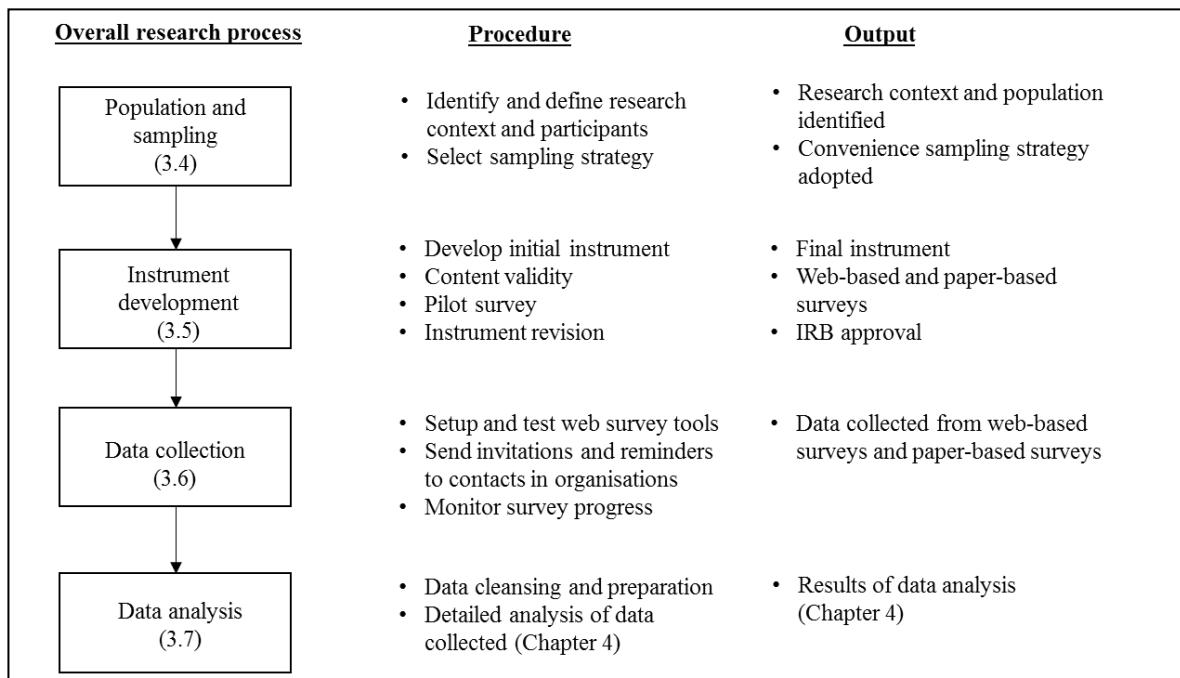


Figure 4: Key steps of the research process

## 3.4 Population and sampling

### 3.4.1 Context and participants

This study targeted at employees in Hong Kong organisations who had studied workplace self-paced e-learning (WSPEL) courses offered by their employers. As discussed in section 1.3, WSPEL is particularly common in statutory regulatory compliance training addressed to

all employees. Occasionally, WSPEL courses across a wide range of subject areas, such as digital skills, language and communication skills, and professional effectiveness, are offered by organisations to employees for professional development.

Although the estimated learning time for each e-learning course ranges from 30 minutes to a few hours, learners are usually given a longer period of time (e.g., from a few weeks to a few months) to complete the WSPEL course on their own. Access to workplace self-paced e-learning courses is usually through a web browser on a computer connected to the Internet or the internal company network, although access using mobile devices is also gaining popularity.

Depending on organisational policy, employee learners at all levels are assigned or self-selected into WSPEL courses. Frequently, administrative personnel from the organisation will oversee operation of the workplace self-paced e-learning courses, but their role is limited to handling administrative arrangements and policing to ensure timely completion of the WSPEL courses by employee learners.

### **3.4.2 Characteristics of organisations in the study**

Since this study focused on employees in Hong Kong organisations, the researcher made use of his network of professional contacts that are known to have implemented e-learning to reach the target participants. Of the 63 Hong Kong organisations approached by the researcher, 21% were in financial services, 18% were in information and telecommunications, 17% were in retail and distribution, 13% were in transportation and

utilities, 12% were government organisations, and the rest were in hospitality, manufacturing, or some other industry. According to the Hong Kong Institute of Human Resource Management, companies in financial services, telecommunications companies, and public organisations have the highest e-learning adoption rate in Hong Kong (HKIHRM, 2017), and these organisations were well represented in the current survey.

### **3.4.3 Sampling strategy**

A key challenge in organisation research is that the researcher is often confronted by the need to collect empirical data from a reluctant population (Gregori & Baltar, 2013). The researcher is generally considered an outsider by the organisation's members and often not welcomed. The need to reach participants across multiple organisations in the current research was particularly challenging. As such, snowball sampling (discussed in the next section), a non-random sampling technique, was selected as the sampling method in the study. To reach the target participants, assistance was sought from contact persons in 63 organisations that are known to have implemented e-learning, with those persons being asked to forward survey invitations to the prospective survey participants.

#### **3.4.3.1 Snowball sampling**

Snowball sampling, also known as chain-referral sampling, is a type of non-probability sampling technique that involves obtaining participants via referrals made among people (Biernacki & Waldorf, 1981). Thus, snowball sampling seeks to take advantage of the social

networks of respondents to provide a set of potential contacts (Thompson, 1997). In the current research, the starting points of the snowball sampling process were professional contacts of the researcher whose employing organisations were known to have implemented e-learning in the workplace. Once a contact point in an organisation was identified, she/he was requested to help the researcher recruit other participants within the organisation.

According to Faugier and Sargeant (1997), snowball sampling is suitable in research when the target population is hard to reach. The current research involved studying employees in multiple organisations who were hard to reach and who needed to possess previous experience studying a WSPEL course. The technique of ‘chain referral’ should aid entry to such settings and hence snowball sampling was adopted.

### **3.4.3.2 Potential limitations and bias**

A concern with snowball samples is the potential bias towards the inclusion of individuals with interrelationships (Griffiths et al., 1993). At the same time, ‘isolates’, who are not connected to any network into which the researcher has tapped, may be missed (Van Meter, 1990). Hence, under-representation or over-representation of particular groups within the sample will result. Such bias in sampling may lead to a constant difference between the results from the sample and the theoretical results from the entire population. In such a case, the study results are not necessarily generalisable to the population. Given this approach’s limitations, Blanken et al. (1992) have suggested that snowball sampling offers practical advantages if the aim of a study is primarily explorative in nature.

The current research sought to identify potential relationships among forces that operate behind WSPEL outcomes and, therefore, is exploratory in nature. The research also required collecting empirical data from a population within multiple organisations that is hard to reach using conventional methods. Snowball sampling allowed the researcher to obtain basic data to empirically test the conceptual framework while avoiding the complications of using a randomised sample. Although the study results may not be generalisable outside of the study sample, the information could still provide some fairly significant insights, and be a good source of data for further research. In the future, these limitations may be partially addressed by generating larger samples as well as by replicating results to strengthen any generalisations.

### **3.5 Instrumentation development**

A self-report survey instrument in the form of a questionnaire was employed to elicit responses from target participants in the current study. The overall process for the development of the survey instrument is depicted in Figure 5: The instrument development. Key sub-processes of instrument development are presented in sections 3.5.1 through 3.5.4.

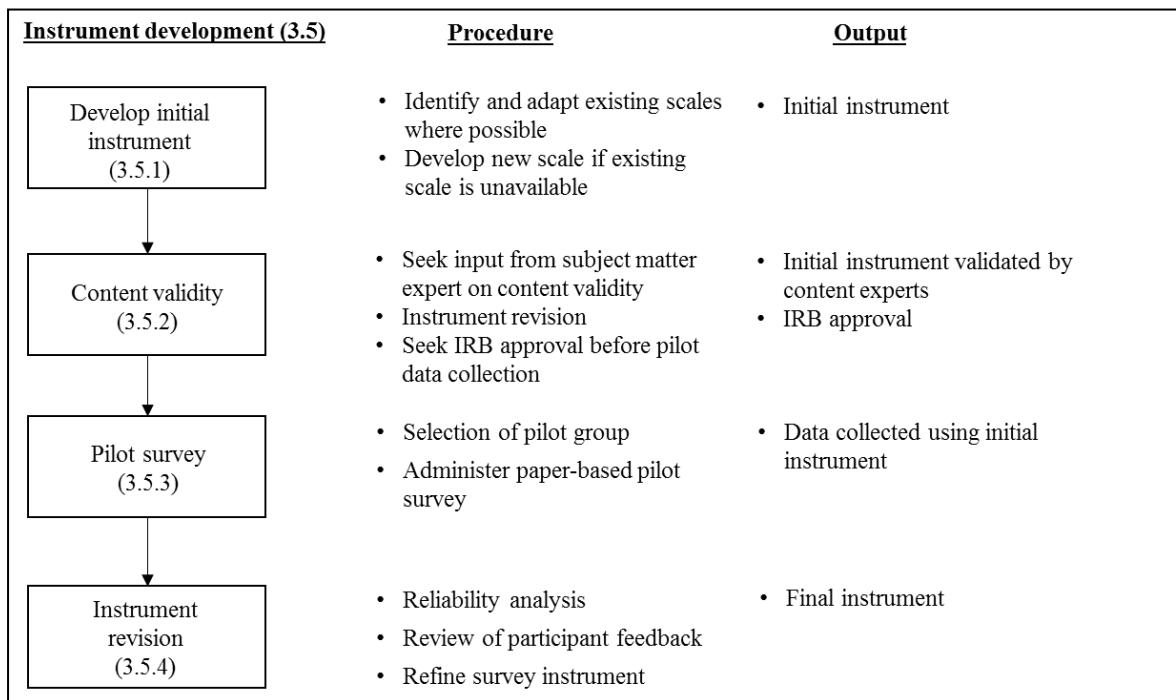


Figure 5: The instrument development process

### 3.5.1 Development of the initial instrument

The survey instrument consisted of 62 scale items to measure level of agreement with a series of statements related to workplace self-paced e-learning. Most scale items were adapted from existing scales used in training and e-learning-related studies. The wording of existing scale items was adapted where necessary. Participants were asked to answer the questions as per their interpretations and subjective opinions related to the questions. To improve the accuracy of recall, respondents rated their most recent workplace self-paced e-learning experience.

As a data collection technique, a questionnaire is not without its limitations. For instance, the format commonly used for answers tends to annoy some participants. In addition, if the participants are unable to comprehend the questions, their responses may turn vague, which

will negatively affect the data collection process. To minimise any potential misunderstanding on the part of survey participants, essential information was provided in the survey instrument to clearly explain research goals and objectives, thereby minimising the potential for confusion among the participants.

Development of each section of the survey instrument is presented next.

### **3.5.1.1 Informed consent**

The survey instrument (see Appendix E) included a shortened version of an informed consent form (refer to Appendix E) and instructions (i.e., Questions 1 and 2 on the survey instrument) on how to complete the survey. Participants were advised to choose the most suitable and honest way to answer the questionnaire. Additionally, participants were assured of privacy and confidentiality. It was also made clear that participation in the study was voluntary and that the respondent could withdraw at any stage. The researcher's email address was also included in the survey in case any participant had questions or concerns.

### **3.5.1.2 Demographic and miscellaneous variables**

Demographic data for each participant were collected for descriptive purposes and to establish study limitations. The data collected included gender, age group, and highest education level attained. Table 1 summarises the demographic variables in the survey instrument.

<b>Question no.</b>	<b>Demographic variables</b>
4	Gender
5	Age group
6	Highest education level attained

Table 1: Demographic variables in survey instrument

To facilitate interpretation of collected data, three additional questions were included in the survey instrument to uncover respondents' overall experience with WSPEL. The three questions were related to the places where they studied WSPEL courses, their preference in mode of training delivery, and the status of e-learning adoption in the participants' organisations.

<b>Question no.</b>	<b>Question</b>
7	Overall, my experience studying employer provided self-paced e-learning courses have been
10	How often do you choose the following places to study your employer provided "self-paced e-learning course"? (at home / at work / other place)
18(e)	I would prefer to undertake the same course as a traditional face-to-face course (instead of a self-paced e-learning course).
21(f)	E-learning is part of the culture in this organisation.

Table 2: Miscellaneous variables in survey instrument

In the original research design, there was a qualitative strand to further understand the lived experience of WSPEL learners. As such, three additional questions (Table 3) were included in the survey instrument to invite survey respondents to participate in the follow-up telephone interview. Due to time and resource constraints, it was decided to focus only on the quantitative strand; hence responses for questions 24–26 are not analysed further in the current study.

<b>Question no.</b>	<b>Question</b>
24	Invitation to participate in a short telephone conversation
25	Name of participant
26	Choice of contact method

Table 3: Variables related to the follow-up interview in survey instrument

The main study variables in the survey instrument are presented next.

### **3.5.1.3 Main study variables**

A summary of the main research constructs in the current study is presented in Table 4. Section 3.5.1.4 presents measurements for the three learning outcome variables (i.e., COMP, SAT and PERF). In addition, the scale used to measure employee learners' motivation to learn is presented in section 3.5.1.5. Measurement of motivational belief and use of self-

regulated learning strategy is discussed in section 3.5.1.6. Finally, measurement of the organisational contextual factors is presented in section 3.5.1.7.

<b>Constructs</b>	<b>Definition</b>	<b>Reference</b>
Completion rate (COMP)	The ratio of the number of workplace self-paced e-learning courses that a learner has completed in the last 3 years to the number of workplace self-paced e-learning courses that the learner attempted during the same period	Wang (2010)
Learner satisfaction (SAT)	The degree of enjoyment and gratification that a learner experienced through participation in workplace self-paced e-learning	Gunawardena, Linder-VanBerschot, et al. (2010)
Perceived learning performance (PERF)	The learner's mastery and retention of content taught in workplace self-paced e-learning courses and job performance as a result of participation in workplace self-paced e-learning	Sharma (2006)
Motivation to learn (MTL)	A specific desire of the learner to learn the content in workplace learning courses	Noe & Schmitt (1986)
Extrinsic goal orientation (EGO)	The extent to which a learner participates in workplace self-paced e-learning for the reason that it is a means to an end such as job performance, rewards, or promotion	MSLQ (Pintrich et al., 1991)

Intrinsic goal orientation (IGO)	The extent to which a learner participates in workplace self-paced e-learning so as to meet a personal challenge, satisfy personal curiosity, and/or attain personal mastery over the elements of the task	MSLQ (Pintrich et al., 1991)
Workplace self-paced e-learning self-efficacy (WSPELEFF)	A learner's belief that he or she is capable of learning and succeeding in workplace self-paced e-learning	New
Metacognitive self-regulation (METACOGSR L)	A learner's use of metacognitive strategies such as planning, monitoring, and regulating while participating in workplace self-paced e-learning	MSLQ (Pintrich et al., 1991)
Time management (TIMEMGMT)	The ability of a learner to manage his or her time for workplace self-paced e-learning through scheduling, planning, and ensuring effective use of the learning time	MSLQ (Pintrich et al., 1991)
Environment management (ENVMGMT)	The ability of a learner to select environments in which the learner has control over possible distractions while participating in workplace self-paced e-learning	MSLQ (Pintrich et al., 1991)
Organisational support (ORGSUPP)	The extent to which an individual perceives that his or her employing organisation values	GTCS, Tracey & Tews (2005)

	the usefulness and benefits of learning and reinforces the use of the learning on the job	
Supervisor support (SUPERSUPP)	The extent to which an individual perceives that his or her supervisors reinforce and support the use of learning on the job	GTCS, Tracey & Tews (2005)
Perceived choice (CHOICE)	The extent to which a learner perceives that he or she has flexibility in making decisions and has opportunities to choose among different options in workplace self-paced e-learning	Ryan (1982)
Workload (WORKLOAD)	The extent to which an individual must work at a rapid pace or work very hard to complete a high volume of work	QWI, Spector & Jex (1998)

Table 4: Definition of main research constructs

### 3.5.1.4 Workplace self-paced e-learning outcomes

Learning outcomes of interest in the current study were the WSPEL course completion rate (COMP), learner satisfaction (SAT), and perceived performance (PERF). Calculation of the workplace self-paced e-learning completion rate is presented in section 3.5.1.4.1, and scales to measure learner satisfaction and perceived performance are presented in sections 3.5.1.4.2 and 3.5.1.4.3, respectively.

### **3.5.1.4.1 Completion rate**

Following the path described by Wang (2010), and instead of measuring the reported completion rate by individual learners, survey respondents were requested to report the number of workplace self-paced e-learning courses they had started (item ‘Vcoursestrt’) and completed (item ‘Vcoursecomp’). The survey limited the e-learning participation to the past 3 years to ensure the accuracy of the measure. The variable ‘Completion rate’ was calculated using the following formula:

$$\text{Completion rate} = \frac{V\text{coursecomp}}{V\text{coursestrt}}$$

where

Vcoursecomp: Number of workplace self-paced e-learning courses started in the past 3 years.

Vcoursestrt: Number of workplace self-paced e-learning courses completed in the past 3 years.

The calculated individual e-learning completion rates ranged from 0% to 100% and were used as the dependent variable in subsequent analysis. In addition to asking participants for the data required in the preceding formula, the instrument included a question designed to assist in assessing the findings from this study. This item concerned the specific reason(s) for non-completion (i.e., Question 11 in the survey instrument).

<b>Question no.</b>	<b>Demographic variables</b>

8	How many employer provided self-paced e-learning courses have you started in the past 3 years?
9	How many employer provided self-paced e-learning courses have you completed in the past 3 years?
11	If you have not completed any self-paced e-learning course as planned, what are the main reasons for not completing?

Table 5: Survey questions related to completion rate (COMP)

### 3.5.1.4.2 Learner satisfaction

In this study, learner satisfaction (SAT) was treated as a dependent variable. Five items [Questions 12(a) to 12(f) in the survey instrument shown in Appendix A] were adapted from Gunawardena, Linder-VanBerschot, et al. (2010) to assess learner satisfaction, with responses being given on a 5-point Likert scale ranging from ‘strongly disagree’ to ‘strongly agree’. These 5 items were originally developed by Gunawardena, Linder-VanBerschot, et al. (2010) to measure learner satisfaction in a multinational corporation in a study examining predictors of learner satisfaction with, and transfer of learning through, corporate online courses. The original satisfaction scale was considered very reliable, with a Cronbach’s alpha of .83. Wordings for the 5 learner satisfaction items were adapted to suit the purpose of the current study. A sample item is ‘All in all, I am satisfied with my experience studying the self-paced e-learning course’. The learner satisfaction scale was considered reliable, with a Cronbach’s alpha of 0.752 (see Table 18).

### **3.5.1.4.3 Perceived learning performance**

Five items adapted from Sharma (2006) were used to assess perceived performance [Questions 19(a) to 19(f) in the survey instrument as shown in Appendix A]; responses used a 5-point Likert scale ranging from ‘strongly disagree’ to ‘strongly agree’. A sample item is ‘All things considered, my job performance has or will improve as a result of the course’. The perceived learning performance scale was considered reliable, with a Cronbach’s alpha of 0.779 (see Table 18).

Having presented the scales adopted for the learning outcome variables, scales for measuring employee learners’ motivation to learn are described next.

### **3.5.1.5 Motivation to learn**

Noe and Schmitt (1986) developed and tested an 8-item motivation-to-learn scale; this scale was validated in subsequent studies (e.g., Kossek et al., 1998). To arrive at a shorter scale to assess motivation to learn, 6 items were selected and adapted for the current study [Questions 12(a) to 12(f) in the survey instrument as shown in Appendix A]. Participants rated their agreement with each item on a 5-point Likert scale ranging from ‘strongly disagree’ to ‘strongly agree’. A sample item is ‘I try to learn as much as I can from training programmes’. The motivation-to-learn scale was considered reliable, with a Cronbach’s alpha of 0.752 (see Table 18).

The next section presents scales for measuring employee learners' self-regulated learning characteristics, including their motivational belief and use of self-regulated learning strategies.

### **3.5.1.6 Self-regulated learning characteristics**

In this section, the instrument most commonly used for measuring self-regulated learning, the Motivated Strategies for Learning Questionnaire (MSLQ), is introduced. This is followed by a discussion of the scale adoption for measuring employee learners' motivational belief [i.e., intrinsic goal orientation (IGO), extrinsic goal orientation (EGO)], use of a metacognitive self-regulation strategy, and resource management strategy. This section also presents a new scale developed specifically for measuring learners' workplace self-paced e-learning self-efficacy in the study context.

#### **3.5.1.6.1 Motivated Strategies for Learning Questionnaire**

The Motivated Strategies for Learning Questionnaire (MSLQ) instrument was used as the basis for questionnaire items for this study to assess the specific self-regulated learning characteristics of intrinsic goal orientation, extrinsic goal orientation, time management, environment management, and metacognitive self-regulation. Developed by Pintrich et al. (1991) at the University of Michigan, the MSLQ is a self-report instrument designed to 'assess college students' motivational orientations and their use of different learning strategies for a college course' (Pintrich et al., 1991, p. 3).

The entire MSLQ scale contains 81 items in two sections, one for motivation and one for learning strategies. The motivation section consists of 31 items in 6 subscales: intrinsic goal orientation, extrinsic goal orientation, task value, control of learning beliefs, self-efficacy for self-regulated learning, and test anxiety. The learning strategy section consists of 50 items in 9 subscales: rehearsal, elaboration, organisation, critical thinking, metacognitive self-regulation, time and study environment management, effort regulation, peer learning, and help seeking (García & Pintrich, 1995, p. 15). One of the major benefits of the MSLQ is its modular structure—that is, the entire instrument does not need to be employed, but rather the subscales may be used individually as required.

The MSLQ instrument has been validated through factor analyses, reliability analyses, and correlates with measures of achievement (Pintrich et al., 1991). Various researchers have indicated that the MSLQ instrument has ‘adequate content validity in that the items represent concepts related to the expectancy-value theory of motivation and the information-processing model of cognitive strategy use’ (VanZile-Tamsen, 2001, p. 234). Recent reviews have found that the MSLQ is the most widely used instrument in SRL measurement (Panadero, 2017; Roth et al., 2016) and in self-efficacy measurement (Honicke & Broadbent, 2016).

### **3.5.1.6.2 Intrinsic and extrinsic goal orientation**

Extrinsic goal orientation was assessed using a 3-item, 5-point Likert scale [Questions 16(a) to 16(c) in the survey instrument as shown in Appendix A], where 1 = ‘strongly disagree’ and 5 = ‘strongly agree’. This scale was adapted from the MSLQ subscale for extrinsic goal

orientation. A sample item is ‘Generally, I would participate more in self-paced e-learning course if it helps me attain external rewards (e.g., approval from others, improved performance, promotion)’. The extrinsic goal orientation scale was considered reliable, with a Cronbach’s alpha of 0.795 (see Table 18).

Intrinsic goal orientation (IGO) was assessed with a 3-item, 5-point Likert scale [Questions 16(d) to 16(f) in the survey instrument as shown in Appendix A], where 1 = ‘strongly disagree’ and 5 = ‘strongly agree’. This scale was adapted from the MSLQ subscale for intrinsic goal orientation. A sample item is ‘Generally, participating in self-paced e-learning course is valuable for personal goals instead of external rewards’. The intrinsic goal orientation scale was considered reliable, with a Cronbach’s alpha of 0.786 (see Table 18).

### **3.5.1.6.3 Self-efficacy for workplace self-paced e-learning**

Very few studies have sought to define and address either various types of self-efficacy for e-learning or self-efficacy specifically in the context of workplace self-paced e-learning. To remedy this omission, a new construct—self-efficacy for workplace self-paced e-learning (WSPELEFF)—is proposed in the current study. In the context of the current study, self-efficacy for workplace self-paced e-learning refers to the employee’s belief in his or her ability to succeed in workplace self-paced e-learning. Self-efficacy for workplace self-paced e-learning (WSPELEFF) is conceptualised as composed of three key dimensions: (1) self-efficacy to study a self-paced e-learning course using a computer; (2) self-efficacy to plan and manage the self-paced e-learning process; and (3) self-efficacy to learn the content in self-paced e-learning.

After an extensive literature review, a new 6-item scale [Questions 13(a) to 13(f) in the survey instrument as shown in Appendix A] was developed to measure employee learners' self-efficacy for workplace self-paced e-learning, as appropriate existing scales could not be found. A sample item is 'I am confident in my ability to use a computer to study the self-paced e-learning course'. Participants rated their agreement with each item on a 5-point Likert scale ranging from 'strongly disagree' to 'strongly agree'. The self-efficacy for workplace self-paced e-learning scale was considered reliable, with a Cronbach's alpha of 0.882 (see Table 18).

#### **3.5.1.6.4 Metacognitive self-regulation**

The metacognitive self-regulation scale consisted of 8 items adapted from the MSLQ [Questions 20(a) to 20(h) in the survey instrument as shown in Appendix A]. Participants rated their agreement with each item on a 5-point Likert scale ranging from 'strongly disagree' to 'strongly agree'. A sample item is 'While studying online, I will find ways to help focus my learning'. The metacognitive self-regulation scale was considered reliable, with a Cronbach's alpha of 0.719 (see Table 18).

#### **3.5.1.6.5 Time management**

The time management scale consisted of 4 items adapted from the MSLQ ([Questions 15(a) to 15(d) in the survey instrument as shown in Appendix A]. Participants rated their agreement

with each item on a 5-point Likert scale ranging from ‘strongly disagree’ to ‘strongly agree’. A sample item is ‘On the whole, I was able to set aside regular times to study these e-learning courses’. The time management scale was considered reliable, with a Cronbach’s alpha of 0.779 (see Table 18).

### **3.5.1.6.6 Environment management**

Two items using a 5-point Likert scale [Questions 17(a) and 17(b) in the survey instrument as shown in Appendix A] and adapted from the MSLQ were used to assess environment management. Participants rated their agreement with each item on a 5-point Likert scale ranging from ‘strongly disagree’ to ‘strongly agree’. A sample item is ‘I will try to find a designated place that is relatively free from interruptions to study the course’. The environment management scale was considered marginal, with a Cronbach’s alpha of 0.653 (see Table 18).

Having presented the measurements used to assess employee learners’ motivational belief and use of self-regulated learning strategy, I shall next present the measurement of the organisational contextual factors.

### **3.5.1.7 Organisational contextual factors**

### **3.5.1.7.1 Organisational support**

Five items [Questions 21(a) and 21(e) in the survey instrument as shown in Appendix A] from Tracey and Tews' (2005) General Training Climate Scale (GTCS) were used to measure organisational support. Participants rated their agreement with each item on a 5-point Likert scale ranging from 'strongly disagree' to 'strongly agree'. A sample item is 'This organisation rewards employees for using newly acquired knowledge and skills on the job'. The organisational support scale was considered reliable, with a Cronbach's alpha of 0.815 (see Table 18).

### **3.5.1.7.2 Supervisor support**

The supervisor support (SUPERSUPP) construct was measured via 5 items [Questions 22(a) and 22(e) in the survey instrument as shown in Appendix A] derived from Tracey and Tews' (2005) General Training Climate Scale (GTCS). Participants rated their agreement with each item on a 5-point Likert scale ranging from 'strongly disagree' to 'strongly agree'. A sample item is 'Supervisors give recognition and credit to those who apply new knowledge and skills to their work'. The supervisor support scale was considered reliable, with a Cronbach's alpha of 0.775 (see Table 18).

### **3.5.1.7.3 Perceived choice**

The perceived choice scale from the Intrinsic Motivation Inventory (IMI) developed by Deci and Ryan (Ryan, 1982; Ryan et al., 1983) was used to assess employee learners' perceived

choice towards WSPEL. This construct was measured using 4 items [Questions 18(a) and 18(d) in the survey instrument as shown in Appendix A] on a 5-point Likert scale ranging from ‘strongly disagree’ to ‘strongly agree’. A sample item is ‘I felt like it was not my own choice to do the course’. The perceived choice scale was considered reliable, with a Cronbach’s alpha of 0.881 (see Table 18).

#### **3.5.1.7.4 Workload**

The workload construct was measured via 5 items [Questions 23(a) and 23(e) in the survey instrument as shown in Appendix A] derived from Spector and Jex’s (1998) Quantitative Workload Inventory (QWI). Participants rated their agreement with each item on a 5-point Likert scale ranging from ‘strongly disagree’ to ‘strongly agree’. A sample item is ‘Your job require you to work very fast most of the time’. The workload scale was considered reliable, with a Cronbach’s alpha of 0.769 (see Table 18).

Having discussed the various scales for measuring the study variables and created the initial survey instrument, the next step in the instrument development process was to establish content validity. This endeavour is described in the next section.

#### **3.5.2 Content validity**

Content validity is the extent to which the questions on an instrument are relevant and are a representative sample of the full domain of content. To ensure that the survey is measuring

the breadth and depth of the issue that it is intended to measure, feedback from subject matter experts (SMEs) was sought. A panel of SMEs was invited to analyse each item on the survey instrument and assist in determining which items should be included in the final version of the instrument. These experts were chosen based on their experience with e-learning. The selection criteria included those who had conducted e-learning research; had published articles on e-learning; had learned from, designed, developed, or taught e-learning courses; and were willing to participate. I emailed pre-identified SMEs to first seek their approval to review the instrument before it was piloted. The instrument was emailed to a panel of three SMEs with clear instructions of what to do. Both verbal and written feedback were sought from the SMEs. Specifically, SMEs were requested to do an item-by-item analysis of the instrument. They were also asked to comment on the overall structure, content, and wording. Some were interviewed over the phone and probed on their responses to the items. Their suggestions were incorporated in the instrument revisions.

### **3.5.3 Pilot survey**

Pilot testing was done to obtain feedback from survey participants. Additional questions were built into the pilot survey instrument to seek written feedback from the pilot group of participants. In particular, participants were asked to comment on the clarity and appropriateness of the questions as well as any problems encountered in completing the survey. In addition, they were asked to report the amount of time they spent completing the survey. This was accomplished by integrating an open-ended question in the instrument. Babbie (1998) has noted that it is reasonable for a pilot-study instrument to contain more questions than does the final survey.

Prior to pilot data collection, the proposed study was submitted to the Research Ethics Committee of the University of Nottingham for review and approval. After approval (see Figure 31: Research ethics approval) was obtained, the instrument was piloted using a convenience sample of employee learners from an organisation. The pilot survey instrument was administered to employees attending briefing sessions for one of the organisation's workplace self-paced e-learning course.

The pilot was carried out in January 2015. All employees in the briefing session were given a copy of the informed consent and the pilot survey instrument in paper form. This was done mainly for administrative convenience. Employees who volunteered to participate in the pilot were asked to read through and fill out the informed consent before filling out the main survey. All informed consent forms and pilot survey instruments were collected after the briefing session for analysis. A total of 11 surveys were completed in the pilot.

### **3.5.4 Instrument revision**

Data from the pilot study was entered into SPSS for statistical analysis. The SPSS procedure 'Reliability Analysis' was employed to perform item analysis and to calculate the internal consistency reliability coefficient for sub-scales in the questionnaire. The purpose of the analysis was to establish that the instrument contained scales with minimally acceptable internal consistency reliability. Cronbach's alpha for all but six sub-scales were below the threshold of 0.7. These six sub-scales were motivation to learn (0.677), time management (0.564), environment management (0.34), metacognitive self-regulation (0.499), perceived

choice (0.312), and extrinsic goal orientation (0.588). These sub-scales in the survey instrument were subsequently re-examined to see if there was any major problem. Premised on the fact that all six sub-scales were based on existing and proven scales, the low alpha value was attributed to the effect of the small sample size of the pilot group. After careful consideration, the decision was to keep all sub-scales, but some wording changes were made to the survey questions to minimise confusion.

Based on feedback from pilot participants, revisions were also made to other parts of the survey instrument. These included general wording changes to more accurately phrase the survey questions and standardisation of terminologies throughout the survey instrument. The term ‘self-paced e-learning’ was used in place of ‘work-related e-learning’ in the pilot instrument to better reflect the research aim. In addition, a definition of employer-provided workplace self-paced e-learning was included before the inclusion/exclusion question (Question 3). This was done to ensure the participants fully understood the meaning of workplace self-paced e-learning before the inclusion/exclusion question was answered and to avoid potential misunderstanding.

After the revision was done, the survey instrument was translated from English into Chinese, with the help of a professional translator, so as to maximise the effectiveness of the data collection. The translated version was carefully checked by the researcher to ensure accuracy of the translation. Some wording changes were made in the Chinese version of the instrument to ensure alignment with the English version. A bilingual version of the final survey instrument was created by merging the English and Chinese versions (see Appendix E).

Subsequently, the web version of the survey instrument was created based on the final bilingual version of the instrument. The survey platform employed in this study was SurveyGizmo (<https://www.surveygizmo.com/>). SurveyGizmo was chosen because of its inherent flexibility in supporting online surveys on mobile devices and bilingual surveys. After the content of the web survey was thoroughly checked and proofread, it was tested using different network connections, desktop computers, and mobile devices to ensure it was free of technical problems. Finally, a paper-based version of the survey instrument was created by exporting the web survey into a document, which was then used to produce the paper-based survey. This was done to ensure both the web survey and the paper-based survey were identical.

After final validation of the web-survey tool, the main study began.

### **3.6 Data collection process**

The main study started in April 2015. The researcher made use of his network of professional contacts to seek permission and assistance in forwarding the survey invitation to the prospective survey participants. Contact persons in 63 organisations were approached with an invitation email (Figure 28: Invitation email to contacts in organisations). The email detailed the purpose of the study, included a copy of the paper-based survey as a reference, and identified the web site address (URL) where the survey was hosted. The contact person in each organisation was requested to forward the invitation to prospective survey participants.

Upon receiving the invitation email forwarded by the contact person in the organisation, the prospective survey participant clicked on the survey web site address (URL) and was brought to the survey instrument. Once on the survey web site, the prospective participant was provided with the research title, research aim, and other essential information to clearly explain the research goals and objectives. In addition, the prospective participant was assured of privacy and confidentiality. It was also made clear that participation in the study was voluntary and that the person could withdraw at any stage. The researcher's email was included in the survey, in case the participant had any questions or concerns. Finally, the prospective participant was notified that clicking the selection 'Yes, I am willing to contribute to the research' indicated he or she had read and understood the content of the informed consent form and agreed to participate in the study. The survey participant was then presented with the survey questions. The web survey was set up in such a way that, with the exception of a few open-ended questions, a response to all survey questions was required before the participant could move on to the next page. This is done to minimise missing data.

After the participant had completed answering all survey questions, he or she was brought to the last section of the survey, which extended an invitation to participate in a voluntary follow-up telephone interview. An informed consent form with details on the goals and objectives of the follow-up telephone interview was shown. In addition, participants were assured of privacy, confidentiality for the interview, and freedom to withdraw at any stage if they chose to participate. If the invitation was declined, the survey participant was thanked for his or her participation and the survey session ended. Otherwise, the participant was invited to leave his or her name and preferred contact method for subsequent follow-up. Due to time and resource constraints, it was ultimately decided to focus only on the quantitative part of the study; hence the follow-up interviews were not conducted.

Data collection for the quantitative phase was completed at the end of July 2015.

### **3.7 Data analysis strategy**

At the end of the survey period, completed survey responses were extracted from the survey tool (<https://www.surveygizmo.com/>) into SPSS. Incomplete surveys were not extracted. A total of 143 completed survey responses were received. Out of these 143 responses, 119 were found to be valid. Valid responses were completed survey responses that included an answer of ‘yes’ to the inclusion/exclusion question (Question 3) on prior experience with employer-provided workplace self-paced e-learning.

There were a total of 14 main study variables, 3 dependent variables (Table 28), and 11 independent variables (Table 29) in the study. All of the main study variables, with the exception of course completion rate (COMP), were latent, rather than observed, variables.

To analyse the data, a methodology that distinguishes the latent variables from their manifest counterparts was needed. This methodology should also be able to handle errors in measurement and unexplained variance. Some of the commonly used methods for data analysis are multiple regression analysis, path analysis, factor analysis, and structural equation modelling (SEM). Both multiple regression analysis and path analysis deal with observed variables rather than latent variables. Factor analysis is able to detect underlying latent variables versus manifest variables as well as to reveal the relationships forming between the detected latent variables and their corresponding observed variables. However,

factor analysis is not capable of revealing the relationships among the latent variables detected. Hence, factor analysis, multiple regression analysis, and path analysis were not suitable for data analysis in the current study.

### **3.7.1 Structural equation modelling for data analysis**

Structural equation modelling (SEM) technique is a second-generation multivariate technique (Fornell & Larcker, 1981) that has been widely used for model testing in research. It allows the simultaneous examination of the relationships among the exogenous latent variables and the endogenous latent variables within a model (Kline, 1998). SEM supports analysis of inferential data and estimates the amount of measurement error within the model (Byrne, 2001). Thus, SEM is the preferred technique to test multiple hypotheses simultaneously (Hair et al., 2016). As this study sought to explore relationships among motivation, self-regulated learning characteristics, organisational contextual factors, and outcomes in workplace self-paced e-learning, SEM was deemed more suitable to achieve this purpose. Hence, SEM was used to test the relationships among the constructs in the current study.

There are two primary techniques for estimating structural equation models that may be used for SEM analysis. The first technique, CB-SEM (Jöreskog, 1978, 1982), is based on covariance-based structure analysis and is implemented by the LISREL and AMOS software programmes. The second technique, PLS-SEM, was developed by Wold (1982) and Jöreskog and Wold (1982b); it is based on component-based analysis using partial least squares estimation.

Both approaches to SEM have distinct features that make them suitable for different research purposes. On the one hand, the covariance-based CB-SEM approach determines how well a proposed theoretical model is able to estimate the covariance matrix for a sample data set. Hence, CB-SEM is adequate when the goal is theory confirmation or comparison of alternative theories and the research requires a global goodness-of-fit criterion (Hair et al., 2012). On the other hand, the variance-based PLS-SEM approach focuses on explaining the variance in the dependent variables when examining the theoretical model. PLS-SEM has an advantage over CB-SEM in that it can be applied to explore the underlying theoretical structure of models of ‘high complexity but low theoretical information’ (Jöreskog & Wold, 1982a, p. 270). PLS-SEM is applicable to testing and validation of hypothesised relationships at the theoretical level for exploratory models. It can also be applied in situations where theory is less developed and when the objective of applying structural modelling is prediction and explanation of target constructs (Hair et al., 2014). According to Tsang (2002, p. 841), PLS-SEM is particularly ‘suitable for data analysis during the early stage of theory development’—the application to which it was put in the current study.

The PLS technique is also robust and imposes minimal demands on measurement scales, sample size, and residual distributions (Chin, 1998a). The CB-SEM approach, by comparison, is sensitive to sample size, such that a small sample size will reduce the statistical power. Moreover, when the sample size is small, the normality assumption, which is required by the covariance-based approach, might not be strictly demonstrated. As pointed out by Wong (2016), the issue of small sample size is particularly common in research in organisational settings. Traditional covariance-based structural equation modelling tools such as LISREL and AMOS may not be ideal in such cases due to their strict data assumptions (Wong, 2010). According to Reinartz et al. (2009), PLS-SEM can operate efficiently with

small sample sizes and avoid many of the restrictive data assumptions (Henseler et al., 2009; Marcoulides & Saunders, 2006; Wong, 2011). PLS is thus suitable when the sample size is relatively small and assumption of normality is in doubt.

The current study used PLS-SEM as opposed to CB-SEM for three primary reasons. First, the goal of the current study was prediction and explanation of target constructs rather than theory confirmation—a goal that rendered PLS-SEM more suitable than CB-SEM (Chin, 2010). Second, the structural model in the current study is complex (many constructs and indicators), and PLS-SEM is better suited to handle this kind of complex model (Hair et al., 2016). Third, PLS-SEM is known to perform better when the sample size is small and/or the data are non-normally distributed. By contrast, CB-SEM has stringent assumptions about the normality of data.

SmartPLS 3.0 (Ringle et al., 2015) was employed for the PLS-SEM analysis in the current study. Before presenting the study results in Chapter 4, I will first discussed the threats to internal and external validity, methodological assumptions and delimitations, and ethical assurances in the current study in sections 3.8, 3.9, and 3.10, respectively.

### **3.7.2 Partial least squares structural equation modelling (PLS-SEM)**

A PLS path model consists of two elements. First, a structural model (also called the inner model) represents the latent constructs. This structural model also displays the relationships (paths) between the constructs. Second, the measurement models (also referred to as the outer

models) of the constructs display the relationships between the constructs and the indicator variables. Specification of the measurement model is discussed in next.

### 3.7.2.1 Reflective and formative measures

As discussed earlier, there is a need to first define latent constructs and measures prior to discussing the relationships found between them in PLS-SEM. A latent construct is a concept that can be defined but cannot be measured directly. Accordingly, one or more indicator items must be used to approximately measure it (Hair et al., 2010). Measurement theory specifies how the latent constructs are measured. Measurement specification requires operationalising measurement models as either reflective or formative (Hair et al., 2013). As shown in Figure 6, the relationship between the indicator items can be either from construct to items (i.e., reflective), or in the opposite direction (i.e., formative) (Götz et al., 2010; Hair et al., 2010; Henseler et al., 2009).

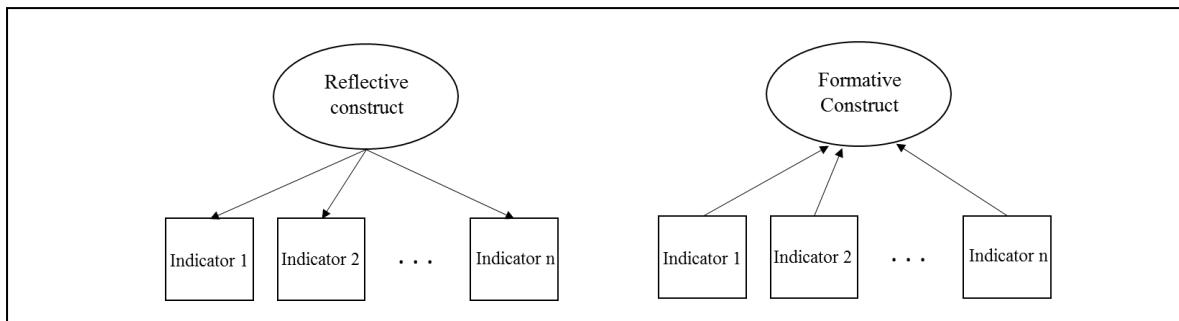


Figure 6: Reflective and formative constructs

Formative constructs are based on the assumption that the indicators cause the construct (i.e., a formative construct is formed by its indicators) and each indicator for a formative construct

captures a specific aspect of the construct's domain. Hence, a change in the indicators results in a change in the underlying formative construct. These indicators are usually not correlated with each other and are not interchangeable (Hair et al., 2016). The omission of an indicator can potentially alter the nature of the formative construct.

In contrast, indicators of reflective constructs represent the manifest effects of an underlying construct. Reflective indicators can be viewed as a representative sample of all possible items available within the conceptual domain of the construct (Nunnally & Bernstein, 1994). The direction of causality goes from the construct to the indicators, and a change in the construct causes a change in the indicators. According to Hair et al. (2016), reflective indicators of a particular construct should be highly correlated with each other and interchangeable. In addition, any single item can generally be left out without changing the meaning of the construct.

General criteria for choosing between formative and reflective models are summarised in Table 6.

<b>Criteria</b>	<b>Reflective</b>	<b>Formative</b>
Direction of causality	From the construct to the indicators	From the indicators to the construct
Explanatory power of items or construct	Construct explains the items	Construct is a combination of the items
Representation of the consequences or causes of the construct by the items	Consequences	Causes
Interchangeability of the items	Yes	No

Table 6: Criteria for choosing between formative and reflective measurements

Drawing upon the distinction between the reflective and formative constructs as discussed previously, it can be inferred that 10 latent constructs (see Table 7) in the current study are formed of conceptually similar items that reflect the overall construct.

<b>Measures used in the study</b>	<b>Type of measure</b>	<b>Rationale</b>
Completion rate (COMP)	Reflective	Single item measuring one construct
Learning satisfaction (SAT)	Reflective	Conceptually similar items measuring one construct
Learning performance (PERF)	Reflective	
Motivation to learn (MTL)	Reflective	
Extrinsic goal orientation (EGO)	Reflective	
Intrinsic goal orientation (IGO)	Reflective	
Workplace self-paced e-learning self-efficacy (WSPELEFF)	Reflective	
Metacognitive self-regulation (METACOGSRL)	Reflective	
Time management (TIMEMGMT)	Reflective	
Environment management (ENVMGMT)	Reflective	
Organisational support (ORGSUPP)	Reflective	
Supervisor support (SUPERSUPP)	Reflective	
Perceived choice (CHOICE)	Reflective	

Workload (WORKLOAD)	Reflective	
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Table 7: Reflective measures used in the study

For instance, the four items in ‘perceived choice’ measure the degree of autonomy employee learners have when participating in WSPEL. The indicator items (see Table 29) are ‘I did the course because I wanted to’ and ‘I felt like it was not my own choice to do the course’ (the item was reversed coded), ‘I did the course because I wanted to’ and ‘I did the course because I had to (I had no choice)’. It can be seen that the items shared a common theme, the direction of causality is from the construct to the constituent items, and the removal or addition of an indicator will not change the meaning of the ‘perceived choice’ construct. These items hence reflect the content of the overall ‘perceived choice’ construct. Extending this argument to the remaining latent constructs, it was considered appropriate to treat these constructs as reflective. COMP (completion rate of WSPEL course) is a single item construct that was the result of dividing the variable Vcoursestr by Vcoursecomp (see section 4.1.2). This single item construct was also treated as reflective in the current study.

Having established the reflective nature of latent constructs in the measurement model, the size of the data set is considered next.

### **3.7.2.2 Sample size considerations in PLS-SEM**

Although it is widely acknowledged that PLS-SEM can produce robust results with relatively limited sample sizes (Hair et al., 2016; Reinartz et al., 2009), Henseler et al. (2016) noted that the size of the sample must be large enough that the regressions that form part of the PLS

algorithm do not evoke singularities. A widely cited and applied rule of thumb is that the sample size must be 10 times the largest number of structural paths directed at a particular construct in the inner path model (Barclay et al., 1995; Hair et al., 2016; Henseler et al., 2009; Peng & Lai, 2012). In the current study, the maximum number of structural paths pointing at the independent variables (i.e., COMP, SAT and PERF) was 8, suggesting a minimum sample size of 80.

Furthermore, Hair et al. (2016) argued that researchers should take into account the statistical power that the study can achieve when determining the appropriateness of the sample size. Hair et al. (2016, p. 25) suggested using a table by Cohen (1992) as guidance to determine the appropriate sample size to produce significant results. Based on Cohen's statistical power rule (Hair et al., 2016, p.26), the maximum number of arrows pointing toward one construct in the study model was 8, so the minimum sample size required to achieve a statistical power of 80% with a significance level at 5%, and to detect an R-square ( $R^2$ ) value of at least 0.25, would be 54 observations. Chin (2010) further suggested that, 'to play it safe, one might recommend 100 or 200 [respondents] to improve accuracy' (p. 662). In the same vein, Reinartz et al. (2009) found in a recent Monte Carlo simulation that PLS-SEM can provide acceptable levels of statistical power with 100 observations.

The sample size in this study was 119. The number of observations exceeded the minimum required when applying the previously cited rule of thumb. Therefore, it can be concluded that the sample size of 119 was sufficient to run a robust PLS-SEM analysis.

### **3.8 Internal and external validity**

#### **3.8.1 Internal validity**

Internal validity in research refers to the degree to which the predictor variable may contribute to a change in the criterion variable (Bhattacherjee, 2012; Sekaran & Bougie, 2013). The goal of the current study was to predict whether a significant relationship exists between motivation, self-regulated learning characteristics, organisational contextual factors, and WSPEL outcomes. Since this study was non-experimental, few of the typical threats—such as threats that deal with time—applied. However, because the survey was given to specific Hong Kong organisations, selection bias may be considered an internal threat. Nevertheless, all of the participants are volunteers and most of them are not known directly to the researcher, so the risk of selection bias should be minimised.

#### **3.8.2 External validity**

External validity refers to the extent to which the results of a study can be generalised to a larger population (Bhattacherjee, 2012; Lodico et al., 2010; Sekaran & Bougie, 2013). In the current study, a convenience sample of employee learners from Hong Kong organisations was utilised for participant recruitment and participation. The lack of a true random sample restricts the ability to generalise any findings to the broader population. However, the findings from the study could be a source of additional knowledge that informs the field of study from two perspectives, those of the employees and those of training and development (T&D) professionals.

## **3.9 Methodological assumptions and delimitations**

### **3.9.1 Assumptions**

The study methodology is dependent upon several assumptions, including support from the organisation, willingness of participants to contribute and self-disclose information for the purposes of the research, and the appropriateness of the use of an online survey tool.

The first assumption was that the selected organisations would support the study by granting the researcher access to the targeted population. This was accomplished by going through contact persons in each of the organisations, who were asked to forward the invitation to participate in the study to the targeted employees. The contact persons did support the study in this way, so this assumption was met.

The second assumption was that the participants would be willing to contribute to the study and give accurate data about their motivation, self-regulated learning characteristics, and organisational context factors in workplace self-paced e-learning. Based on the response rate ( $n = 143$ ), the cooperation assumption was met.

A third assumption was that an online survey is an appropriate data collection tool for use with WSPEL learners. Since the target participants for the current study were employee learners who had prior experience studying workplace self-paced e-learning courses, they

should be reasonably familiar with the use of web technology tools. Hence, this assumption was also met.

### **3.9.2 Delimitations**

Delimitations describe how aspects of the study affect external validity (Ellis & Levy, 2009). Delimitations are restrictions imposed at the beginning of the study to narrow or tighten the study's focus. Two delimitations were made to narrow the scope of this study. First, only employees of Hong Kong organisations were included. This study targeted employees who had participated in employer-provided self-paced e-learning programmes that were delivered 100% online by Hong Kong organisations. Second, participants had to have participated in at least one online course, a delimitation intended to ensure that adult learner participants had some experience with the method of delivery. Hence, employees who had no prior experience studying workplace self-paced e-learning course were excluded from the current study.

### **3.10 Ethical assurances**

When research involves human beings, ethical issues may occur. This research complied with all standards for conducting research with human participants. Before collecting any data, the appropriate forms were completed and submitted to the University of Nottingham Research Ethics Committee. Approval from the Ethics Committee (Figure 31: Research ethics approval) was secured prior to participant solicitation and data collection. The sample population anonymously (and voluntarily) participated. No monetary compensation was

offered to any of the participants.

The link to the survey utilised in this research study was provided in an email that was sent to the employee learner's email address through the corresponding organisational contact. The email included an overview of the study as well as informed consent information. The consent form included such items as the researcher's name, the intent of the study, and risks to the participant (refer to Appendix E). It also informed the participants of their right to withdraw from part or all of the study at any time. The consent form also made it clear that participation was voluntary and that results would not be linked back to personal identification or specific individuals. Since the informed consent was entered online, acceptance consisted of the participant clicking on a link to acknowledge understanding and enter the study. By clicking on the link to the survey, participants agreed that they had read the description of the study and acknowledged that they could withdraw from the survey at any time, decide not to complete the survey, or choose not to answer any questions.

In general, participants in this study were not required to provide any personal data that would enable the researcher to identify the participant directly or through identifiers linked to the participant when completing the surveys. The only exception came when the participant voluntarily provided contact information for the follow-up telephone interview.

Data security measures were implemented to maintain data integrity and assure confidentiality. SurveyGizmo was used to administer the survey, and the responsibility for security of the online data collection and storage resided with the vendor. The vendor's security policy is available online and, per the security statement, responses are transmitted over an encrypted, secure connection. Collecting data unknowingly from participants was avoided because the informed consent form was presented to each participant before

collection of data, and the participants' names and other identifying information were not collected as part of the data.

### **3.11 Chapter summary**

This chapter discussed the research philosophy of this research as well as the detailed design of the research process. The methodology used in the research was described and justified. The measurement development of the survey was then discussed. Next, the data collection process and sampling procedure were examined. Finally, the selected method for data analysis was briefly discussed.

In chapter 4, the statistical methods are discussed in detail, along with their application to the data. The results of the analysis are provided as well.

## Chapter 4 Data analysis

The previous chapter presented the methodology, research design, survey instrument development process, and sampling procedures used in the study. In addition, the selection of the data analysis method was highlighted. This chapter presents the analyses of the data collected. The steps for data analyses are detailed in Figure 7.

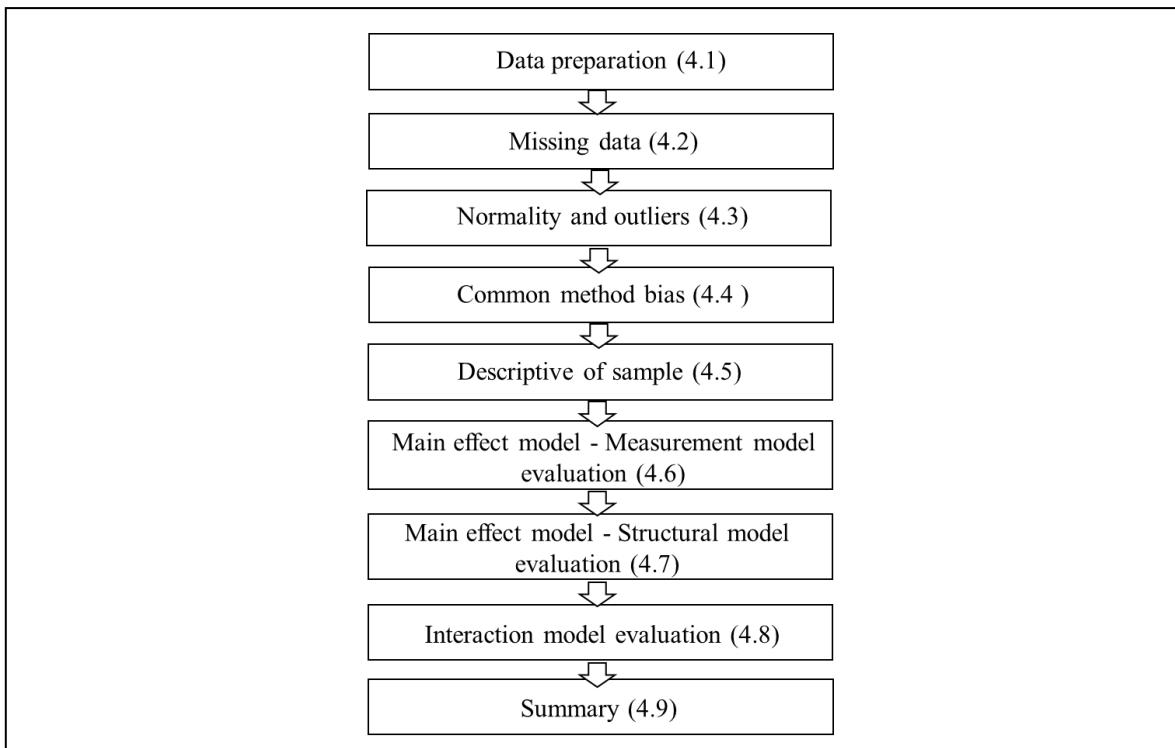


Figure 7: Overall data analysis process

This chapter begins by considering the data preparation step (section 4.1), in which the collected data were consolidated and extracted from the survey tool. The sample data set was then checked for missing data (section 4.2). This was followed by examination of normality and outliers (section 4.3). Descriptives of the survey sample, including the participant profile, are presented in section 4.5. The study model (main effect model) was then assessed in two stages. In stage 1 (section 4.6), the measurement model (outer model) was assessed to review

how well the variables involved in the study were measured. This was followed by an evaluation of the structural model (inner model) in stage 2 (section 4.7) to assess the relationships among the study variables, the path coefficients, p-values, R-squares, and effect sizes, among other things. Additional analysis that examined the interaction effects (interaction model) is presented in section 4.8. Section 4.9 summarises the data analysis process.

## **4.1 Data preparation**

### **4.1.1 Data screening**

Data screening and preparation for model testing was performed using IBM SPSS Statistics Version 21. After the survey period closed, data collected using the paper-based surveys was input into the online survey tool (i.e., SurveyGizmo) to consolidate data collected from both sources. Upon completion of data input, a thorough checking and validation process was carried out to ensure the input data were identical to those recorded on the paper-based surveys. The collected data were then extracted from the online survey tool into IBM SPSS Statistics Version 21 for further analysis. This data set included valid responses collected from both the online and paper-based surveys. Valid responses were completed surveys that included an answer of ‘yes’ to the inclusion/exclusion question of prior experience with employer-provided workplace self-paced e-learning (i.e., item ‘vPrevElnExp’ in the survey) (see Question 3 in the survey instrument in Appendix E). Answering ‘no’ to this inclusion/exclusion question implied that the participant had no prior experience in workplace self-paced e-learning and, therefore, did not meet the criteria for target sample

inclusion in this study. Out of 143 responses collected, 119 responses met the requirement for a valid response in this study and were downloaded to SPSS for further analysis.

#### **4.1.2 Calculation of course completion rate**

After the sample data set was downloaded to SPSS, the next step was to compute the values for the variable ‘Completion rate’ (COMP), a dependent variables in the study, using SPSS according to the following formula:

$$\text{Completion rate} = \frac{V_{coursecomp}}{V_{coursestrt}}$$

Out of the total 119 valid responses downloaded, there were 107 cases in which Vcoursecomp (i.e., number of WSPEL courses completed in the last 3 years) was less than or equal to Vcoursestrt (i.e., number of WSPEL courses started in the last 3 years). The completion rate for these 107 cases was calculated using the above formula. However, there were 5 cases in which Vcoursecomp was greater than Vcoursestrt. This can easily happen if the participant has completed all workplace self-paced e-learning courses started in the last 3 years plus any outstanding workplace self-paced e-learning course that the participant started before the 3-year period. In these cases, the survey participant has achieved the ‘maximum’ completion rate, which is 100%. Hence the completion rate for these 5 cases was set to 100%. The mean completion rate for these 112 (107 + 5) cases was then calculated (90.25%). Finally, the remaining 7 cases had zeros in both Vcoursecomp and Vcoursecomp. This could be because the survey participants found it difficult to recall the exact number. These 7 cases were treated as missing data. Following the recommendation by Hair et al. (2010) (to be discussed in section 4.2), the completion rate for these 7 cases were replaced by the mean

completion rate (90.25%).

Next, the sample data were examined for missing data.

## 4.2 Missing data

Missing data happen when a respondent either deliberately or accidentally fails to answer a question. The level of missing data in this sample was very low, only 1.15% of the total possible data points. Upon examination, the missing values were found to result from unanswered questions on the paper-based surveys. Because the web survey tool required answers for all questions, no missing data were found in the online surveys.

Missing data are ideally avoided through the design and administration of surveys. However, where missing data exist, imputation of missing values is an accepted way to deal with the issue. Although not ideal, the imputation procedure preserves to some extent the statistical power that would be lost if all cases with missing data were dropped from the analysis. The weakness of this approach is the potential for bias in the way the values are imputed or from dropping cases altogether, which is duly noted as a limitation here. For the missing data, I followed the process recommended by Hair et al. (2006) and applied the series mean of the missing data to impute the missing values. A brief analysis of the survey variables with missing data and the action taken is provided in Table 8.

Variable	Valid	Missing	%	Action
Vage	117	2	1.7%	Replaced - Vage_1 = MEDIAN(Vage ALL)

Vcoursestrt	117	2	1.7%	Replaced - Vcoursestrt_1 = SMEAN(Vcoursestrt ALL)
Vcoursecomp	117	2	1.7%	Replaced - Vcoursecomp_1 = SMEAN(Vcoursecomp ALL)
InOffice	116	3	2.5%	Replaced - InOffice_1 = MEDIAN(InOffice ALL)
OtherLoc	101	18	15.1%	Replaced - OtherLoc_1 = MEDIAN(OtherLoc ALL)
CULTURE1	118	1	0.8%	Replaced - CULTURE1_1 = SMEAN(CULTURE1)
SELFEFF6	117	2	1.7%	Replaced - SELFEFF6_1 = SMEAN(SELFEFF6)
TIMEMGMT4	118	1	0.8%	Replaced - TIMEMGMT4_1 = SMEAN(TIMEMGMT4)
ORGSUPP5	118	1	0.8%	Replaced - ORGSUPP5_1 = SMEAN(ORGSUPP5)
WORKLOAD4	118	1	0.8%	Replaced - WORKLOAD4_1 = SMEAN(WORKLOAD4)

Table 8: Missing data and actions taken

Next, normality and outliers in the sample data set are examined.

### 4.3 Normality and outliers

Before data analysis began, the sample data set was examined for extreme skewness and kurtosis. Skewness and kurtosis are two statistical characteristics used to describe non-normality (Hair et al., 2010; Tabachnick & Fidell, 2001). Skewness assesses the extent to which a variable's distribution is symmetrical. Kurtosis is a measure of whether the distribution is too peaked. Byrne (2001) and Kline (2015) suggest that if the skewness value falls outside the range of +1 to -1, the distribution is substantially skewed. Furthermore, kurtosis values, in absolute terms, of more than 10 suggest a potential problem (Hair et al.,

2010). Upon examination of skewness and kurtosis values of the variables in the sample data set (see Table 32), it was found that several variables showed negative skewness and non-zero kurtosis values (e.g., SUPERSUPP3, SELFEFF1). Given that the PLS approach makes no distributional assumption and is relatively forgiving of non-normality (Chin, 1998b; Haenlein & Kaplan, 2004) (see also section 3.7.1), analysis was performed on the raw data without making any transformation.

Next, outliers were examined. Outliers are cases with ‘extreme’ values that are very different from the rest of the data (Tabachnick & Fidell, 2001). A widely accepted rule of thumb for determining an ‘extreme’ value is that any score more than three standard deviations beyond the mean is defined as an outlier (Kline, 2015), and outliers should be considered for removal (Field, 2009). The ‘Explore’ option in IBM SPSS Statistics 21 was used to produce box plots and stem-and-leaf plots to detect outliers in the data set. A number of cases were spotted as outliers (i.e., more than three standard deviations beyond the mean).

Upon subsequent analysis, it was decided to retain all of the cases for the following reasons. First, there was insufficient proof that these outliers were not part of the population. Some respondents might genuinely have different responses from the majority of the sample population. Along the same vein, Gaskin (2016) has argued that outliers do not really exist in Likert scales (a 5-point Likert scale was adopted in the survey instrument in this study). This author also notes that answering at the extreme (1 or 5) is not really representative of outlier behaviour. Likewise, Kock (2014) has argued that the deletion of outliers is often a mistake, as an outlier can sometimes reveal the true nature of the relationship. This author further suggests that outliers should be removed only if they are due to measurement error. In the same vein, Kline (2015) has argued that the presence of a few outliers within a large sample

size should be of minor concern. Finally, Hair et al. (2016) suggest that ‘If there is no clear explanation for the exceptional values, outliers should be retained’ (p. 60).

The sample data set is next assessed for potential common method bias.

#### **4.4 Common method bias**

Common method variance is ‘variance that is attributable to the measurement method rather than to the constructs the measures represent’ (Podsakoff et al., 2003, p. 897). Since this study involved a single source of data using self-reported measurement, common method variance (bias) is a potential concern. To avoid this possibility, a number of methods recommended by Podsakoff et al. (2003) were adopted in the survey instrument to confirm the quality of the questionnaire. For instance, the study employed a mix of positively and negatively worded statements for the items (see Table 28 and Table 29), preserved the respondents’ anonymity, hid the name of each research variable, and required respondents to answer the questionnaire as honestly as possible. In addition, Harman’s single-factor test (Podsakoff & Organ, 1986) was used to evaluate the quantitative data for common method variance. The analytic results showed that the first factor accounted for 18.38% of the total variance. This means that no single factor accounted for most of the variance and, therefore, common method variance was not considered a threat in this research.

After examining the sample data set for missing data, normality, outliers, and common method bias, the data set was deemed ready for further analyses.

## **4.5 Description of the sample**

This section presents descriptive statistics for the study. The participant profile, including the respondents' age, gender, and highest level of education attended, is presented in Table 9. The WSPEL course completion rate for this sample of learners is presented in Table 10. In addition, summaries of participants' responses regarding their general involvement in workplace self-paced e-learning are provided in Table 11 through Table 16 to offer an overall insight in their views. Findings are reviewed separately in the following sub-sections in detail.

### **4.5.1 Participant profile**

The descriptive statistics (Table 9) revealed that the study sample consisted of relatively mature employee learners, with 54.2% being older than age 40. The group was dominated by male employees (60%) and was relatively well educated (93.3% with a bachelor's degree or above).

Age		
	21–30	16.7% (n = 20)
	31–40	27.5% (n = 33)
	41–50	31.7% (n = 38)
	50+	22.5% (n = 27)
Gender		
	Female	40% (n = 48)
	Male	60% (n = 72)

Highest education level attended		
	Secondary	0.8% (n = 1)
	Post-secondary	5.8% (n = 7)
	Bachelor	38.3% (n = 46)
	Master	53.3% (n = 64)
	Doctorate	1.7% (n = 2)

Table 9: Participant profile

The relatively high education level of the participants and their age profile (81.7% older than age 30 and 54.2% older than age 40) suggest that these employee e-learners were unlikely to be entry-level employees. Given the amount of working experience (as reflected through their age profile) as well as the group's high education level, they are more likely to be professionals, knowledge workers, or persons at supervisory and managerial positions in organisations.

#### 4.5.2 WSPEL courses completion rate

The findings also revealed that the WSPEL course completion rate for this sample of Hong Kong employees was 90.25% (Table 10). On the average, each employee learner was found to have started 2.29 WSPEL courses and completed 2.22 of them every year for the past 3 years.

	N	Min.	Max.	Sum	Mean	Std. deviation
WSPEL course started (past 3 years)	119	.0	60.0	816.7	6.863	9.8221

WSPEL course completed (past 3 years)	119	.0	60.0	793.3	6.667	9.6199
WSPEL course completion rate	119	.00	1.00	107.40	.9025	.22149

Table 10: WSPEL course completion rate

This is quite a high completion rate when compared to figures reported in many of the early studies [(e.g., Frankola (2001); Long et al. (2009); Sener & Hawkins (2007); Welsh et al. (2003)] discussed in section 1.4.2. However, it is quite close to the finding by Wang (2010), who reported a e-learning completion rate of 74% for the HRD online communities in the United States. One possible explanation for the high WSPEL completion rate for this sample of Hong Kong employee learners is the mandatory nature of the statutory and compliance WSPEL courses that are popular in Hong Kong organisations.

#### 4.5.3 Places where employee learners study WSPEL courses

Responses to the question ‘How often do you choose the following places to study your e-learning course(s)?’ revealed that this sample of Hong Kong employees studied WSPEL courses mainly at work (see Table 11). A total of 69.7% of employee learners reported they often or mostly studied WSPEL courses at work. Likewise, a total of 68.1% reported that they rarely or never studied WSPEL courses at home. In addition, 94.1% reported they rarely or never studied WSPEL courses at a place other than their workplace or at home.

Q10. How often do you choose the following places to study your e-learning course(s)?		
At home	Never	33.6% (n = 40)
	Rarely	34.5% (n = 41)

	Often	22.7% (n = 27)
	Mostly	9.2% (n = 11)
At work	Never	2.5% (n = 3)
	Rarely	27.7% (n = 33)
	Often	36.1% (n = 43)
	Mostly	33.6% (n = 40)
Other places	Never	80.7% (n = 96)
	Rarely	13.4% (n = 16)
	Often	5.9% (n = 7)
	Mostly	0% (n = 0)
	Highly Positive	0% (n = 0)

Table 11: Locations where learners study WSPEL courses

When asked for the location where they studied WSPEL courses other than at work or at home in a follow-up question, the top two types of locations cited were transportation and coffee shop/library (see Table 12).

Other locations	Frequency	%
Transportation	6	38%
Coffee shop/library	5	31%
Others	5	31%

Table 12: Other locations for studying WSPEL courses

Participants' responses revealed that this sample of Hong Kong employees studied workplace self-paced e-learning courses mainly at work locations (69.7%) and seldom at home (68.1%). This suggests that a high percentage of employee learners probably study their WSPEL courses during work hours—a finding consistent with that of Baldwin-Evans (2004) (to be

discussed in section 5.4.3). In addition, the discovery that transportation and a coffee shop/library were also places where some employee learners chose to study WSPEL courses suggests that some employee learners may not have the time or a proper environment to study WSPEL courses at work or at home.

#### **4.5.4 Main reasons for non-completion of WSPEL courses**

When asked for their main reasons for not able to complete WSPEL courses as planned (Table 13), the top three reasons were time-related issues, content-related issues, and the fact that e-learning was non-mandatory. Time-related issues (e.g., no time, too busy, tight time, limited time available) were mentioned by 42% of those who responded to the question as the main reason for non-completion. This was followed by content-related issues (12%) (e.g., course design is poor and not interactive, boring content) and the non-mandatory nature of the e-learning (7%).

Q11. Main reasons for non-completion	Frequency	%
Time-related issues	18	42%
Content-related issues	5	12%
E-learning is non-mandatory	3	7%
Motivation-related issue	2	5%
Workload-related issue	2	5%
E-learning is mandatory	1	2%
Environment-related issue	1	2%
Other reasons	11	26%

Table 13: Main reasons for non-completion of WSPEL courses

Thus, time-related issues were one of the key causes of non-completion of WSPEL courses among this sample of employee learners. Given their high education level (i.e., 93.3% with a bachelor's degree or above and 55% with a master's or doctoral degree), it is not very likely that they lack the skills to plan and properly use the time allocated for studying WSPEL courses. Instead, the source of these time-related issues is likely to be tied to the work environment, as most of the respondents studied WSPEL courses at work. This issue will be discussed further in Chapter 5.

#### **4.5.5 Employee learners' overall experience studying WSPEL courses**

When asked about their overall experience studying WSPEL courses (Table 14), the majority of the learners described the experience as positive or highly positive (64.4%). Only 2.5% of the survey participants rated their experience studying WSPEL courses as negative or highly negative.

Q7. Overall, my experience studying self-paced e-learning courses		
	Highly negative	0.0% (n = 0)
	Negative	2.5% (n = 3)
	Neutral	31.1% (n = 37)
	Positive	62.2% (n = 74)
	Highly positive	4.2% (n = 5)

Table 14: Learners' overall experience studying WSPEL courses

Overall, the findings generally revealed a positive picture of WSPEL in Hong Kong organisations. Although a little more than 30% of survey participants were neutral on the e-

learning experience, a great majority (64.4%) of them were positive or highly positive, reflecting a general acceptance of WSPEL by this sample of employee learners.

#### **4.5.6 Employee learners' preference for ILT**

Another question asked survey participants about their preference for ILT. Participants were asked the question, 'I would prefer to undertake the same course as a traditional face-to-face course (instead of a self-paced e-learning course)' (Table 15). The results revealed that more survey participants preferred to take the same course in ILT (36.1%) instead of WSPEL (25.2%).

Q18 (e). I would prefer to undertake the same course as a traditional face-to-face course (instead of a self-paced e-learning course)		
	Strongly disagree	1.7% (n = 2)
	Disagree	23.5% (n = 28)
	Neutral	38.7% (n = 46)
	Agree	26.9% (n = 32)
	Strongly agree	9.2% (n = 11)

Table 15: Learners' preference for ILT over WSPEL course

As revealed in survey participants' responses, there was a general preference for the traditional instructor-led face-to-face course over a WSPEL course. Those who preferred ILT (36.1%) exceeded those who preferred WSPEL (25.2%) by 10.9%. At the same time, 38.7% of survey participants were indifferent to the delivery mode. This neutral stance contrasts with the finding in section 4.5.5, in which survey participants generally reported a positive

experience with WSPEL. It suggests that employee learners' preference for ILT may be due to factors outside of the learning experience itself (to be discussed further in Chapter 5).

#### **4.5.7 E-learning is part of the culture in employee learners' organisation**

In response to a question that asked whether survey participants agreed that e-learning is part of the culture in their work organisation, a slight majority (55.5%) agreed or strongly agreed, while 17.6% disagreed or strongly disagreed (Table 16). This suggested that more than half (55.5%) of the employee learners who participated in the survey agreed that e-learning was not new and perhaps widely adopted in their employing organisation.

Q21 (f). E-learning is part of the culture in this organisation		
	Strongly disagree	2.5% (n = 3)
	Disagree	15.1% (n = 18)
	Neutral	26.9% (n = 32)
	Agree	45.4% (n = 54)
	Strongly agree	10.1% (n = 12)

Table 16: E-learning culture in learner's organisation

In summary, a few observations could be inferred from the descriptive analysis. The study sample consisted of a group of relatively mature employee learners, with 54.2% being older than age 40. The group was dominated by male employees (60%) and was relatively well educated (93.3% with a bachelor's degree or above). The majority of the group (69.7%) reported they often or mostly studied WSPEL courses at work, and most of them (64.4%)

found their workplace self-paced e-learning experience to be positive or highly positive. However, only 25.2% of the study sample preferred WSPEL to ILT, even though 55.5% of the survey participants agreed e-learning is part of the culture in their organisation.

Having discussed the study sample from a descriptive perspective, the research model is evaluated next using the PLS-SEM approach of structural equation modelling (discussed in section 3.7.2).

#### **4.6 Measurement model evaluation (main effect model)**

A PLS path model consists of two elements. First, a structural model (also called the inner model) both represents the constructs and displays the relationships between the constructs. Second, a measurement model (also referred to as the outer model) of the constructs displays the relationships between the constructs and the indicator variables. Hair et al. (2016) recommend the use of a two-stage approach to evaluate PLS path models. Stage 1 of the process deals with the evaluation of the quality of the measurement model by measuring the relationships between the manifest variables and the latent constructs. Quality of the structural model is then evaluated in stage 2 by measuring the relationships among the latent constructs.

Following the recommendations of Hair et al. (2016), evaluation of the measurement model is presented in this section first, before the evaluation of the structural model is addressed in section 4.7.

#### 4.6.1 Evaluation of the measurement model (reflective measurement model)

The objective of the present section is to examine the accuracy of the measurement model before considering the proposed relationships. For this purpose, the SmartPLS 3.0 software package (Ringle et al., 2015) was employed. The overall evaluation process for the reflective measurement model in the current study is shown in Figure 8.

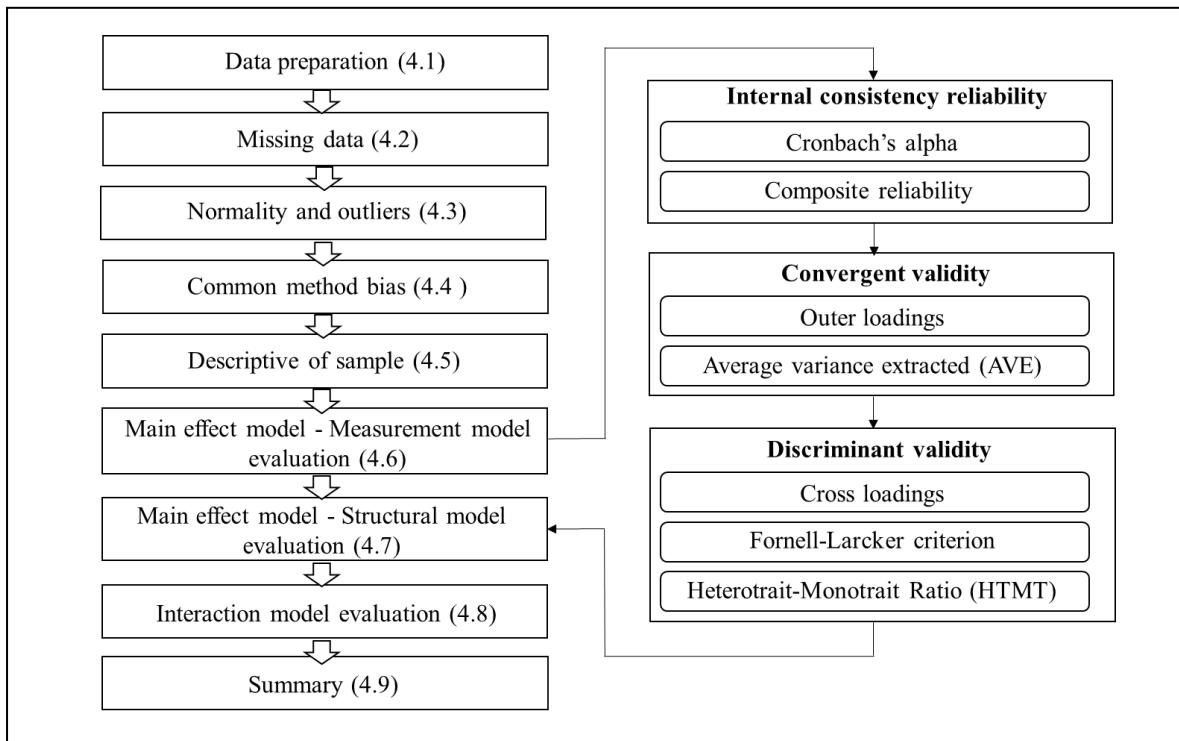


Figure 8: Evaluation process for the reflective measurement model

Evaluation of the measurement model consisted of two main aspects: tests of the reliability (i.e., internal consistency reliability) and tests of the validity (i.e., convergent validity and discriminant validity) of the instrument items (Chin et al., 2003). The procedure established in the literature was followed to remove low-performing indicator items when the initial

measurement model failed to meet the quality criteria (Table 33, Table 34 and Table 35). The revised model was then reassessed.

In the current study, the initial measurement model (see Figure 17) was assessed in section 4.6.2. Subsequent to assessment of the initial measurement model, several low-performing indicators were dropped, and the revised measurement model (see Figure 18) was reassessed for internal consistency reliability (section 4.6.3), convergent validity (section 4.6.4), and discriminant validity (section 4.6.5). Appendix C lists the criteria for the evaluation of the measurement model (Table 33, Table 34, and Table 35). The following sub-sections detail the evaluation process.

## **4.6.2 Internal consistency reliability (initial measurement model)**

Assessment of internal consistency reliability allows the evaluation of the extent to which a variable or set of variables is consistent in what it intends to measure. In the current study, internal consistency reliability of the initial measurement model was assessed using Cronbach's coefficient alpha (section 4.6.2.1) and composite reliability (section 4.6.2.2).

### **4.6.2.1 Cronbach's coefficient alpha**

Cronbach's coefficient alpha (Cronbach, 1951) measures the internal consistency of item constructs by determining how well a set of items (or variables) measures a single one-dimensional latent construct. Based on the assumption that all indicators are similarly

reliable, Cronbach's coefficient alpha provides an evaluation of reliability based on the inter-correlation of the observed indicators variable.

Cronbach's alpha may be estimated by the following equation (Cronbach, 1951):

$$\alpha = \frac{N - \bar{r}}{1 + (N - 1) - \bar{r}}$$

where:

N      Number of items

$\bar{r}$       Average inter-correlation among items (average of all Pearson correlation coefficients between the items)

When data have a multidimensional structure, Cronbach's alpha will usually be low.

According to Nunnally (1978), values of 0.70 and greater are considered acceptable for existing scales, while values of 0.60 or greater are appropriate for new scales. Results from SmartPLS 3.0 were used to assess Cronbach's alpha of the initial measurement model; the result is presented in Table 17.

	Cronbach's alpha	Composite reliability
CHOICE	0.88	0.92
COMP	1.00	1.00
EGO	0.80	0.87
ENVMGMT	<b>0.65</b>	0.85
IGO	0.79	0.87
METACOGSRL	<b>0.57</b>	<b>0.58</b>
MTL	<b>0.48</b>	<b>0.49</b>
ORGSUPP	0.82	0.87
PERF	0.80	0.86

SAT	0.80	0.86
SUPERSUPP	0.71	0.81
TIMEMGMT	<b>0.30</b>	0.67
WORKLOAD	0.82	0.85
WSPELEFF	0.88	0.91

Table 17: Internal consistency reliability (Initial measurement model)

With the exception of ENVMGMT (0.65), METACOGSRL (0.57), MTL (0.48), and TIMEMGMT (0.30), the Cronbach's reliability coefficients for all variables exceeded 0.70, suggesting the model had a satisfactory level of reliability. The internal consistency reliability of the initial measurement model was also assessed using composite reliability, as discussed next.

#### 4.6.2.2 Composite reliability

According to Chin (1998b), the traditional Cronbach's alpha value is influenced by the number of indicators used to measure a latent variable and tends to provide a conservative measurement of reliability. For this reason, researchers suggest using an alternative measure of reliability—that is, composite reliability. Contrary to the Cronbach's alpha approach of weighing all items equally without considering their factor loadings, composite reliability utilises actual loadings of indicators in calculating a reliability coefficient. As such, it is not influenced by the number of indicators and, therefore, is a better measure of internal consistency (Chin & Newsted, 1999; Fornell & Larcker, 1981; Gerbing & Anderson, 1988).

Composite reliability is calculated using the following formula:

$$\rho_c = \frac{(\sum \lambda_i)^2}{(\sum \lambda_i)^2 + \sum_i var(\varepsilon_i)}$$

where:

$\rho_c$  Composite reliability score

$\lambda_i$  Component loading of each item to a latent variable

$var(\varepsilon_i) = (1 - \lambda^2)$

Composite reliability varies between 0 and 1, and higher values indicate higher levels of reliability. Nunnally (1978) suggests 0.7 as a benchmark for ‘modest’ composite reliability. In contrast, Bagozzi and Yi (1988) suggested that composite reliability should be 0.7 or higher. For exploratory research, a value of 0.6 or higher is acceptable. Hair et al. (2014) agreed that composite reliability values between 0.60 and 0.70 are acceptable in exploratory research, such as in the current study. Values less than 0.60 indicate a lack of internal consistency.

The composite reliability of the constructs in the initial measurement model is presented in Table 17. Using Nunnally's (1978) 0.7 benchmark for composite reliability, all the constructs demonstrated an acceptable level of internal consistency reliability except METACOGSRL (0.58) and MTL (0.49).

Having examined the initial consistency reliability of the initial measurement model, the indicator reliability of that model is examined next.

#### 4.6.2.3 Indicator reliability

Indicator reliability is the extent to which measurements of the latent variables measured with a multiple-item scale reflect mostly the true scores of the latent variables relative to the error. In essence, it examines the correlations of the items with their respective latent variables. To evaluate indicator reliability, the outer loadings are assessed. High outer loadings on a construct indicate that the associated indicators have much in common, which is captured by the construct. A loading of 0.7 implies that approximately 50% of the variance in the observed variables (i.e., the square of the loadings) is due to the latent variable. Nunnally (1978) suggested that items with low loadings should be reviewed, and perhaps dropped because they would add very little explanatory power to the model. According to Hulland (1999), in general terms, items with loadings of less than 0.4 or 0.5 should be dropped. Fornell and Larcker (1981) recommended a cut-off point of 0.70, while Chin (1998b) suggested a cut-off of 0.707.

Analysis of items in the initial measurement model based on the results from SmartPLS 3.0 (Table 36) revealed that loadings for most items were greater than 0.7 and so were significant. However, a group of indicator items in the initial measurement model had lower values of factor loading for several constructs—for example, METACOG1 (-0.23), MOTIVATE (-0.4), WORKLOAD4\_1 (-0.59), and so forth.

Following the recommendation made by Hulland (1999), indicator items with loadings of less than 0.5 in the initial measurement model were dropped and the measurement model reassessed. Upon removal of items with loadings of less than 0.5, several variables still showed low loadings. Hair et al. (2016) suggested that indicators with low outer loadings (i.e., less than 0.70) should be considered for removal from the scale when deleting the indicator leads to an increase in the composite reliability (or the average variance extracted)

above the suggested threshold value. Following that recommendation, indicator items with loadings less than 0.7 were removed on the condition that such removal led to an increase in the composite reliability. After completion of the procedure, 50 indicator items were retained in the revised measurement model (Figure 18). The revised measurement model was subsequently reassessed for internal consistency reliability (section 4.6.3), convergent validity (section 4.6.4), and discriminant validity (section 4.6.5).

#### **4.6.3 Internal consistency reliability (revised measurement model)**

The revised measurement model was reassessed for internal consistency reliability, convergent validity and discriminant validity using SmartPLS 3.0. The evaluation results are summarised in Table 18.

Constructs	Indicator	Outer loadings	Cronbach's alpha	Composite reliability	Average variance extracted (AVE)
CHOICE	CHOICE1R	0.893	0.881	0.918	0.736
	CHOICE2	0.865			
	CHOICE3	0.881			
	CHOICE4R	0.790			
COMP	Completion_Rate	1.000	1.000	1.000	1.000
ENVMGMT	ENVMGMT1	0.770	0.653	0.843	0.730
	ENVMGMT2	0.932			
EGO	GOALEXT1	0.821	0.795	0.875	0.700
	GOALEXT2	0.829			

	GOALEXT3	0.860			
IGO	GOALINT1	0.849	0.786	0.869	0.688
	GOALINT2	0.776			
	GOALINT3	0.861			
METACOGSR	METACOG4	0.708	0.719	0.826	0.542
	METACOG6	0.728			
	METACOG7	0.738			
	METACOG8	0.770			
MTL	MOTIVATE1	0.709	0.752	0.837	0.563
	MOTIVATE3	<b>0.694</b>			
	MOTIVATE4	0.787			
	MOTIVATE5	0.806			
ORGSUPP	ORGSUPP1	0.723	0.815	0.879	0.647
	ORGSUPP3	0.720			
	ORGSUPP4	0.873			
	ORGSUPP5_1	0.886			
PERF	PERF1	0.717	0.779	0.848	0.529
	PERF2	<b>0.680</b>			
	PERF3	0.741			
	PERF5	0.742			
	PERF6	0.753			
SAT	SATISF1	0.796	0.792	0.865	0.615
	SATISF3	0.730			
	SATISF4	0.795			
	SATISF5	0.814			
WSPELEFF	SELFEFF1	0.705	0.882	0.910	0.628
	SELFEFF2	0.822			
	SELFEFF3	0.764			
	SELFEFF4	0.764			

	SELFEFF5	0.837			
	SELFEFF6_1	0.852			
SUPERSUPP	SUPERSUPP1	0.850	0.775	0.869	0.690
	SUPERSUPP2	0.865			
	SUPERSUPP3	0.774			
TIME MGMT	TIMEMGMT1	0.805	0.779	0.871	0.693
	TIMEMGMT3	0.867			
	TIMEMGMT4_1	0.824			
WORKLOAD	WORKLOAD1	0.772	0.769	0.848	0.584
	WORKLOAD2	0.815			
	WORKLOAD3	0.769			
	WORKLOAD5	<b>0.695</b>			

Table 18: Internal consistency reliability and AVE (revised measurement model)

As shown in Table 18, Cronbach's alpha for all latent constructs (except ENVMGMT) exceeded 0.70, suggesting a satisfactory level of reliability. Cronbach's alpha for ENVMGMT (0.653) was only marginally below the threshold of 0.7. Since Cronbach's alpha generally tends to underestimate the internal consistency reliability, Hair et al. (2016) recommend the use of composite reliability (discussed in section 4.6.2.2). The composite reliability of the constructs in the measurement model ranged from 0.826 to 0.910 (see Table 18). Using Nunnally's (1978) 0.7 benchmark for composite reliability, all the constructs in the revised measurement model demonstrated an acceptable level of internal consistency reliability. Hence the measurement items were appropriate for their respective latent variables in the revised measurement model and the internal consistency reliability of the revised measurement model was established.

Having established the internal consistency reliability, the convergent validity of the revised measurement model is evaluated next.

#### **4.6.4 Convergent validity (revised measurement model)**

Convergent validity is the degree to which a measure correlates positively with alternative measures of the same construct (Hair et al., 2014). Convergent validity is evaluated to ensure that the items assumed to measure each latent variable truly measure them and not another latent variable. Criteria for evaluating convergent validity (see Table 34) are outer loadings and average variance extracted (AVE), as described in the following sub-sections.

##### **4.6.4.1 Outer loadings**

Outer loadings (or indicator reliability) quantify the extent to which measurements of the latent variables measured with multiple-item scale reflect mostly the true scores of the latent variables relative to the error.

Analysis of outer loadings in the revised measurement model (Table 18) based on the output from SmartPLS 3.0 revealed that outer loadings for all but three items (i.e., MOTIVATE3, PERF1, and WORKLOAD5) were greater than 0.7. This implies that less than half of all items' variances were due to error, so these items were significant. The outer loadings for the items MOTIVATE3 (0.694), PERF1 (0.680), and WORKLOAD5 (0.695) were only marginally below the threshold of 0.7. In view of the exploratory nature of the current

research, these three items were retained. The revised measurement model generally met the quality criteria for convergent validity (Table 34) based on outer loadings. The model is next assessed based on average variance extracted (AVE).

#### **4.6.4.2 Average variance extracted**

The average variance extracted (AVE) refers to the amount of variance that a latent variable extracts from its indicators relative to the amount due to a measurement error (Chin & Newsted, 1999). AVE is calculated as follows:

$$AVE = \frac{\sum \lambda_i^2}{\sum \lambda_i^2 + \sum_i var(\varepsilon_i)}$$

where:

AVE              Average variance extracted

$\lambda_i$               Component loading of each item to a latent variable

$$var(\varepsilon_i) = (1 - \lambda_i^2)$$

According to Fornell and Larcker (1981), AVE should be higher than 0.5. An AVE value of 0.50 or higher indicates that a construct explains more than half of the variance of its indicators (Hair et al., 2014) and, in turn, that at least 50% of measurement variance is captured by the latent variables.

In this study, the AVE generated as part of SmartPLS 3.0 output is shown in Table 18. The AVE results ranged from 0.529 to 0.736. The values for all latent variables in the measurement model were greater than 0.5, indicating that, on average, the construct explained more than 50% of the variance of its items. In keeping with the work of Fornell and Larcker (1981), the convergent validity of the measurement model was established.

To sum up, the outer loadings for almost all indicators exceeded the threshold of 0.70. The only exceptions were MOTIVATE3 (0.694), PERF1 (0.680), and WORKLOAD5 (0.695), which were only marginally below the threshold. These results were considered acceptable in exploratory research. Furthermore, except the single-item construct of COMP, the average variance extracted for all measures (range, 0.529 to 0.736) exceeded the lower bound threshold value of 0.50 recommended by Fornell and Larcker (1981). These results demonstrated that there was convergent validity in the revised measurement model.

Having established the internal consistency reliability and convergent validity for the revised measurement model, the next step was to assess the discriminant validity.

#### **4.6.5 Discriminant validity (revised measurement model)**

Discriminant validity is the extent to which a construct is distinct from other constructs in the model, both in terms of how much it correlates with other constructs and in terms of how distinctly the indicators represent only this single construct. In the current study, the discriminant validity of the measurement model was assessed using cross-loadings (section 4.6.5.1), the Fornell-Larcker criterion (section 4.6.5.2), and the heterotrait–monotrait ratio (HTMT) (section 4.6.5.3).

##### **4.6.5.1 Cross-loadings**

The recommended guideline for using cross-loadings to assess discriminant validity (Table 35) is that an indicator variable should exhibit a higher loading on its own construct than on any other construct included in the structural model (Hair et al., 2014, 2016). If the loadings of the indicators are consistently highest on the construct with which they are associated, then the construct exhibits discriminant validity.

Table 38, all items loaded higher on the latent variable they were theoretically specified to measure than on any other latent variable in the model. Thus, the analysis of cross-loadings indicated that all 50 measurement items loaded distinctly on the specified latent variables they measured, thereby demonstrating the discriminant validity of the 14 latent variables. In summary, the revised measurement demonstrated discriminant validity based on cross-loadings. The Fornell-Larcker criterion to establish discriminant validity is assessed next.

#### **4.6.5.2 Fornell-Larcker criterion**

According to Fornell and Larcker (1981), the average variance extracted (AVE) of a latent factor should be greater than the variance shared between the latent factor and other latent factor. Discriminant validity can be assessed by using the Fornell-Larcker criterion, which compares the square root of the AVE values with the latent variable correlations. According to Fornell and Larcker (1981) and Chin et al. (2003), the value of the square root of the average variance extracted of each latent variable can be regarded as acceptable if its value exceeds that construct's correlation with other constructs.

In this study, SmartPLS 3.0 was used to assess discriminant validity using the Fornell-Larcker criterion; the result is shown in Table 19. The diagonal of the matrix in Table 19 is

the square root of the AVE. For adequate discriminant validity, the diagonal elements should be greater than the off-diagonal elements in the corresponding rows and columns. The output from SmartPLS 3.0 confirmed that the square root of each construct's AVE is indeed greater than its highest cross-correlation. Hence, the discriminant validity test did not reveal any serious problem. The results confirmed that the discriminant validity in the revised measurement model was adequate.

	CHOICE	COMP	EGO	ENVMGMT	IGO	METACOGSRL	MTL	ORGSUPP	PERF	SAT	SUPERSUPP	TIMEMGMT	WORKLOAD	WSPELEFF
CHOICE	<b>0.858</b>													
COMP	-0.116	<b>1.000</b>												
EGO	0.142	0.069	<b>0.837</b>											
ENVMGMT	0.061	0.139	0.050	<b>0.855</b>										
IGO	0.121	-0.077	0.069	0.075	<b>0.830</b>									
METACOGSRL	0.214	0.130	0.121	0.314	0.188	<b>0.736</b>								
MTL	0.171	0.314	0.129	0.180	0.169	0.253	<b>0.751</b>							
ORGSUPP	0.177	0.044	0.159	0.035	0.133	0.205	0.171	<b>0.804</b>						
PERF	0.444	0.176	0.281	0.313	0.215	0.478	0.435	0.377	<b>0.727</b>					
SAT	0.351	0.135	0.228	0.159	0.314	0.345	0.496	0.219	0.508	<b>0.784</b>				
SUPERSUPP	0.094	0.139	0.157	0.029	-0.042	0.293	0.145	0.550	0.317	0.243	<b>0.830</b>			
TIMEMGMT	0.094	0.390	0.220	0.161	0.105	0.287	0.375	0.155	0.309	0.476	0.217	<b>0.832</b>		
WORKLOAD	-0.182	0.175	-0.053	0.045	0.165	0.038	-0.080	-0.082	-0.073	-0.127	-0.223	-0.176	<b>0.764</b>	
WSPELEFF	0.234	0.286	0.094	0.212	0.189	0.378	0.627	0.125	0.478	0.646	0.160	0.586	-0.120	<b>0.792</b>

Table 19: Fornell-Larcker criterion (revised measurement model)

#### 4.6.5.3 Heterotrait–monotrait ratio

Some recent criticism of the Fornell and Larcker (1981) criterion suggests that it does not reliably detect lack of discriminant validity in common research situations (Henseler et al., 2015). Henseler et al. (2015) have suggested an alternative approach, based on the multitrait–multimethod matrix, to assess discriminant validity—namely, the heterotrait–monotrait (HTMT) ratio of correlations. According to Henseler et al. (2015), discriminant validity has been established between two reflective constructs if the HTMT value is less than 0.90 (see Table 35). The HTMT approach was shown by these authors to be superior to both the Fornell-Larcker criterion and the assessment of cross-loadings by means of a Monte Carlo simulation study.

The HTMT output from SmartPLS 3.0 was used to assess discriminant validity in the current study. The results obtained for the HTMT criterion output from SmartPLS 3.0 (Table 20) ranged from 0.073 to 0.646, which was well below the threshold value of 0.90. In keeping with the work by Henseler et al. (2015), discriminant validity was thus established for the measurement model.

	CHOICE	COMP	EGO	ENVMGMT	IGO	METACOGSRL	MTL	ORGSUPP	PERF	SAT	SUPERSUPP	TIMEMGMT	WORKLOAD
COMP	0.134												
EGO	0.166	0.073											
ENVMGMT	0.130	0.169	0.120										
IGO	0.139	0.090	0.206	0.134									
METACOGSRL	0.260	0.156	0.163	0.462	0.254								
MTL	0.199	0.329	0.158	0.293	0.241	0.384							

ORGSUPP	0.204	0.060	0.217	0.110	0.165	0.293	0.213						
PERF	0.507	0.203	0.329	0.395	0.269	0.632	0.516	0.450					
SAT	0.414	0.150	0.273	0.253	0.372	0.457	0.603	0.282	0.646				
SUPERSUPP	0.146	0.149	0.212	0.122	0.138	0.435	0.211	0.691	0.399	0.317			
TIMEMGMT	0.187	0.443	0.260	0.223	0.122	0.378	0.465	0.196	0.386	0.593	0.280		
WORKLOAD	0.238	0.180	0.152	0.145	0.231	0.210	0.247	0.135	0.182	0.202	0.309	0.229	
WSPELEFF	0.262	0.294	0.150	0.267	0.224	0.459	0.748	0.164	0.564	0.769	0.198	0.682	0.195

Table 20: Heterotrait–monotrait ratio (HTMT) (revised measurement model)

#### 4.6.6 Measurement model assessment summary

The assessment of the reflective measurement model evaluated the model's reliability and validity. The results showed that the measurement model met all common requirements. First, the reflective individual items were reliable because most outer loadings were greater than 0.7 (Table 18), so the individual item reliability was deemed adequate. Second, all reflective constructs met the requirement of construct reliability, since their composite reliabilities (Table 18) were greater than 0.7 (Nunnally & Bernstein, 1994). Third, these latent variables achieved convergent validity because their average variance extracted (AVE) surpassed 0.5 level (Fornell & Larcker, 1981) (Table 19). Finally, all variables met the discriminant validity requirements. Confirmation of this validity came from the comparison of cross-loadings (4.6.5.1), the finding that the square root of each construct's AVE was greater than its highest cross-correlation (Fornell-Larcker criterion) (Table 19), and the confirmation that all heterotrait–monotrait (HTMT) ratios were below the threshold value of 0.90 (Henseler et al., 2015). It can be concluded that the revised measurement model was valid and reliable, as it met all the assessment criteria.

In the face of the satisfactory robustness of the revised measurement model, the next step was to assess the structural model. Evaluation of the structural model involved determination of the model's explanatory power. It also encompassed the model's predictive capabilities and relationships among the exogenous and endogenous variables, as discussed in the next section.

#### **4.7 Structural model evaluation (main effect model)**

In PLS-SEM, the structural model, also called the inner model, describes the hypothesised predictive relationship between the latent variables in the model (Tenenhaus et al., 2005). The relationships between the exogenous and the endogenous latent variables are represented through single-headed arrows. Variables that have arrows pointed toward them are called endogenous variables and variables that do not receive any arrow are called exogenous variables. The structural model of the current study is shown in Figure 9. Assessment of the structural model seeks to determine how well empirical data support the model, its predictive capabilities, and the relationships between the constructs.

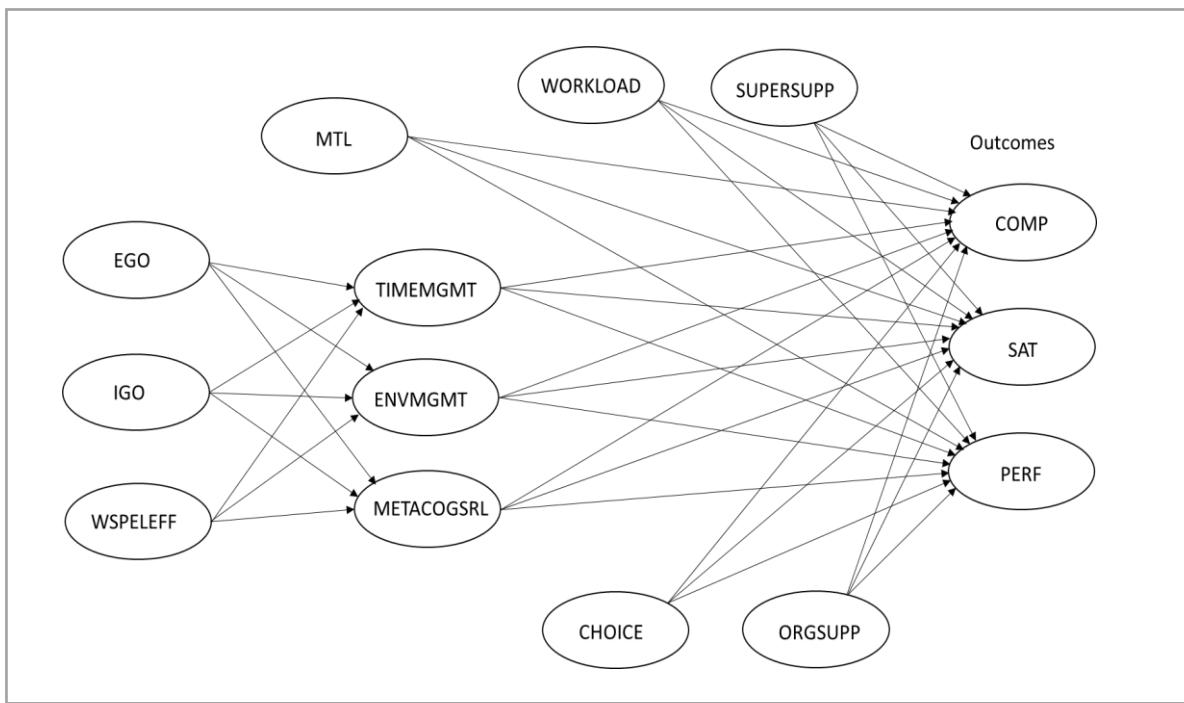


Figure 9: Structural model of the current study

As discussed in section 3.7.1, PLS-SEM fits the model to the sample data to obtain the best parameter estimates by maximising the explained variance of endogenous latent variables. It seeks to assess whether more paths would provide more explanation, and whether more constructs are needed (Willaby et al., 2015). Hence, the concept of statistically testing the model's overall goodness of fit (GoF) is not supported (Tenenhaus et al., 2005), and goodness of fit measures that are generally associated with CB-SEM (e.g., GFI, CFI, chi-square test) cannot be applied.

Instead, assessment of the quality of the PLS-SEM model is based on its ability to predict the endogenous constructs. Key criteria for assessing the quality of the structural model are the  $R^2$  values of endogenous constructs and the level and significance of the path coefficients (Chin, 2010; Hair et al., 2013; Henseler et al., 2009). Hair et al. (2016) have also suggested

that a structural model can be generally assessed in terms of collinearity issues, significance of relationships among the constructs, evaluation of  $R^2$ , effect sizes, and assessment of the predictive relevance  $Q^2$  (Table 39).

Following Hair et al. (2016), the steps to properly analyse the structural model of the current study using PLS-SEM are shown in Figure 10.

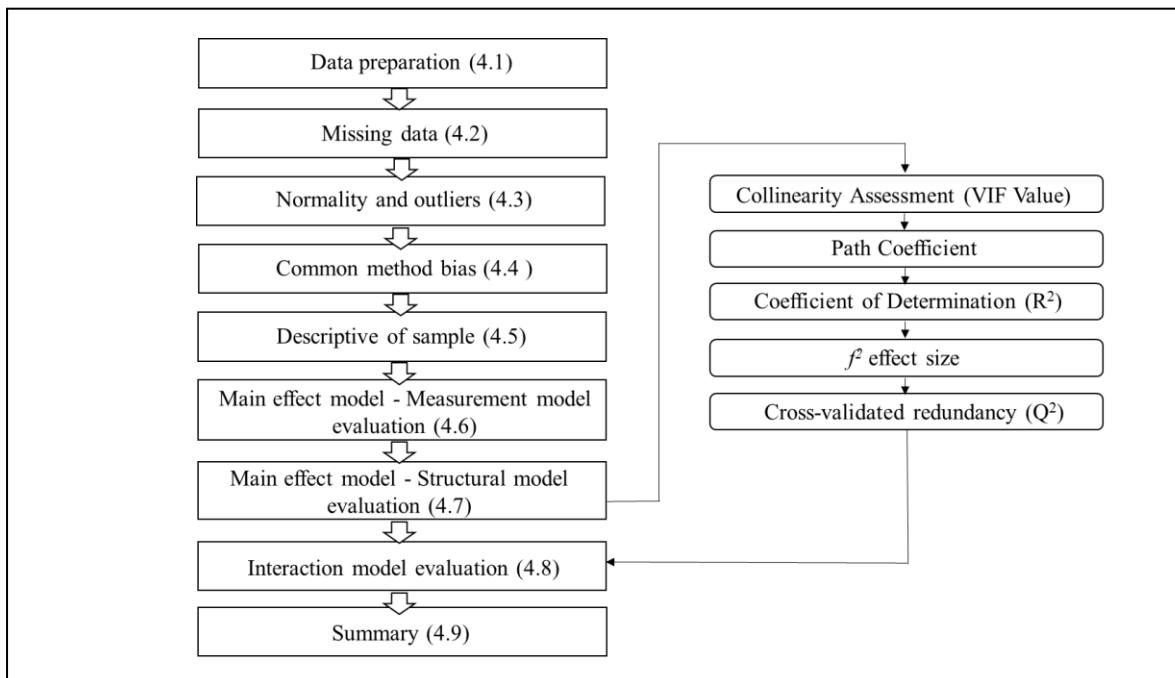


Figure 10: Evaluation process for the structural model

The evaluation process starts with collinearity assessment (section 4.7.1) to ensure that the results are not biased by collinearity issues. This is then followed by evaluation of the model's path coefficients (section 4.7.2). The explanatory power of the model is then assessed by examining the coefficient of determination ( $R^2$ ) (section 4.7.3). Next, the contribution of each independent variable to the amount of variance explained in the dependent latent variables is assessed using the  $f^2$  effect size (section 4.7.4). Finally, the

predictive relevance of the model is assessed using cross-validated redundancy for calculating  $Q^2$  (section 4.7.5).

#### **4.7.1 Collinearity assessment**

A key step in structural model evaluation is the computation of path coefficients linking the constructs based on a series of regression analysis. Therefore, it is important to ascertain that the results are not biased by collinearity issues. Collinearity is evaluated through the analysis of the variance inflation factors (VIF). Each set of predictor constructs in the model is examined separately for each sub-part of the structural model. VIFs less than 5 are acceptable (see Table 39 for the detailed criteria). A collinearity check was performed using SmartPLS 3.0 and the results are presented in Table 21.

VIF	COMP	ENVMGMT	METACOGSRL	PERF	SAT	TIMEMGMT
CHOICE	1.128			1.128	1.128	
EGO		1.012	1.012			1.012
ENVMGMT	1.135			1.135	1.135	
IGO		1.040	1.040			1.040
METACOGSRL	1.361			1.361	1.361	
MTL	1.233			1.233	1.233	
ORGSUPP	1.489			1.489	1.489	
SUPERSUPP	1.622			1.622	1.622	
TIMEMGMT	1.275			1.275	1.275	
WORKLOAD	1.145			1.145	1.145	
WSPELEFF		1.044	1.044			1.044

Table 21: Variance inflation factors (VIF) (main effect model)

As shown in Table 21, the VIFs of all the paths in the structural model varied between 1.012 and 1.622, which was lower than the threshold value of 5 (see Table 39) and hence provides confidence that the structural model results were not negatively affected by collinearity. Since there was no evidence of collinearity in the structural model, the magnitude and significance of the structural model relationships are assessed next.

#### **4.7.2 Evaluation of path coefficients**

Path coefficients represent the relationships among the constructs. They have standardised values between –1 and +1. Estimated path coefficients close to +1 represent strong positive relationships. The closer the estimated coefficients are to 0, the weaker the relationships.

Because PLS-PM makes no distributional assumption, the statistical significance of the path coefficients and loadings were estimated using a bootstrap procedure. In the bootstrap procedure, a large number of random samples with replacement are drawn from the actual data, and path coefficients and loadings are then estimated for each sample. Means and standard deviations of the path coefficients and loadings are calculated from the bootstrapped samples, and these values are subsequently used in the calculation of the t values for the path coefficients and loadings of the actual data. The bootstrap result approximates the normality of the data. The minimum number of bootstrap samples must be at least as large as the number of valid observations (in this study, 119 observations) and ideally is 5,000 (Hair et al., 2014, 2016).

To determine the significance of the relationships, the model was run using a bootstrap resampling routine with the 119 cases and 5,000 sub-samples using the bootstrap function of SmartPLS 3.0. This bootstrap resampling routine generates sub-samples by randomly selecting a case from the data set, and the sub-samples are used for assessing the significance of relationships (Chin, 1998b).

The significance levels of all possible relationships within the research model were assessed using two-tailed tests. The exact p values associated with the t values of each path coefficient were also estimated. Following the recommendation made by Hair et al. (2016), the critical value of 1.65 for the two-tailed t-test for a significance level of 10% was adopted in this exploratory research. A summary of the path coefficients, the corresponding t- values, and the estimated p values is shown in Table 22.

	<b>Path</b>	<b>t statistic</b>	<b>p values</b>	<b>f<sup>2</sup></b>	<b>Assessment</b>
CHOICE → COMP	-0.133	1.581	0.114	0.022	Non-significant
CHOICE → PERF	0.307	4.282	0.000	0.169	Positive, significant, and medium
CHOICE → SAT	0.239	3.117	0.002	0.089	Positive, significant, and medium to small
EGO → ENVMGMT	0.029	0.226	0.821	0.001	Non-significant
EGO → METACOGSRL	0.080	0.894	0.371	0.008	Non-significant
EGO → TIMEMGMT	0.166	1.983	0.047	0.044	Positive, significant, and small
ENVMGMT → COMP	0.055	0.720	0.472	0.004	Non-significant
ENVMGMT → PERF	0.162	2.157	0.031	0.047	Positive, significant, and small
ENVMGMT → SAT	0.006	0.074	0.941	0.000	Non-significant
IGO → ENVMGMT	0.035	0.275	0.784	0.001	Non-significant
IGO → METACOGSRL	0.117	1.279	0.201	0.016	Non-significant

IGO → TIMEMGMT	-0.015	0.181	0.856	0.000	Non-significant
METACOGSRL → COMP	-0.056	0.585	0.559	0.003	Non-significant
METACOGSRL → PERF	0.223	2.699	0.007	0.074	Positive, significant, and medium to small
METACOGSRL → SAT	0.105	1.106	0.269	0.014	Non-significant
MTL → COMP	0.222	1.893	0.058	0.056	Positive, significant, and medium to small
MTL → PERF	0.234	2.876	0.004	0.090	Positive, significant, and medium to small
MTL → SAT	0.305	4.000	0.000	0.133	Positive, significant, and medium
ORGSUPP → COMP	-0.082	0.760	0.447	0.006	Non-significant
ORGSUPP → PERF	0.182	2.029	0.042	0.045	Positive, significant, and small
ORGSUPP → SAT	0.018	0.214	0.831	0.000	Non-significant
SUPERSUPP → COMP	0.161	1.438	0.150	0.022	Non-significant
SUPERSUPP → PERF	0.077	0.822	0.411	0.007	Non-significant
SUPERSUPP → SAT	0.074	0.941	0.347	0.006	Non-significant
TIMEMGMT → COMP	0.350	2.827	0.005	0.135	Positive, significant, and medium
TIMEMGMT → PERF	0.062	0.778	0.437	0.006	Non-significant
TIMEMGMT → SAT	0.290	3.275	0.001	0.116	Positive, significant, and medium to small
WORKLOAD → COMP	0.259	2.088	0.037	0.082	Positive, significant, and medium to small
WORKLOAD → PERF	0.029	0.287	0.774	0.001	Non-significant
WORKLOAD → SAT	0.006	0.053	0.957	0.000	Non-significant
WSPELEFF → ENVMGMT	0.203	2.377	0.018	0.041	Positive, significant, and small
WSPELEFF → METACOGSRL	0.349	4.496	0.000	0.139	Positive, significant, and medium
WSPELEFF → TIMEMGMT	0.573	10.387	0.000	0.499	Positive, significant, and large

Table 22: Path coefficients, p-values, and  $f^2$  (main effect model)

As shown in Table 22, 15 paths were found to be statistically significant at a 10% level (i.e., the coefficient is significantly different from zero in the population). The values of the statistically significant paths indicate the extent to which the exogenous construct is associated with the endogenous construct. This result is also presented in graphical form in Figure 11.

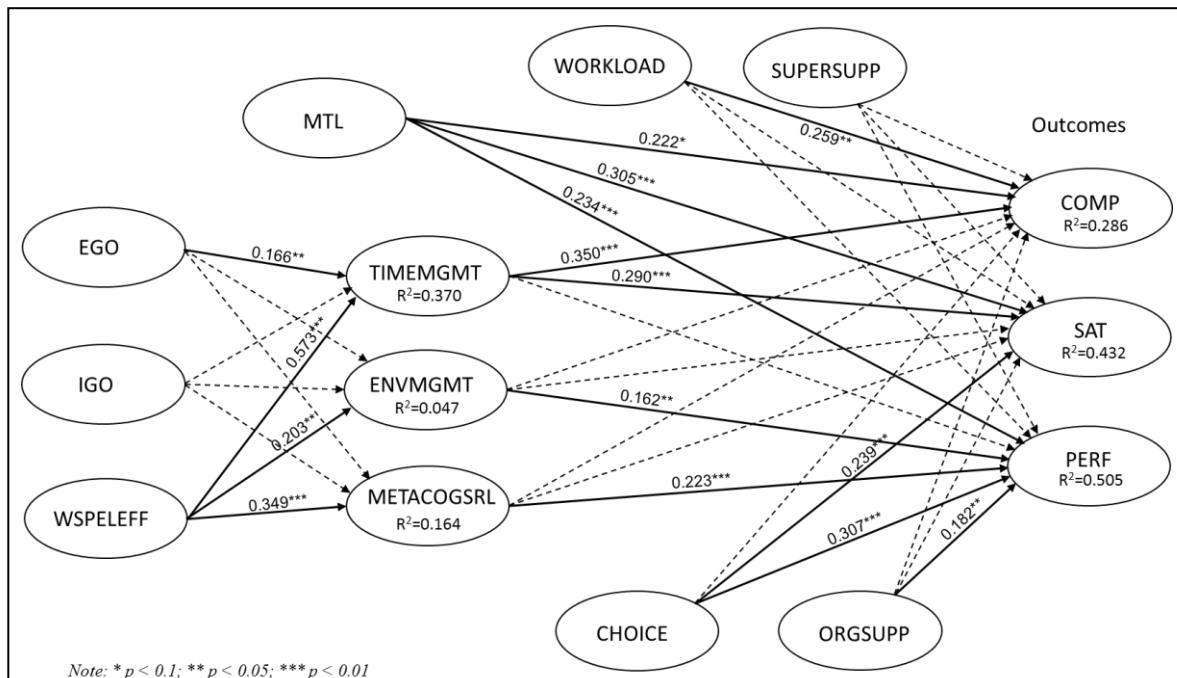


Figure 11: Path coefficients (main effect model)

The first research question asked to what extent, if any, a relationship exists between motivation to learn and WSPEL outcomes. As shown in Figure 11, the findings revealed employee learners' motivation to learn (MTL) was positively and significantly correlated with all three WSPEL outcome measures.

The path coefficients for completion rate (COMP), learner satisfaction (SAT), and perceived learning performance (PERF) were 0.222 ( $p < 0.10$ ), 0.305 ( $p < 0.01$ ) and 0.234 ( $p < 0.01$ ), respectively. This suggested that the motivation to learn construct is a potential factor to

consider in workplace self-paced e-learning.

The second research question asked to what extent, if any, a relationship exists between employee learners' motivational belief and their use of self-regulated learning strategy. As revealed in Figure 11, employee learners' motivational belief was found to be partially related to their use of a self-regulated learning strategy in WSPEL. In particular, workplace self-paced e-learning self-efficacy (WSPELEFF) was found to be positively and significantly related to all three measures of metacognitive and resource management strategy. Specifically, WSPELEFF was correlated with TIMEMGMT (path coefficient = 0.573,  $p < 0.01$ ), ENVMGMT (path coefficient = 0.203,  $p < 0.05$ ) and METACOGSRL (path coefficient = 0.349,  $p < 0.01$ ). Similarly, learners' extrinsic goal orientation (EGO) was positively correlated with their use of time management strategy (TIMEMGMT) (path coefficient = 0.166,  $p < 0.05$ ). These results suggest the need to pay more attention to employee learners' motivational beliefs—in particular, their workplace self-paced e-learning self-efficacy—when implementing WSPEL.

The third research question asked to what extent, if any, a relationship exists between employee learners' use of self-regulated learning strategy and WSPEL outcomes. The study findings provided partial support for the relationship between learners' self-regulated learning strategy use and WSPEL outcomes. Specifically, use of a time management strategy was found to be positively and statistically significantly related to COMP (path coefficient = 0.350,  $p < 0.01$ ) and SAT (path coefficient = 0.290,  $p < 0.01$ ). The findings also revealed a positive and significant relationship between ENVMGMT and PERF (path coefficient = 0.162,  $p < 0.05$ ) as well as between METACOGSRL and PERF (0.223,  $p < 0.01$ ). The results

generally supported the relationships between learners' self-regulated learning strategy use—in particular, the use of a time management strategy—and WSPEL success.

The fourth research question asked to what extent, if any, a relationship exists between organisational contextual factors and WSPEL outcomes. The findings partially supported such a relationship between organisational contextual factors and WSPEL outcome measures.

The construct of perceived choice (CHOICE) was found to correlate positively and statistically significantly with SAT (path coefficient = 0.239,  $p < 0.01$ ) and PERF (path coefficient = 0.307,  $p < 0.01$ ). Similarly, employee learners' WORLOAD was positively and significantly related to COMP (path coefficient = 0.259,  $p < 0.05$ ). Finally, ORGSUPP was found to relate positively and significantly to PERF (0.182,  $p < 0.05$ ). Thus, the autonomy of learners in WSPEL attendance, their level of workload, and support from their employing organisations were found to relate to different outcome measures in WSPEL.

Having examined the relationships between variables in the structural mode, the explanatory power of the mode was evaluated next (Figure 10).

#### **4.7.3 Assessing the coefficient of determination ( $R^2$ )**

The explanatory power of the structural model can be evaluated by examining the amount of variance in the dependent variables, which can be explained by the model. The coefficient of determination ( $R^2$ ) is a measure of the model's predictive accuracy and represents the amount of variance in an endogenous construct explained by all exogenous constructs linked to it.  $R^2$  values range from 0 to 1, with higher values indicating higher levels of predictive accuracy.

The range of acceptable  $R^2$  depends on the type of study. While Roldán and Sánchez-Franco (2012) recommend that  $R^2$  measures should be at least 0.10, Henseler et al. (2009) and Chin (1998b, p. 323) indicate that 0.67, 0.33, and 0.19 are substantial, moderate, and weak values, respectively. Table 23 summarises the  $R^2$  for the current model's endogenous latent variables.

	<b>R square</b>	<b>R square adjusted</b>
COMP	<b>0.286</b>	0.234
ENVMGMT	0.047	0.022
METACOGSRL	0.164	0.142
PERF	<b>0.505</b>	0.469
SAT	<b>0.432</b>	0.391
TIMEMGMT	0.370	0.354

Table 23: R-square (main effect model)

In the research model,  $R^2$  for COMP is 0.286, meaning that about 28.6% of the changes in WSPEL completion rate was due to the exogenous variables in the model. According to Henseler et al. (2009) and Chin (1998b, p. 323), this is a medium to small value of  $R^2$ . By comparison, approximately 50.5% of the changes in PERF and 43.2% of the changes in SAT were explained by exogenous variables in the current model, which more than meets Chin's (1998b) 'moderate' level. So based on Chin's (1998b) guidelines, the model exhibits reasonably good quality from the  $R^2$  perspective.

Having assessed the explanatory power of the model using the coefficient of determination, the model is next assessed using  $f^2$  effect size.

#### 4.7.4 Evaluation of $f^2$ effect size

A total of 15 relationships were found to be statistically significant (i.e.,  $p < 0.10$ ) in section 4.7.2. Although the  $p$  values of these paths showed statistical significance, they did not show the size of effects. In some cases, the path coefficients in the structural model may be significant, but their sizes may be too small to warrant managerial attention. Therefore, Hair et al. (2013) suggested that changes in the  $R^2$  value should also be examined.

To examine the contributions of key constructs (exogenous latent variables) in explaining variance in the three WSPEL outcomes, the main effect model was reconstructed incrementally (see Figure 20 through Figure 25). The results are summarised in Table 24.

$R^2$	Sub-model (1a) (Figure 20)	Sub-model (1b) (Figure 21)		Sub-model (1c) (Figure 22)		Sub-model (1d) (Figure 23)		Sub-model (1e) (Figure 24)		Sub-model (1f) (Figure 25)	
	$R^2$	$R^2$	$\Delta R^2$								
COMP	0.158	0.189	<b>3.1%</b>	0.222	<b>3.3%</b>	0.27	<b>4.8%</b>	0.27	0.0%	0.286	<b>1.6%</b>
PERF	0.283	0.358	<b>7.5%</b>	0.456	<b>9.8%</b>	0.456	0.0%	0.502	<b>4.6%</b>	0.505	0.3%
SAT	0.283	0.374	<b>9.1%</b>	0.426	<b>5.2%</b>	0.426	0.0%	0.429	0.3%	0.432	0.3%

Notes:

Sub-model (1a): SRL constructs only (i.e., EGO, IGO, WSPELEFF, METACOGSRL, TIMEMGMT,

ENVMGMT)

Sub-model (1b): Sub-model (1a) plus MTL

Sub-model (1c): Sub-model (1b) plus CHOICE

Sub-model (1d): Sub-model (1c) plus WORKLOAD

Sub-model (1e): Sub-model (1d) plus ORGSUPP

Sub-model (1f): Sub-model (1e) plus SUPERSUPP (the main effect model)

Table 24: Incremental variance of key constructs (main effect model)

It was found that the six self-regulated learning constructs [i.e., sub-model 1(a)] explained about 15.8%, 28.3%, and 28.3% of the variances in COMP, PERF, and SAT, respectively. CHOICE [sub-model (1c)] and WORKLOAD [sub-model (1b)] contributed the largest incremental variance in COMP. The two constructs explained about 4.8% and 3.3%, respectively, of the incremental variance in COMP. By comparison, CHOICE [sub-model (1c)] contributed 9.8% and MTL [sub-model (1b)] contributed 7.5% of the incremental variance in PERF, the highest among all the exogenous variables. Finally, MTL [sub-model (1b)] and CHOICE [sub-model (1c)] contributed 9.1% and 5.2%, respectively, of the incremental variance in SAT.

As can be seen from the incremental variances in Table 24, MTL had the greatest effect (9.1%) in terms of incremental variance in SAT, followed by CHOICE (5.2%). Likewise, CHOICE had the greatest contribution (9.8%) to the incremental variance in PERF, followed MTL (7.5%). These findings provide further evidence to support the positive relationships between these two constructs (i.e., MTL and CHOICE) and the two outcome measures (i.e., SAT and PERF) in WSPEL.

Having examined the aspect of incremental variance, the effect sizes ( $f^2$ ) of the exogenous latent variables were assessed next to show how much an exogenous latent variable contributes to an endogenous latent variable's  $R^2$  value. Effect size ( $f^2$ ) is defined as the amount of substantive impact of each exogenous latent variable on the endogenous variable. The power of the substantive effect of an exogenous latent variable can be estimated by using the following formula (Henseler et al., 2009, p. 303):

$$f^2 = \frac{R^2_{\text{included}} - R^2_{\text{excluded}}}{1 - R^2_{\text{included}}}$$

where  $R^2_{\text{included}}$  and  $R^2_{\text{excluded}}$  are  $R^2$  provided on the endogenous variable when the exogenous latent variable is used or omitted in the structural equation, respectively.

General guidelines for assessing  $f^2$  suggest that values of 0.02, 0.15, and 0.35 represent small, medium, and large effect sizes, respectively (Cohen, 1988). However, Aguinis et al. (2005) have shown that the average effect size in tests of moderation is only 0.009. Kenny (2015) subsequently proposed that 0.005, 0.01, and 0.025 constitute more realistic standards for small, medium, and large effect sizes, respectively. To measure the effect size, I used Cohen's (1988) guidelines, which specify a value of 0.02 for small effects, 0.15 for medium effects, and 0.35 for large effects. Values below 0.02 indicate that the effects are too small to be considered relevant from a practical point of view, even when the corresponding p values are statistically significant. Table 22 provides a summary of the effect size result.

The largest effect in the study model was between WSPELEFF and TIMEMGMT ( $f^2 = 0.499$ ). In agreement with the results of the analysis of incremental variance, the constructs MTL and CHOICE were found to have medium and medium to small effect sizes on WSPEL outcome measures. The greatest effect was found for the relationship between CHOICE and PERF ( $f^2 = 0.169$ ). A medium to small effect was also found for the relationship between CHOICE and SAT ( $f^2 = 0.089$ ). Likewise, the exogenous latent variable MTL was found to affect WSPEL outcomes. Specifically, medium to small effects were found for the relationships between MTL and SAT ( $f^2 = 0.133$ ), between MTL and PERF ( $f^2 = 0.090$ ), and between MTL and COMP ( $f^2 = 0.056$ ). Another exogenous latent variable that exhibited medium to small effect sizes on WSPEL outcome measures was TIMEMGMT. The effect size ( $f^2$ ) for the relationship between TIMEMGMT and COMP was 0.135, and that between TIMEMGMT and SAT was 0.116. Other relationships with medium to small effect sizes in

the research model were between WORKLOAD and COMP (0.082), METACOGSRL and PERF (0.074), ENVMGMT and PERF (0.047), ORGSUPP and PERF (0.045), EGO and TIMEMGMT (0.044), and WSPELEFF and ENVMGMT (0.041).

These results indicated that the exogenous latent variables have a practical significance in predicting their respective endogenous variables.

#### **4.7.5 Evaluation of predictive relevance Q<sup>2</sup>**

In addition to assessing the structural model using R<sup>2</sup>, it is possible to assess the model's quality by examining its ability to predict outcomes. The rationale of this technique is that 'the prediction of observables or potential observables is of much greater relevance than the estimation of what are often artificial construct-parameters' (Geisser, 1975, p. 320). The predictive relevance (Q<sup>2</sup>) technique was developed by Stone and Geisser between 1974 and 1975; it suggests that the model must be capable of predicting each endogenous latent variable's indicators adequately (Hair et al., 2011).

The Q<sup>2</sup> technique builds on the blindfolding procedure, which is a sample reuse technique that omits selected data points in the endogenous construct's indicators and predicts the omitted part using the previously computed estimates. When a PLS path model exhibits predictive relevance, it accurately predicts data not used in the model estimation (Hair et al., 2016). As such, Q<sup>2</sup> is considered a measure of out-of-sample predictive power or predictive relevance (Hair et al., 2016; Rigdon, 2014; Sarstedt et al., 2014).

The  $Q^2$  value indicates the ability to reproduce the latent variable using its indicators; the values should be non-zero and positive if this ability is present. A  $Q^2$  value larger than zero indicates that the model has predictive relevance for the particular construct. In contrast,  $Q^2$  values lower than zero ( $Q^2 < 0$ ) indicate a lack of predictive validity (Chin, 1998b). In general, values of 0.02, 0.15, and 0.35 are considered of small, medium, or large predictive relevance (Hair et al., 2014).

There are two approaches to calculating  $Q^2$ : cross-validated redundancy and cross-validated communality. Following the recommendations from Hair et al. (2016), the current study adopted cross-validated redundancy for calculating  $Q^2$ . Table 25 summarised the  $R^2$  values and the  $Q^2$  values for the endogenous variables obtained by using the blindfolding function of SmartPLS 3.0 with an omission distance of 9.

	<b><math>R^2</math></b>	<b><math>Q^2</math></b>	<b>Assessment</b>
COMP	<b>0.286</b>	0.123	Small to medium predictive relevance
ENVMGMT	0.047	0.009	Small predictive relevance
METACOGSRL	0.164	0.067	Small predictive relevance
PERF	<b>0.505</b>	0.215	Medium to large predictive relevance
SAT	<b>0.432</b>	0.218	Medium to large predictive relevance
TIMEMGMT	0.370	0.232	Medium to large predictive relevance

Table 25: Predictive relevance  $Q^2$  (main effect model)

In Table 25, the  $Q^2$  values reflect validity and the  $R^2$  values reflect the percentage of explained variance. Findings revealed that the cross-validated redundancy values ( $Q^2$ ) for all endogenous constructs were greater than the threshold value of zero. In particular, the  $Q^2$  values for ‘perceived learning performance’ (0.215) and ‘learner satisfaction’ (0.218) were

well above zero. Coupled with the moderate to substantial  $R^2$  for ‘learner satisfaction’ (0.432) and ‘learning performance’ (0.505), this further substantiates the model’s predictive validity.

#### **4.7.6 Main effect model summary**

This study sought to explore relationships among motivation, self-regulated learning characteristics, organisational contextual factors, and outcomes in workplace self-paced e-learning. The technique of PLS-SEM was employed to test the relationships between the exogenous latent variables and the endogenous variables in the conceptual study model (Figure 2), also referred to as the main effect model.

Following the recommendations made by Hair et al. (2016), evaluation of the PLS path model was carried out using a two-stage approach. While quality of the measurement model was assessed in stage 1 (Figure 8), quality of the structural model was evaluated in stage 2 by measuring the relationships among the constructs (Figure 10).

Assessment of the initial measurement model found several low-performing indicators. A revised measurement model was arrived at after the removal of some low-performing indicators by following established procedures (discussed in section 4.6.2.3). The revised measurement model demonstrated internal consistency reliability (all composite reliabilities exceeded 0.70), convergent validity (most outer loadings were greater than 0.7 and the rest were only marginally below the threshold; AVE for all measures exceeded 0.5), and discriminant validity (per cross-loadings, Fornell-Larcker criterion, and HTMT criteria). The latent variables were within an acceptable level of error.

Evaluation of the structural model found the results were not biased by collinearity issues. The explanatory power of the structural model was demonstrated by moderate to small  $R^2$  values for the model's endogenous variables [i.e., COMP (0.286), SAT (0.432), and PERF (0.505)] as well as their corresponding medium  $Q^2$  effect size [i.e., COMP (0.123), SAT (0.218), and PERF (0.215)]. Based on Chin's (1998b) guidelines, the model exhibited reasonably good quality from the  $R^2$  perspective.

A total of 15 positive and statistically significant relationships were found between the exogenous latent variables and the endogenous variables in the structural model at a 10% level with medium to small effect sizes ( $f^2$ ).

#### **4.8 Interaction analysis (interaction model)**

It was established in section 1.4.2 that the completion rate is critical to success of workplace self-paced e-learning. However, the  $R^2$  value for the completion rate (COMP) in the main effect model was found to be relatively weak (0.286) when compared to the  $R^2$  values for the other two WSPEL outcome measures—namely, SAT (0.4342) and PERF (0.505). This suggests that important relationships could have been missing in the main effect model. As described in section 4.5.4, time-related issues were cited by learners as the top reason for non-completion of WSPEL courses. This was further supported by findings in the current study, as TIMEMGMT was found to be positively and significantly related to COMP (path coefficient = 0.350,  $p < 0.01$ ) with a medium  $f^2$  effect size (0.135). In addition, the current study revealed that employee learners mostly studied WSPEL in the workplace (see section

4.5.3). Thus, it is likely that employee learners' use of a time management strategy was also constrained or enhanced by factors in the workplace context, as suggested by Johns (2006). In other words, organisational contextual factors may change the strength or even the direction of the relationship between learners' use of a time management strategy, which will in turn affect completion of WSPEL courses. Therefore, in an additional analysis, I explored the potential two-way interaction effect between organisational contextual factors and learners' use of a time management strategy that might have influenced WSPEL completion. The process and findings are presented in the following sub-sections; more data can be found in the appendices.

#### **4.8.1 Two-stage approach for creating the interaction term**

To test any potential two-way interaction effect between organisational contextual factors (i.e., CHOICE, WORKLOAD, ORGSUPP, and SUPERSUPP) and learners' time management strategy (TIMEMGMT) in affecting WSPEL completion (COMP), I followed the two-stage approach recommended by Hair et al. (2016), which was first proposed by Chin et al. (2003). According to Hair et al. (2016), the two-stage approach is very versatile. When the objective is to disclose a significant moderating effect (which is the objective of this additional analysis), the two-stage approach yields high levels of statistical power as compared to the other approaches (e.g., product-indicator approach and orthogonalisation approach) (Hair et al., 2016, p. 263).

The first step in the two-stage approach is to estimate the main effect without the interaction effect (i.e., the interaction term). This step was carried out (as described in section 4.7.2) when the structural model was evaluated, and the result is presented in Table 22. In stage 2, the latent variable scores (related to measurement error of indicator variables of the latent variables) of the exogenous latent variables and moderator variables from stage 1 are multiplied to create a single-item measure to measure the interaction term. In the current study, the SmartPLS 3.0 software was used to create the interaction term (Figure 12) and the resulting interaction model is presented in Figure 27.

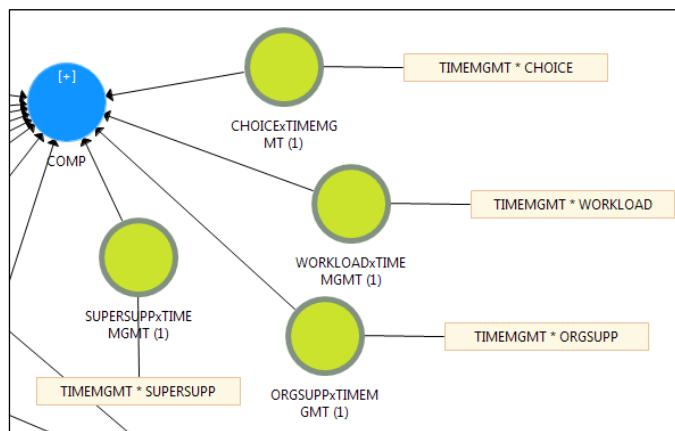


Figure 12: Interaction term (interaction model)

According to Hair et al. (2016), the measurement and structural model evaluation criteria, as applied previously in assessing the main effect model, also apply to the interaction model.

#### 4.8.2 Measurement model evaluation (interaction model)

The same process as described in Figure 8 was applied to assess the reliability and validity of the reflective measurement model of the interaction model (Figure 26). The results showed

that the measurement model met all common requirements. First, reflective individual items were reliable because all outer loadings were greater than 0.7 (Table 40). Consequently, the individual item reliability was adequate. Second, since their composite reliabilities were greater than 0.7 (Table 40), all reflective constructs met the requirement of construct reliability. Third, these latent variables achieved convergent validity because their average variance extracted (AVE) surpassed 0.5 level (Table 40). Finally, all variables met the discriminant validity requirements. Confirmation of this validity came from a comparison of the cross-loadings (Table 41), square root of AVE versus the corresponding latent variable correlations (Table 42), and the fact that all heterotrait–monotrait (HTMT) ratios were below the threshold value of 0.90 (Table 43). The evaluation of the moderator variable's measurement model proved that the construct measures were reliable and valid.

#### **4.8.3 Evaluation of two-way interaction effect (interaction model)**

Having analysed the measurement model, the proposed interactions can be examined. Bootstrapping (5,000 samples) provides t values that enable the evaluation of relationships' statistical significance in the interaction model. Table 26 summarises the significance and intensity of each of the four interaction effects.

	Interaction model			
	Path	t statistic	Sig.	f <sup>2</sup>
CHOICE → COMP	-0.092	1.130	NS	0.013
CHOICE → PERF	0.307	4.176	***	0.169
CHOICE → SAT	0.239	3.131	***	0.089

EGO → ENVMGMT	0.029	0.221	NS	0.001
EGO → METACOGSRL	0.080	0.879	NS	0.008
EGO → TIMEMGMT	0.166	1.974	**	0.044
ENVMGMT → COMP	0.095	1.327	NS	0.013
ENVMGMT → PERF	0.162	2.168	**	0.047
ENVMGMT → SAT	0.006	0.072	NS	0.000
IGO → ENVMGMT	0.035	0.272	NS	0.001
IGO → METACOGSRL	0.117	1.279	NS	0.016
IGO → TIMEMGMT	-0.015	0.178	NS	0.000
METACOGSRL → COMP	-0.056	0.623	NS	0.004
METACOGSRL → PERF	0.223	2.731	***	0.074
METACOGSRL → SAT	0.105	1.082	NS	0.014
MTL → COMP	0.154	1.626	NS	0.031
MTL → PERF	0.234	2.914	***	0.090
MTL → SAT	0.305	3.962	***	0.133
ORGSUPP → COMP	-0.062	0.626	NS	0.004
ORGSUPP → PERF	0.182	2.013	**	0.045
ORGSUPP → SAT	0.018	0.205	NS	0.000
SUPERSUPP → COMP	0.147	1.392	NS	0.023
SUPERSUPP → PERF	0.077	0.834	NS	0.007
SUPERSUPP → SAT	0.074	0.914	NS	0.006
TIMEMGMT → COMP	0.268	2.479	***	0.089
TIMEMGMT → PERF	0.062	0.782	NS	0.006
TIMEMGMT → SAT	0.290	3.187	***	0.116
WORKLOAD → COMP	0.209	2.035	**	0.062
WORKLOAD → PERF	0.029	0.285	NS	0.001
WORKLOAD → SAT	0.006	0.052	NS	0.000
WSPELEFF → ENVMGMT	0.203	2.380	**	0.041
WSPELEFF → METACOGSRL	0.349	4.498	***	0.139

WSPELEFF → TIMEMGMT	0.573	10.208	***	0.499
CHOICE × TIMEMGMT (1) → COMP	0.168	1.980	**	0.047
ORGSUPP × TIMEMGMT (1) → COMP	0.051	0.505	NS	0.003
SUPERSUPP × TIMEMGMT (1) → COMP	-0.274	2.109	**	0.103
WORKLOAD × TIMEMGMT (1) → COMP	-0.187	1.805	*	0.055

Table 26: Path coefficients (interaction model)

The result is also presented in graphical form in Figure 13.

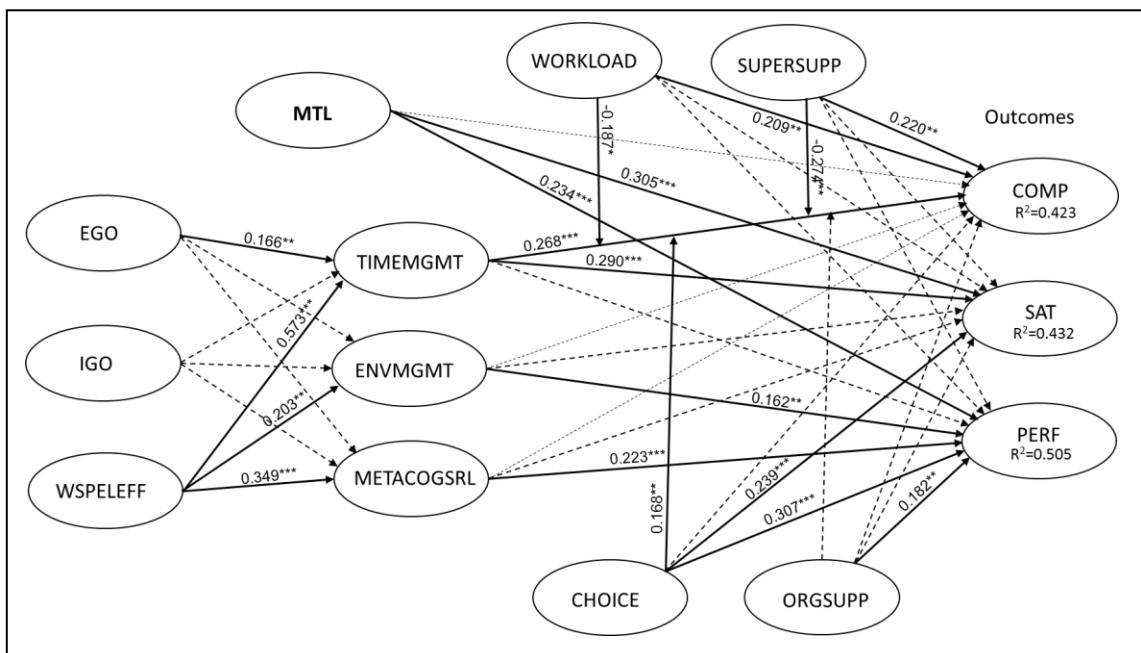


Figure 13: Path coefficients (interaction model)

As shown in Figure 13, a total of 3 interactions were found to be statistically significant at a 10% level. These findings are discussed next.

#### 4.8.3.1 Two-way interaction between CHOICE and TIMEMGMT

In this study, the path coefficient  $\text{CHOICE} \times \text{TIMEMGMT} \rightarrow \text{COMP}$  (0.168\*\*) is statistically significant (see Table 26). Thus, the variable CHOICE does moderate the relationship between TIMEMGMT and COMP. As can be seen in Table 26, the interaction terms  $\text{CHOICE} \times \text{TIMEMGMT}$  (1)  $\rightarrow \text{COMP}$  has a positive effect on COMP (0.168), whereas the simple effect of TIMEMGMT on COMP is 0.268. Based on the work of Hair et al. (2016), this result suggests that the relationship between TIMEMGMT and COMP is 0.268 for an average level of CHOICE. For higher levels of CHOICE, the relationship between TIMEMGMT and COMP increases by the size of the interaction term (i.e.,  $0.268 + 0.168 = 0.436$ ). On the contrary, for lower levels of CHOICE, the relationship between TIMEMGMT and COMP becomes  $0.268 - 0.168 = 0.2$ .

To visualise the two-way interaction effect, a simple slope analysis was conducted. The three lines shown in the simple slope plot in Figure 14 represent the relationship between TIMEMGMT (x-axis) and COMP (y-axis). The middle line represents the relationship for an average level of the moderator variable CHOICE. The other two lines represent the relationship between TIMEMGMT and COMP for higher (i.e., mean value of CHOICE plus one standard deviation unit) and lower (i.e., mean value of CHOICE minus one standard deviation unit) levels of the moderator variable CHOICE. As shown in Figure 14, the relationship between TIMEMGMT and COMP is positive for all three lines as indicated by their positive slope. Hence, higher levels of TIMEMGMT are associated with higher levels of COMP.

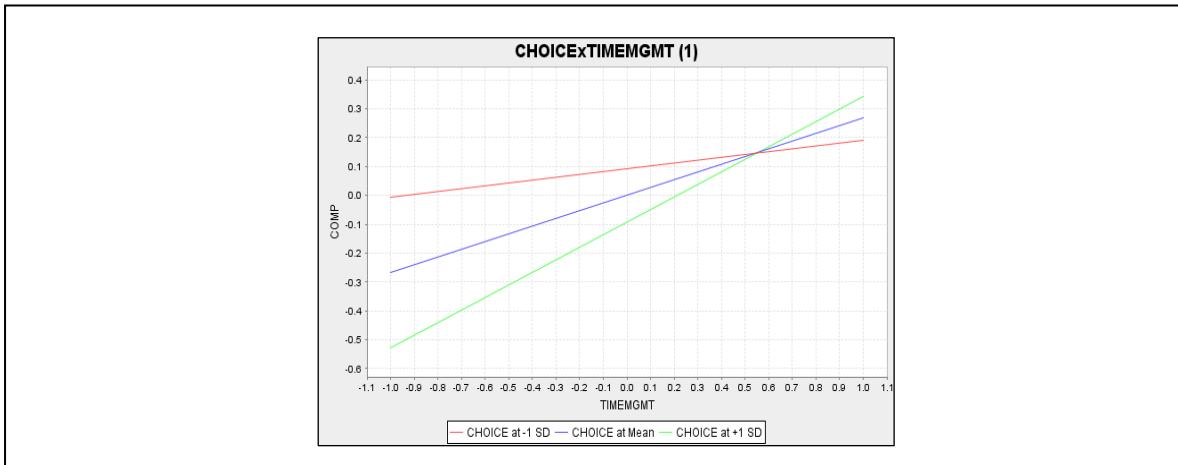


Figure 14: Interaction effect: CHOICE  $\times$  TIMEMGMT on COMP

The upper line, which represents a lower level of the moderator construct CHOICE, has a flatter slope, while the lower line, which represents a higher level of CHOICE, has a steeper slope. According to Hair et al. (2016, p.269), the slope of the high level of the moderator construct is the simple effect plus the interaction effect, while the slope of the low level of the moderator construct is the simple effect minus the interaction effect. This simple slope plot thus revealed that lower CHOICE levels entail a weaker relationship between TIMEMGMT and COMP, while higher levels of CHOICE lead to a stronger relationship between TIMEMGMT and COMP.

Overall, these results provide clear support for the contention that CHOICE exerted a significant and positive effect on the relationship between TIMEMGMT and COMP. The higher the level of CHOICE, the stronger the relationship between TIMEMGMT and COMP.

#### 4.8.3.2 Two-way interaction between WORKLOAD and TIMEMGMT

Similarly, the coefficient  $\text{WORKLOAD} \times \text{TIMEMGMT} \rightarrow \text{COMP}$  ( $-0.187^*$ ) is also statistically significant (see Table 26). The interaction term  $\text{WORKLOAD} \times \text{TIMEMGMT}$  ( $1$ )  $\rightarrow \text{COMP}$  has a negative effect on  $\text{COMP}$  ( $-0.187$ ), whereas the simple effect of  $\text{TIMEMGMT}$  on  $\text{COMP}$  is  $0.268$ . Jointly, these results suggest that the relationship between  $\text{TIMEMGMT}$  and  $\text{COMP}$  is  $0.268$  for an average level of  $\text{WORKLOAD}$ . For higher levels of  $\text{WORKLOAD}$ , the relationship between  $\text{TIMEMGMT}$  and  $\text{COMP}$  decreases by the size of the interaction term (i.e.,  $0.268 - 0.187 = 0.081$ ). On the contrary, for lower levels of  $\text{WORKLOAD}$ , the relationship between  $\text{TIMEMGMT}$  and  $\text{COMP}$  becomes  $0.268 + 0.187 = 0.455$

To visualise the two-way interaction effect, a simple slope analysis was conducted (See Figure 15). As shown in Figure 15, the relationship between  $\text{TIMEMGMT}$  and  $\text{COMP}$  is positive for all three lines, as indicated by their positive slope. Hence, higher levels of  $\text{TIMEMGMT}$  are associated with higher levels of  $\text{COMP}$ .

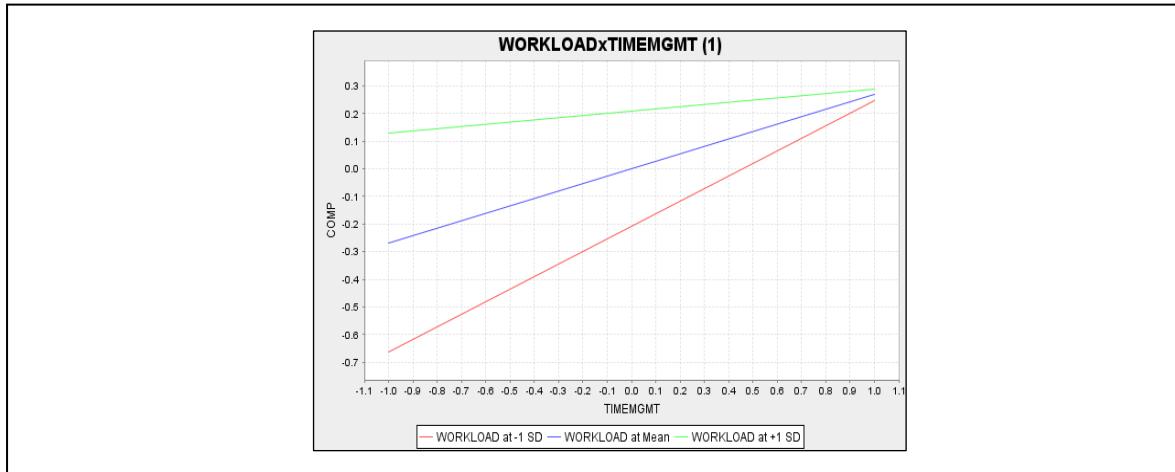


Figure 15: Interaction effect:  $\text{WORKLOAD} \times \text{TIMEMGMT}$  on  $\text{COMP}$

In addition, the upper line, which represents a higher level of the moderator construct  $\text{WORKLOAD}$ , has a flatter slope, while the lower line, which represents a lower level of

WORKLOAD, has a steeper slope. According to Hair et al. (2016, p. 269), the slope of the high level of the moderator construct is the simple effect plus the interaction effect, while the slope of the low level of the moderator construct is the simple effect minus the interaction effect. This simple slope plot thus revealed that higher WORKLOAD levels entail a weaker relationship between TIMEMGMT and COMP, while lower levels of WORKLOAD lead to a stronger relationship between TIMEMGMT and COMP.

Overall, these results provide clear support for the contention that WORKLOAD exerted a significant and negative effect on the relationship between TIMEMGMT and COMP. The lower the level of WORKLOAD, the stronger the relationship between TIMEMGMT and COMP.

#### **4.8.3.3 Two-way interaction between SUPERSUPP and TIMEMGMT**

Likewise, the coefficient  $SUPERSUPP \times TIMEMGMT \rightarrow COMP$  ( $-0.274^{**}$ ) is statistically significant (see Table 26). The interaction term  $SUPERSUPP \times TIMEMGMT (1) \rightarrow COMP$  has a negative effect on COMP ( $-0.274^{**}$ ), whereas the simple effect of TIMEMGMT on COMP is 0.268. Jointly, these results suggest that the relationship between TIMEMGMT and COMP is 0.268 for an average level of SUPERSUPP. For higher levels of SUPERSUPP, the relationship between TIMEMGMT and COMP decreases by the size of the interaction term (i.e.,  $0.268 - 0.274 = 0.006$ ). On the contrary, for lower levels of SUPERSUPP, the relationship between TIMEMGMT and COMP becomes  $0.268 + 0.274 = 0.542$ .

To visualise the two-way interaction effect, a simple slope analysis was conducted (see Figure 16).

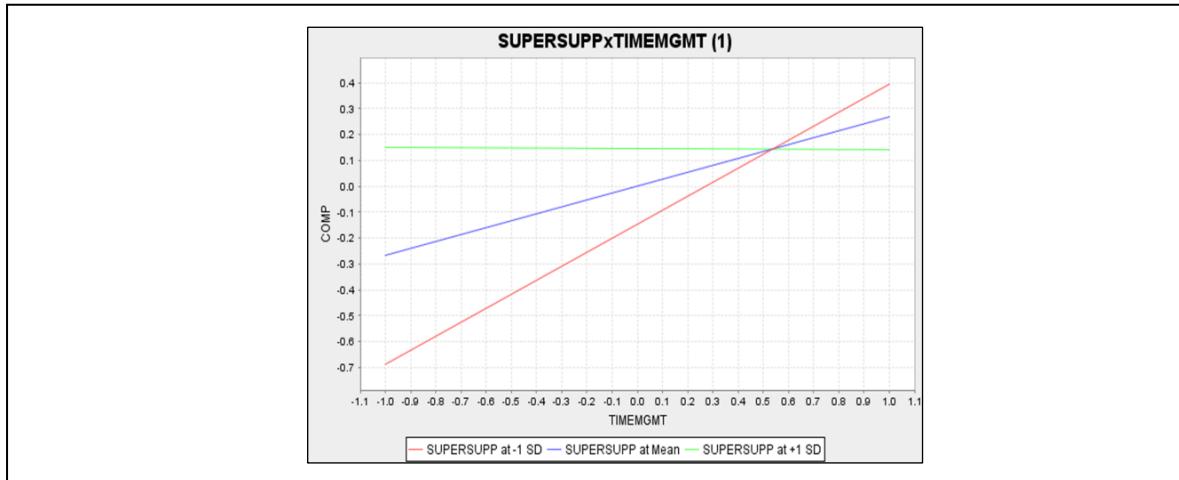


Figure 16: Interaction effect: SUPERSUPP  $\times$  TIMEMGMT on COMP

In Figure 16, the upper line, which represents a higher level of the moderator construct SUPERSUPP, has a flatter (slightly negative) slope, while the lower line, which represents a lower level of SUPERSUPP, has a steeper slope. According to Hair et al. (2016, p. 269), the slope of the high level of the moderator construct is the simple effect plus the interaction effect, while the slope of the low level of the moderator construct is the simple effect minus the interaction effect. This simple slope plot thus revealed that higher SUPERSUPP levels entail a weaker and slightly negative relationship between TIMEMGMT and COMP, while lower levels of SUPERSUPP lead to a stronger relationship between TIMEMGMT and COMP.

Overall, these results provide clear support for the contention that SUPERSUPP exerted a significant and negative effect on the relationship between TIMEMGMT and COMP. The lower the level of SUPERSUPP, the stronger the relationship between TIMEMGMT and COMP.

#### 4.8.3.4 Two-way interaction between ORGSUPP and TIMEMGMT

Finally, the coefficient  $\text{ORGSUPP} \times \text{TIMEMGMT}$  (1) → COMP (0.051 NS) is statistically not significant (see Table 26). Thus, the variable ORGSUPP does moderate the relationship between TIMEMGMT and COMP.

#### 4.8.3.5 Significance of the two-way interaction effects

To test the importance of the impact of moderating effects in the model, a comparison of the model with  $R^2$  and the model without  $R^2$  was undertaken; Cohen's (1988)  $f^2$  shows the significance of this change.

	Main effect model		Interaction model	
	$R^2$	$Q^2$	$R^2$	$Q^2$
COMP	0.286	0.123	<b>0.423</b>	0.150
ENVMGMT	0.047	0.009	0.047	0.009
METACOGSRL	0.164	0.067	0.164	0.067
PERF	0.505	0.215	0.505	0.215
SAT	0.432	0.218	0.432	0.218
TIMEMGMT	0.370	0.232	0.370	0.232

Table 27:  $R^2$  and  $Q^2$  (main effect model vs interaction model)

As shown in Table 27, the main effect model accounted for 28.6% of the variance in COMP that could be explained by the 11 exogenous variables.

The interaction model accounted for 42.3% of variance in COMP after the interaction terms moderators CHOICE, WORKLOAD, SUPERSUPP, and ORGSUPP were included. The value of the effect size ( $f^2$ ) for the moderating links CHOICE  $\times$  TIMEMGMT, WORKLOAD  $\times$  TIMEMGMT, and SUPERSUPP  $\times$  TIMEMGMT were 0.047, 0.055, and 0.103, respectively. According to Cohen (1988), these values indicated a medium to small effect.

#### **4.9 Summary**

This chapter discussed the empirical analysis of the research model. All relationships were tested and the results were presented in this chapter.

A total of 15 positive and statistically significant relationships were found between the exogenous latent variables and the endogenous variables in the research model at a 10% level with medium to small effect sizes ( $f^2$ ). The findings supported the positive relationships between motivation to learn (MTL) and all three WSPEL outcome measures with medium to small effect sizes. In addition, partial support was found for the relationship between learners' motivational belief and their use of a self-regulated learning strategy. While WSPELEFF was found to be related to the use of all three self-regulated learning strategies with large to small medium effect sizes, EGO was found to be related only to TIMEMGMT, with a small effect size of 0.044. The findings also provided partial support for the

relationship between learners' self-regulated learning strategy use (i.e., MEGACOGSRL, TIMEMGMT, and ENVMGMT) and WSPEL outcomes with medium, medium to small, and small effect sizes. Finally, partial support was found for the relationship between three organisational contextual factors (i.e., CHOICE, WORKLOAD, and ORGSUPP) and WSPEL outcomes.

In the additional analysis, three two-way interactions was found to be statistically significant at a 10% level. The findings provided clear support that CHOICE exerts a significant and positive effect on the relationship between TIMEMGMT and COMP. The higher the level of CHOICE, the stronger the relationship between TIMEMGMT and COMP. In addition, WORKLOAD was found to exert a significant and negative effect on the relationship between TIMEMGMT and COMP. The lower the level of WORKLOAD, the stronger the relationship between TIMEMGMT and COMP. Finally, the findings supported the significant and negative effect of SUPERSUPP on the relationship between TIMEMGMT and COMP. The lower the level of SUPERSUPP, the stronger the relationship between TIMEMGMT and COMP.

The next chapter discusses the results and links them to the available literature.

## **Chapter 5 Discussion**

The purpose of this chapter is to discuss the findings of the study. The chapter is divided into nine sections. Section 5.1 provides an overview of the study. Sections 5.2 through 5.5 discuss the findings of the study as they relate to each research question. The study's contributions to theory and practice are discussed in section 5.6. Limitations of the study are addressed in section 5.7, and suggestions for future research are described in section 5.8. The chapter ends with a conclusion in section 5.9.

### **5.1 Overview of the study**

The main objective of the current study was to develop an empirically based conceptual framework of the principal forces that operate behind key WSPEL outcomes to inform practice. Specifically, the potential relationships among employee learners' motivation to learn, self-regulated learning characteristics, organisational contextual factors, and WSPEL outcomes were explored. Although individual studies may have related some of these variables individually or in groups to learning outcomes, in the current study these variables were incorporated into a more comprehensive, better-specified research framework (Figure 2). This allowed exploration of potential relationships among variables as well as identification of potential hypotheses for future testing and model building.

Conducted in Hong Kong organisations through an online survey tool, this study collected cross-sectional data from a non-random sample of 119 respondents using a questionnaire instrument that consisted mainly of existing scales with proven reliability. The variance-based

PLS-SEM approach of structural equation modelling technique was employed to examine the potential relationships among the study variables to answer the research questions.

## **5.2 Relationship between motivation to learn and WSPEL outcomes**

The first research question asked to what extent, if any, a relationship exists between motivation to learn (MTL) and WSPEL outcomes in terms of course completion, learner satisfaction, and perceived learning performance.

Findings in this study supported the connection between MTL and WSPEL outcomes for this sample of WSPEL learners. The construct of motivation to learn (MTL), originating from Noe (1986), was found to be positively and significantly related to course completion (path coefficient = 0.222,  $p < 0.1$ ), learner satisfaction (path coefficient = 0.305,  $p < 0.01$ ), and perceived learning performance (path coefficient = 0.234,  $p < 0.01$ ). Further analysis revealed MTL explained a significant proportion of the incremental variance (Table 24). This single variable contributed 11% (COMP), 21% (SAT), and 14.9% (PERF) to the total variance explained by the model.

Although the effect size estimate for MTL in predicting COMP was considered small at 0.056, the variable had a medium to small effect size on SAT (0.133.) and PERF (0.090). This suggested that the more the employee learner is willing to engage in training and development activities and desires to learn the content in WSPEL courses, the higher the WSPEL course completion rate, the more satisfied the employee learner, and the better that learner's perceived learning performance in WSPEL. The effect was particularly significant

on learner satisfaction: With a path coefficient of 0.305 ( $p < 0.01$ ) and a medium to small effect size (0.133), it contributed 21% of the total variance in learner satisfaction explained by the model.

It is possible to explain the significant relationship between motivation to learn and the various WSPEL outcomes by examining the nature of the motivation to learn construct and the special characteristics of WSPEL.

### **5.2.1 Motivation to learn and learning performance**

Noe (1986) developed the motivation to learn (MTL) construct based on Vroom's (1964) VIE framework. However, Noe's (1986) conceptualisation focuses mainly on the expectancy component (i.e., the effort–performance relationship), rather than the instrumentality and valence component of Vroom's (1964) VIE framework. In other words, the MTL construct is related directly to proximal outcomes such as perceived learning performance as a result of the training (i.e., whether personal effort will lead to successful completion and learning of the knowledge and skills in WSPEL courses). Hence, MTL and learning performance are inherently related.

WSPEL is technology oriented and often loosely structured to allow greater learner control. Thus, more effort is required on the part of WSPEL learners to plan and organise when, where, and how to engage with the WSPEL course. According to Noe and Schmitt (1986), MTL influences the direction, effort, interest, and persistence that learners demonstrate in learning. Thus, it should positively affect learners' participation, which will in turn affect

their completion and learning performance in WSPEL.

This is also consistent with the literature. In the past, MTL has been found to be positively related to learning performance (Tai, 2006), time spent in learning (Brown, 2005), and training retention (Chiaburu & Tekleab, 2005) in e-learning settings. More recently, Sitzmann et al. (2009) found that motivation predicted learning when examining trainees' motivation to learn over time in e-learning.

### **5.2.2 Motivation to learn and completion**

Motivation to learn also influenced completion of WSPEL courses for the sample of learners in the current study. The social pressure from live instructors and peers typically found in traditional ILT may dissuade the learners who are considering dropping out. However, non-completion in WSPEL is as simple as just closing the web browser from which the WSPEL course is delivered. In the absence of the external pressures of a live instructor and of peers completing the same activities, the role of MTL in influencing learners' willingness to exert, sustain, and direct energy towards WSPEL becomes more salient. Learners who are more motivated to learn the course content are more committed to their learning goals. They are hence more likely to persist in the mundane process of WSPEL, thereby decreasing their probability of dropping out.

The findings in this study are also consistent with the extant literature. A substantial body of research has identified MTL as a key determinant of outcomes in traditional training settings (Baldwin et al., 1991; Mathieu et al., 1992a; Sitzmann et al., 2009; Tracey et al., 2001).

Likewise, support for this relationship has been found in e-learning settings. For instance, Garavan et al. (2010) investigated completion of e-learning activity using a large sample of employees drawn from 275 organisations. MTL was found to have had a significant path to the completion rate for the e-learning. In another study, Brown (2005) examined e-learning activities of 311 university employees in a year-long study. This author also found MTL to be an important factor in determining the aggregate time spent in e-learning. Furthermore, the time spent on e-learning courses was found to predict subsequent differences in skill and performance improvement.

### **5.2.3 Motivation to learn and satisfaction**

Among the three WSPEL outcomes, MTL was found to have the strongest effect on learner satisfaction: It had a path coefficient of 0.305 ( $p < 0.01$ ) and a medium to small effect size (0.133), and contributed 21% of the total variance in learner satisfaction explained by the framework. Learners who are motivated to learn the course content are more committed to their learning goals. Consequently, they should generally have a more positive view of learning. With a positive perception of learning, learners are more likely to react positively to the WSPEL learning environment, thus influencing their feeling of enjoyment, which in turn will affect their satisfaction.

This finding is also in agreement with past studies. The literature has shown relationships between training motivation and training satisfaction. For instance, Tracey et al. (2001) and Sitzmann et al. (2008) found strong relationships between training motivation and trainee reactions (e.g., overall training satisfaction). In another study, Sitzmann, Brown, Ely, and

Kraiger (2009) examined trainees' motivation to learn over time, and found motivation predicted trainee reaction as well as learning. In a quasi-experiment in six university-level business courses, Klein et al. (2006) compared the relative effects of delivery mode (classroom versus blended learning) on MTL and course outcomes. These researchers also found MTL predicted course satisfaction.

Taken as a whole, the evidence provided clear support for the relationship between MTL and outcomes in WSPEL for this sample of WSPEL learners. The results of this research strengthen the arguments developed in previous research, suggesting that the more the employee learner is willing to engage in training and development activities and the greater his or her desire to learn the content in WSPEL courses, the higher the WSPEL course completion rate, the more satisfied the employee learner, and the better the perceived performance in WSPEL.

Therefore, the following hypotheses are identified for further research:

H1: Motivation to learn is positively correlated with the completion rate of workplace self-paced e-learning courses.

H2: Motivation to learn is positively correlated with learner satisfaction in workplace self-paced e-learning.

H3: Motivation to learn is positively correlated with perceived learning performance in workplace self-paced e-learning.

## **5.3 Relationship between motivational beliefs and SRL strategy use**

The second research question asked to what extent, if any, a relationship exists between employee learners' goal orientation, self-efficacy belief, and use of a self-regulated learning strategy (i.e., metacognitive self-regulation, time, and environment) in WSPEL.

### **5.3.1 Self-efficacy and SRL strategy use**

The study's findings supported the connection between employee learners' domain-specific self-efficacy belief—that is, workplace self-paced e-learning self-efficacy (WSPELEFF)—and their use of self-regulated learning strategy in this sample of learners. Specifically, WSPELEFF demonstrated a moderate to small statistically significant positive correlation with the use of metacognitive self-regulation (METACOGSRL) (path coefficient = 0.349,  $p < 0.01$ ). It also demonstrated a moderate to strong relationship with the use of time management strategy (TIMEMGMT) (path coefficient = 0.573,  $p < 0.01$ ) as well as a small relationship with the use of environment management strategy (ENVMGMT) (path coefficient = 0.203,  $p < 0.05$ ). Further analysis revealed a large  $f^2$  effect size (0.499), a medium  $f^2$  effect size (0.139), and a small  $f^2$  effect size (0.041) for WSPELEFF in predicting TIMEMGMT, METACOGSRL, and ENVMGMT, respectively.

This result suggested that learners in the study sample who feel efficacious about WSPEL are able to better manage their time for learning, engage more in self-regulation, and create effective environments for learning. The more strongly employee learners believe in their

ability to study WSPEL courses using a computer, to plan and manage the self-paced e-learning process, and to learn the content in WSPEL courses, the more they will use a metacognitive strategy (i.e., metacognitive self-regulation) and a resource management strategy (i.e., time management and environment management) in WSPEL.

These findings are consistent with the extant literature. Numerous past studies have shown that self-efficacy relates positively to the productive use of self-regulatory strategies (Pajares, 2008; Pintrich & Zusho, 2002; Zimmerman et al., 1992; Zimmerman & Cleary, 2009; Zimmerman & Martinez-Pons, 1990). It is also well documented in educational psychology that self-efficacy belief and use of a self-regulated learning strategy are important predictors of a learner's academic success (Bandura, 1986; Pajares & Schunk, 2001; Pintrich, 2004).

Although research generally supports the connection between self-efficacy and use of learning strategy, many of these studies relied on generalised measures of academic self-efficacy and were carried out in academic settings. The present study focused on more specific measures of self-efficacy for workplace self-paced e-learning in organisational settings (i.e., WSPELEFF). Thus, this study provided additional confirmation of the previous findings in organisational contexts, which suggested that employee learners who believe that they are capable of learning in WSPEL environments will use more learning strategies, including a metacognitive strategy and a resource management strategy.

A notable finding in the current study is the strong relationship between WSPELEFF and TIMEMGMT (path coefficient = 0.573,  $p < 0.01$ ;  $f^2$  effect size = 0.499). Since self-efficacy belief of learners can be influenced through a variety of means (e.g., social persuasion), it is therefore possible to influence the use of a time management strategy by learners through

enhancing their self-efficacy. This will, in turn, positively influence WSPEL completion and learner satisfaction (to be discussed in section 5.4.2). Taken together, the evidence is clear: In this sample, the employee learners' self-efficacy beliefs (i.e., WSPELEFF) are related to the strategies they choose to learn the WSPEL courses.

Hence, the following hypotheses are identified for further research:

H4: Workplace self-paced e-learning self-efficacy is positively correlated with the use of metacognitive self-regulation strategy in workplace self-paced e-learning.

H5: Workplace self-paced e-learning self-efficacy is positively correlated with the use of time management strategy in workplace self-paced e-learning.

H6: Workplace self-paced e-learning self-efficacy is positively correlated with the use of environment management strategy in workplace self-paced e-learning.

### **5.3.2 Goal orientation and time management strategy use**

#### **5.3.2.1 Extrinsic goal orientation and time management**

Another finding in the current study is the connection between employee learners' extrinsic goal orientation (EGO) and their use of time management strategy. Surprisingly, the current study failed to find any relationship between learners' intrinsic goal orientation (IGO) and

their use of learning strategy in WSPEL. Indeed, the findings revealed only a small but statistically significant positive correlation between learners' extrinsic goal orientation (EGO) and their use of time management strategy (TIMEMGMT) (path coefficient = 0.166,  $p < 0.05$ ), with a small  $f^2$  effect size of 0.044. Although this suggested that the more employee learners participate in WSPEL because they perceive it as a means to an end, the more they will use time management strategy in WSPEL, the relationship is rather weak. This is contrary to the findings obtain in an early study by Pintrich and Garcia (1991). These authors found extrinsic goal orientation was negatively correlated with use of self-regulated learning strategies, while a learning goal orientation (i.e., intrinsic goal orientation) was positively correlated with the use of learning strategies.

One possible explanation for the differences in the results obtained in the current study and those described by Pintrich and Garcia (1991) is the difference in context. According to Johns (2006), such opposition of sign is 'a frequent signature of context effects' (p. 395). In organisational contexts, work-specific contextual variables (e.g., organisational policy, co-worker relationship) may be at play, reflecting the proximal contextual determinants of behaviour. For instance, organisational policy may require employees to prove their understanding of the ever-changing regulatory requirements through timely completion of WSPEL courses (discussed in section 1.3). To avoid negative consequences and to prove their abilities, employee learners may be induced to utilise learning strategies such as time management to self-regulate their behaviour and thereby ensure these WSPEL courses are completed in time and the employees conform to the organisation's policies.

The prevalence of mandatory and compliance-related WSPEL courses in Hong Kong organisations (discussed in section 1.3.3) may also help to explain why the expected

relationship between intrinsic goal orientation (IGO) and learners' use of learning strategy was not found in the current study. In contexts where WSPEL courses are mandatory, learning may be seen more as an assignment (perhaps a job assignment) and the origin of learners' motivation tends to be more external (i.e., extrinsic in nature). The influence of learners' intrinsic goal orientation (i.e., learning for the sake of learning) on learners' use of learning strategy may be constrained and dampened by the learning context and, therefore, not visible. Additional research may be needed to clarify the relationship between IGO and learners' use of SRL strategies.

Based on finding in the current study, the following hypothesis is identified for further research:

H7: Extrinsic goal orientation is positively correlated with the use of time management strategy in workplace self-paced e-learning.

#### **5.4 Relationship between SRL strategy use and WSPEL outcomes**

The third research question asked to what extent, if any, a relationship exists between employee learners' use of self-regulated learning strategy (i.e., metacognitive strategies and resource management strategies) and WSPEL outcomes.

##### **5.4.1 Metacognitive self-regulation and WSPEL outcomes**

Findings in this study partially supported the connection between employee learners' use of self-regulated learning strategies (i.e., metacognitive self-regulation, time and environment management) and WSPEL outcomes. Specifically, metacognitive self-regulation (METACOGSRL) demonstrated a small to moderate statistically significant positive correlation with perceived performance (PERF) (path coefficient = 0.223,  $p < 0.01$ ), with a medium to small  $f^2$  effect size of 0.074. This suggests that the more employee learners use metacognitive self-regulation (e.g., setting goals, tracking and refocusing attention, testing understanding, adjusting the pace), the better their mastery and retention of WSPEL course content and job performance will be as a result of participation in WSPEL.

The finding that metacognitive self-regulation strategies positively influence learning outcomes is consistent with the literature. For instance, Zimmerman and Martinez-Pons (1990) reported that learners who demonstrated the use of effective self-regulation strategies and who had a high degree of self-efficacy were more likely to succeed academically. Recently, Richardson et al. (2012) conducted a meta-analysis reviewing 13 years of research into antecedents of university students' grade-point average (GPA). The authors found metacognitive strategies had a small, significant, positive correlation with GPA.

Compared to traditional ILT, WSPEL tends to provide learners with less support and guidance on how to learn effectively. WSPEL courses often feature a hypermedia learning environment that is non-linear in nature without a rigid structure (Scott & Schwartz, 2007). The challenges of studying the WSPEL content material while simultaneously learning how to navigate within the hypermedia environment and monitoring the structure of the environment can quickly overwhelm the learner's working memory. This may lead to cognitive overload and disorientation (Gerjets et al., 2008) and hinders knowledge

acquisition.

Metacognitive self-regulation should facilitate the balancing of content comprehension and effective navigation during learning with WSPEL courses. The use of metacognitive self-regulation strategies should allow learners, when they become confused with the WSPEL material, to consciously go back to the course material and endeavour to figure it out. In this way, the use of metacognitive self-regulated learning strategies positively influences knowledge acquisition, which in turn affects perceived learning performance in WSPEL.

Prior work in e-learning environments has demonstrated the relationship between use of metacognition strategies and improvement in academic achievement (Azevedo & Aleven, 2013; Broadbent & Poon, 2015; Niemi et al., 2003). When Wilson and Narayan (2016) studied 96 undergraduate students in a blended learning environment, they found that learning strategy use had a significant positive effect on performance. Azevedo et al. (2008) found that students who used more metacognitive strategies, such as monitoring their thinking process, performed significantly better than students who used fewer metacognitive strategies in web-based learning environments. A systematic review of research from 2004 to 2014 on self-regulated learning strategies and academic achievement in online higher-education learning environments (Broadbent & Poon, 2015) also revealed metacognition, effort regulation, and time management were positively correlated with academic outcomes.

The evidence is clear that metacognitive self-regulation (METACOGSRL) is related to academic performance. The following hypothesis is identified for further research:

H8: The use of metacognitive self-regulation strategy is positively correlated with perceived learning performance in workplace self-paced e-learning.

#### **5.4.2 Time management and WSPEL outcomes**

Findings in this study also partially support the connection between employee learners' use of time management (TIMEMGMT) strategy and WSPEL outcomes in this sample of learners. Specifically, TIMEMGMT demonstrated a moderate to small statistically significant positive correlation with WSPEL course completion rate (COMP) (path coefficient = 0.350,  $p < 0.01$ ), with a medium to small  $f^2$  effect size of 0.129. In addition, a small to moderate relationship was found between TIMEMGMT and learner satisfaction (SAT) (path coefficient = 0.290,  $p < 0.01$ ), with a medium to small  $f^2$  effect size of 0.116. This suggests that the more employee learners use time management strategies such as prioritising learning tasks, allocating time to sub-tasks, and revising their plans as necessary, the higher their WSPEL course completion rate and the more satisfied the employee learners in WSPEL will be.

##### **5.4.2.1 Time management and WSPEL completion**

Time support is an interesting element in workplace e-learning. Some organisations may provide their employees with time to study WSPEL courses during work hours, whereas others may not provide any time off for WSPEL. In a study of more than 200 employees across 14 countries across Europe, Baldwin-Evans (2004) found that only one organisation set specific times aside for its employees to learn via e-learning. Studies have shown that lack

of time for learning is a major hurdle in completion of e-learning (Aragon & Johnson, 2008; Serwatka, 2005), and it is starting to be recognised as one of the main factors in learners' dropout rates (Barbera & Clarà, 2012; Park & Choi, 2009; Romero & Barberà, 2011).

Research has shown that employee learners mostly study e-learning courses at work. For instance, in the survey conducted by Baldwin-Evans (2004), the majority (68%) of employee learners reported studying e-learning courses at work, mostly at the employee's own desk. Similarly, Eidson (2009) reported that most of the US federal government employees (60%) who participated in her case study research completed their e-learning in the office. The current study also revealed 69.7% of the study sample often or mostly studied WSPEL courses at work (Table 3).

Given that time-related issues are a key reason for non-completion of WSPEL courses and that employees mostly study WSPEL courses at work, such time-related issues are likely to stem from the workplace environment in which the learning takes place. Without a doubt, the primary function of the workplace is for work, and employees' priority should be the production of goods and services, not learning. A natural tension thus exists between work and learning, resulting in constant interruptions of the learning process. This may explain Baldwin-Evans' (2004) finding that 77% of employees surveyed reported being unable to complete online courses in one attempt, even though duration of some of WSPEL courses can be as short as 30 minutes (discussed in section 1.2.2).

Further support for the relationship between TIMEMGMT and completion of e-learning courses in organisation settings can be found in the work of Sener and Hawkins (2007) and Long, Dubois, et al. (2009). Sener and Hawkins (2007) noticed a large disparity in

completion rates between ILT and e-learning courses in a corporate university. When these authors conducted a study to determine the possible causes of this discrepancy, they found time conflicts with work commitments were an important factor affecting completion rates in e-learning courses. Likewise, Long et al. (2009) utilised a case study approach to examine factors that influenced the use of online training by 5,000 employees in a 14-month study. A completion rate of 21% was reported. Subsequent analysis revealed the principal factor that contributed to course attrition was lack of time available both at work and at home. These findings are corroborated by the current study, in which time-related issues were also the top reason—cited by 42% of the respondents—for non-completion of WSPEL courses (section 4.5.4).

As WSPEL learners usually face the prospect of being involved both in their study and in their job at the same time, the successful completion of WSPEL courses clearly depends on the efficient use of the amount of time available to the employees. As time constraints were widely cited as a key determinant of e-learning non-completion, they constitute a barrier to completion of WSPEL courses. If this factor is not properly managed, non-completion occurs. The evidence is clear that time management is a salient factor affecting WSPEL completion.

The following hypothesis is identified for further research:

H9: The use of time management strategy is positively correlated with completion rate of workplace self-paced e-learning courses.

#### **5.4.2.2 Time management and satisfaction**

Results of the current study also revealed a small to moderate statistically significant positive correlation between time management (TIMEMGMT) and learner satisfaction (SAT) (path coefficient = 0.290,  $p < 0.01$ ), with a medium to small  $f^2$  effect size of 0.089. This suggested that the more employee learners use a time management strategy in the context of e-learning, the more satisfied the employee learners are with WSPEL.

Intuitively, it is reasonable that learners who report engaging more in time management are also satisfied WSPEL learners. However, the interpretation of this link is not always clear. As discussed earlier, WSPEL learners often need to study at work and often in the flow of work. They have to fit their learning around their daily responsibilities and in the face of competing personal and work priorities, which can result in a very stressful situation. According to Hellsten (2012), inefficient time use, lack of control over time demands, and inadequate amounts of time for learning and work have negative impacts on individuals' psychological resources. One potential coping strategy is time management. The stress literature portrays time management as a way to lower stress and to gain greater efficiency, satisfaction, and health (Schuler, 1979). It follows that effective time management has the potential to lower stress and strain.

Two early studies by Macan (1994, 1996) found that engaging in time management behaviours led to a greater perception of control over time. In addition, individuals who perceived having more control over their time reported fewer job-induced tensions, less stress, and greater job satisfaction than individuals who did not perceive themselves as having control over their time. It is possible, then, that studying WSPEL courses leads to a higher

level of stress situation due to the employee learners' perceived lack of control over study time owing to the competing learning and work priorities. Engaging in time management behaviours while studying WSPEL courses leads to a greater perception of control over time. Such perception of control, according to Schuler (1979), is associated with a lower level of stress, efficiency gains, and greater satisfaction. This will, in turn, result in a more positive attitude, a higher degree of enjoyment, and more gratification that a learner experiences in the WSPEL learning process. Hence, time management is a salient factor in affecting learner satisfaction in WSPEL.

The following hypothesis is identified for further research:

H10: The use of time management strategy is positively correlated with learner satisfaction in workplace self-paced e-learning.

#### **5.4.2.3 Time management and supervisor support**

An interesting finding in the current study was the two-way interaction between supervisor support (SUPERSUPP) and time management (TIMEMGMT) in their relationship with COMP. It was found that SUPERSUPP exerted a significant and negative effect on the relationship between TIMEMGMT and COMP. The lower the level of SUPERSUPP, the stronger the relationship between TIMEMGMT and COMP. Conversely, a higher level of supervisor support led to a weaker relationship between time management and WSPEL completion rate.

At first glance, this result may be counterintuitive, but it is indeed in agreement with the literature. As described in section 2.4.2, supervisor support involves supervisors' encouragement of participation in training, providing time support or allowing the employee to study during work hours, and providing recognition to employees involved in these activities (Tracey & Tews, 2005). Hence, a higher level of supervisor support should, to a certain extent, be associated with a higher level of time support for employees' learning. It follows that WSPEL completion under such circumstances should be less closely related to employee learners' use of time management strategy, resulting in a weaker relationship between these variables.

The following hypothesis is identified for further testing:

H11: There is a negative two-way interaction between supervisor support and use of time management strategy in their relationship with WSPEL course completion rate.

### **5.4.3 Environment management and WSPEL outcomes**

A third relationship found in this study is the connection between environment management strategy and perceived performance of the learners. Specifically, environment management (ENVMGMT) demonstrated a small and statistically significant positive correlation with perceived learning performance (PERF) (path coefficient = 0.162,  $p < 0.05$ ), with a small  $f^2$  effect size of 0.047. This finding suggests that the more employee learners use an environment management strategy such as selecting environments in which the learner has control over possible distractions while participating in WSPEL, the better the learner's

mastery and retention of WSPEL course content and job performance as a result of participation in WSPEL will be. However, the relationship is relatively weak.

Although a key feature and benefit of WSPEL is the flexibility—that is, the ability to study anytime, anywhere. Unfortunately, this flexibility comes with the cost of potential interruptions. The fact that employee learners mostly study WSPEL courses at work and from their desk (Baldwin-Evans, 2004) suggests that they may be studying WSPEL courses and handling work-related tasks at the same time. As revealed in Eidson's (2009) study (discussed in section 5.4.2), although most learners complete their e-learning in the office, 70% indicate that their learning was highly impacted by continuous workplace distractions. Workplace interruptions were also cited by employee learners in Baldwin-Evans's (2004) study as one of the most common reasons for failing to complete e-learning course in one attempt (the other reason is time constraints, as discussed in section 5.4.2.1).

When an employee learner studying WSPEL courses encounters an externally generated event (e.g., a ringing phone, notification of arrival of email or a message), an interruption occurs. According to action regulation theory (Hacker, 2003), interruptions make it more difficult to pursue a goal and regulate goal progress. Research examining the effects of interruptions on performance also suggests that interruptions decrease task efficiency by increasing processing time and errors (Cellier & Eyrolle, 1992; Gillie & Broadbent, 1989; Monk et al., 2004; Zijlstra et al., 1999). As a result, decreased learning and performance occur.

The ability of the learner to select a place to study WSPEL courses in which the learner has control to lessen the probability of encountering a distraction or to reduce the intensity of

distractions that do occur is, therefore, linked to learning and performance in WSPEL. However, only marginal support for this relationship was provided by the findings in the current study. Further testing is needed to advance our understanding of the influence of environment management strategy on perceived learning performance in WSPEL

The following hypothesis is thus identified for further testing:

H12: The use of environment management strategy is positively correlated with perceived learning performance in workplace self-paced e-learning.

## **5.5 Relationship between organisational contextual factors and WSPEL outcomes**

The fourth research question addressed the relationship between organisational contextual factors and learning outcomes. The research question asked to what extent, if any, a relationship exists between organisational contextual factors (i.e., organisational support, supervisor support, perceived choice, and workload) and WSPEL outcomes in terms of course completion, learner satisfaction, and perceived learning performance

### **5.5.1 Perceived choice and WSPEL outcomes**

#### **5.5.1.1 Perceived choice, satisfaction and learning performance**

Findings in this study partially supported the connection between perceived choice (CHOICE) and WSPEL outcomes in this sample of learners. Specifically, perceived choice (CHOICE) demonstrated a small, statistically significant positive correlation with learner satisfaction (SAT) (path coefficient = 0.239,  $p < 0.01$ ), with a medium to small  $f^2$  effect size of 0.089. Further analysis revealed CHOICE contributed 5.2% of the incremental variance in SAT (Table 24), the highest amount among all organisational contextual factors and second only to MTL (9.1%). This suggests that perceived choice (CHOICE) might have practical significance in affecting learner satisfaction in WSPEL settings.

Another relationship found in the current study is the connection between perceived choice (CHOICE) and perceived learning performance (PERF). A small to moderate statistically significant positive correlation (path coefficient = 0.307,  $p < 0.01$ ) and a medium  $f^2$  effect size of 0.169 were found between perceived choice (CHOICE) and perceived learning performance (PERF). Further analysis of incremental variance found CHOICE contributed the largest amount of incremental variance (9.8%) for PERF (Table 24). The strength of the relationship, the  $f^2$  effect size, and its significant contribution to incremental variance suggest that perceived choice (CHOICE) is a key organisational contextual factor affecting perceived learning performance in WSPEL.

These findings are also in agreement with the extant literature. A meta-analysis of 41 studies by Patall et al. (2008), which examined the effect of choice on intrinsic motivation and related outcomes with both children and adults, found that providing choice enhanced intrinsic motivation, effort, task performance, and perceived competence, among other outcomes. The authors stressed that providing choice might be the most obvious way to support a person's experience of autonomy. More recently, O'Reilly (2014) studied 77 adult

learners in a foreign language programme. This author also found that learners' perception of autonomy support was related to their levels of intrinsic motivation, which was also moderately correlated to learning outcomes (i.e., GPA).

In organisational contexts, employee learners enter into WSPEL with a relative degree of autonomy and choice. They may self-initiate their participation in WSPEL courses. Their participation in WSPEL courses may also be initiated, supported, endorsed, hinted at, suggested, recommended, or even required by the organisation or by their superiors.

According to the self-determination theory (SDT; discussed in section 2.4.4), organisational contexts that satisfy the need for autonomy, such as providing choice of attendance in WSPEL courses, are supportive of employees' autonomy. SDT further posits that an environment that is supportive of autonomy will lead to higher levels of intrinsic motivation, which will in turn result in better learning performance as well as a personally satisfying experience in WSPEL. It follows that the provision of choice in decisions, such as voluntary training opportunities, and the removal of external controls, such as pressures, may be the most obvious way to support an employee's experience of autonomy. This is corroborated by findings in the current study in which positive relationships were found between CHOICE and SAT as well as between CHOICE and PERF.

The following hypothesis are identified for further research:

H13: Perceived choice is positively correlated with learner satisfaction in workplace self-paced e-learning.

H14: Perceived choice is positively correlated with perceived performance in workplace self-paced e-learning.

### **5.5.1.2 Perceived choice and time management**

Another interesting finding in the current study was the two-way interaction between CHOICE and TIMEMGMT in their relationship with COMP in the learners. It was found that the more the learner perceived he or she had the flexibility in making decisions pertaining to his or her participation in WSPEL, the stronger the relationship between TIMEMGMT and COMP. In other words, the more autonomy the learner perceived he or she had in WSPEL participation (e.g., in voluntary training), the more the WSPEL completion was related to the use of time management strategy. Conversely, the less autonomy the learner had in terms of WSPEL participation, such as in mandatory training, the weaker the relationship between WSPEL completion and the use of time management strategy. This suggests that time management is more important in a situation in which an employee learner has flexibility in making decisions pertaining to his or her participation in WSPEL, such as in voluntary training.

The following hypothesis is identified for further research:

H15: There is a positive two-way interaction between perceived choice and use of time management strategy in their relationship with WSPEL course completion rate.

## **5.5.2 Organisational support and WSPEL outcomes**

The study findings supported the connection between organisational support (ORGSUPP) and WSPEL outcomes, but failed to find any relationship between supervisor support (SUPERSUPP) and WSPEL outcomes in the learners. Specifically, organisational support (ORGSUPP) demonstrated a small, statistically significant positive correlation with perceived learning performance (PERF) (path coefficient = 0.182,  $p < 0.05$ ), with a small  $f^2$  effect size of 0.045. The construct also contributed 4.6% of the incremental variance in PERF. This suggested that the more the employee learner perceives his or her employing organisation as supporting the employee's learning, values the usefulness and benefits of learning, and reinforces the use of the learning on the job, the better the employee's learning and performance in WSPEL will be. Given the small path coefficient (0.182) and the small  $f^2$  effect size (0.045), this relationship is, however, rather weak.

Evidence for the important role of organisational support in workplace e-learning can be found in a study by Eidson (2009) (discussed in section 5.4.2). In the study, the author quoted one employee as expressing feelings of guilt or reluctance to use work time for learning and further commented that 'in an organizational environment perceived to devalue learning, employees may be conditioned to believe that learning in the workplace is inappropriate and that they bear little responsibility for learning' (p. 51). In another study, Chuo et al. (2011) found that organisational support has an indirect influence on e-learning usage intention, a precondition for learning and performance. Recently, Sawang et al. (2013) reported organisational support leads to greater satisfaction in e-learning.

It follows that the provision of appropriate resources, encouragement, constant emphasis on the importance of WSPEL, and tying of certain rewards to employees' participation in WSPEL should lead to positive outcomes, including learning performance in WSPEL. However, a relatively weak relationship between organisational support and perceived learning performance was revealed in the current study. The following hypothesis is therefore identified:

H16: Organisational support is positively correlated with perceived performance in workplace self-paced e-learning.

### **5.5.3 Workload and WSPEL outcomes**

#### **5.5.3.1 Workload and completion**

Findings in the current study revealed a small, statistically significant positive correlation between learners' level of workload (WORKLOAD) and the WSPEL course completion rate (COMP) (path coefficient = 0.259,  $p < 0.05$ ), with a medium to small  $f^2$  effect size of 0.082. However, the construct contributed only a mere 1.6% of the incremental variance in COMP.

Intuitively, it is reasonable to expect that learners who report higher levels of workload would complete fewer WSPEL courses. WSPEL, as a responsibility that adds to the existing workload, takes time to complete. The employee's workload may place practical constraints on how much time is available for the employee to commit to learning or limit his or her

discretion in choosing learning over other activities. Employee learners with higher workloads should be more challenged in finding time to engage in WSPEL, so that a lower completion rate should be expected.

This phenomenon can also be explained from a self-regulation perspective. Employee learners who deliberately self-regulate their behaviour in the WSPEL process must exert energy (Vohs et al., 2005). Compared to employees with lower workloads, employees with higher workloads may find it difficult to exert the mental energy necessary to alter their behaviour, thereby limiting the WSPEL-related outcomes. It follows that a higher workload should exert a dampening effect on WSPEL.

Surprisingly, a relationship in the opposite direction was found in the current study. At first glance, the finding that a positive relationship exists between learners' level of workload (WORKLOAD) and the WSPEL course completion rate (COMP) may be counterintuitive. However, Karasek's (1979) job demands control model suggests that high job demands, such as workload, challenge employees and induce the need for more effective work strategies and behaviours to achieve their goals. In other words, demanding tasks create a discrepancy between the desired state (i.e., the demands or goals) and one's actual competence level. Attempts to close this gap require learning (Wielenga-Meijer, 2010). Therefore, it is possible that a high workload challenges employees to develop new competencies and skills and, therefore, promotes learning. Hence, some studies—including the current study—show positive effects of workload on learning outcomes.

This finding is also in agreement with the literature. For instance, Wielenga-Meijer et al. (2010) quantitatively reviewed 85 studies published between 1969 and 2005 that investigated

the relationship between job characteristics and learning consequences. Moderately strong evidence for a positive relationship was found between job demands and job control on the one hand and learning consequences on the other hand. The authors subsequently proposed that job demands, along with other job characteristics such as variety, autonomy, and feedback, will affect learning consequences positively. In another study, Raemdonck et al. (2014) examined a total of 837 workers, ages 18 to 65, from different sectors and with different educational levels. Their analysis revealed that job demands, along with self-directed learning orientation, constitute significant and positive predictors of workplace learning behaviour.

The following hypothesis is identified for further research:

H17: Workload is positively correlated with course completion rate in workplace self-paced e-learning.

### **5.5.3.2 Workload and time management**

Another interesting finding related to employee learners' level of workload in the current study was the two-way interaction between WORKLOAD and TIMEMGMT in their relationship with COMP. It was found that WORKLOAD exerted a significant and negative effect on the relationship between TIMEMGMT and COMP. The lower the level of WORKLOAD, the stronger the relationship between TIMEMGMT and COMP. Conversely, the relationship between TIMEMGMT and COMP was weaker at a higher level of WORKLOAD.

This is in agreement with the findings discussed in section 5.4.2. Because most employee learners study WSPEL courses at work, they constantly face competing demands from work and other types of learning. At a lower level of workload, employee learners should be able to find some free time to learn. Hence, use of a time management strategy may help employee learners juggle the work and learning tasks, resulting in relatively higher WSPEL completion. When the level of workload is high, however, employees have to work at a relatively faster pace and should have less free time available. Under such time pressures and because work is always the priority, a time management strategy will be less effective in helping the employees juggle between the work and learning tasks. Hence, the relationship between TIMEMGMT and COMP should be weaker in a high workload situation.

The following hypothesis is identified for further research:

H18: There is a negative two-way interaction between workload and use of time management strategy in their relationship with WSPEL course completion rate.

## **5.6 Research contributions**

### **5.6.1 Conceptual contribution to knowledge**

Given the growing popularity of WSPEL in Hong Kong organisations and the general concern that the expected outcomes from such e-learning may not ultimately materialise, it is

necessary to gain a better awareness of the interplay between the forces that operate behind WSPEL outcomes so as to make recommendations for optimising existing practices. Of the many forces that have the potential to influence WSPEL outcomes, the learner's motivation, self-regulated learning, and organisational context have been identified as particularly salient in the literature. This leads to the construction of a conceptual framework (section 2.1.3) that allows a systematic investigation of the extent to which motivation, self-regulated learning, and organisational context predict WSPEL outcomes.

The conceptual framework used in this study employed a combination of the relevant WSPEL outcomes (i.e., completion rate, learner satisfaction, and learning performance) as independent variables. The 11 dependent variables identified were intrinsic and extrinsic goal orientation, workplace self-paced e-learning self-efficacy, metacognitive self-regulation, time management, environment management, motivation to learn, perceived choice, supervisor support, organisational support, and workload. These variables were operationalised, and 37 relationships were proposed on the basis of predicted relationships between the key concepts of the framework.

The variables were measured and the proposed relationships were tested against the questionnaire data collected from 119 employees in Hong Kong organisations. Using the PLS-SEM (partial least squares structural equation modelling) technique, 18 out of the 37 relationships specified in the conceptual framework were found to be significant. Together, the framework explained 42.3%, 43.2%, and 50.5% of the amount of the variance in COMP, SAT, and PERF, respectively. This suggests that motivation, self-regulated learning, and organisation context are some of the principal forces that operate behind WSPEL, which has the potential to predict the outcomes expected of WSPEL.

In the past, the vast majority of self-regulated learning research has been conducted in formal educational contexts rather than in workplace settings. As the nature of these two contexts as well as the opportunities for provision and support of learning in them are different, findings from academic context may not be readily generalisable to the workplace (see section 2.5.2).

The current research is the first empirical work to systematically examine, within a comprehensive conceptual framework, the relationship between employee learners' motivation, self-regulated learning characteristics, organisational contextual factors, and workplace self-paced e-learning outcomes in Hong Kong organisations. Thus, this study contributes to the understanding of how self-regulated learning influences WSPEL outcomes at work. It is also the first such study to report this type of valuable data from Hong Kong employees, and enables us to gain deeper insights into common learning practices of Hong Kong employees and the issues they encounter in their WSPEL learning processes. In addition, this empirical collection of evidence from Hong Kong organisations contributes to the global literature on workplace self-paced e-learning.

Findings in this study demonstrate that self-regulation strategies are important for WSPEL. In particular, use of time management and metacognitive self-regulation strategies has a strong impact on WSPEL outcomes. Moreover, the results of this research highlight the important role of organisational contextual factors in WSPEL. Context, as summarised broadly by Johns (2006), is 'situational opportunities and constraints' (p. 386) and often 'operates in such a way as to provide constraints on or opportunities for behaviour and attitudes in organisational settings' (Johns, 2001). Context can serve as a main effect on organisational behaviour and/or a moderator of relationships. A good example of such contextual variable found in the current study is perceived choice (CHOICE): This variable had main effects on

SAT and PERF, yet moderated the relationship between time management (TIMEMGMT) and completion rate (COMP). This opens up the possibility that particular contextual variables can be used as levers to shape behaviours within the organisation, including outcomes in workplace self-paced e-learning.

The emergent findings from this study do not claim to establish a definitive theory of workplace self-paced e-learning in a positivistic sense. Nevertheless, a total of 18 hypotheses (see sections 5.2 through 5.5) were identified that can be further tested for future model building to inform practice. There seems to be enough positive evidence supporting these hypotheses to warrant further investigation and to advance our understanding of what makes workplace self-paced e-learning a success in organisations.

### **5.6.2 Practical application of the findings**

The current research provides a unique lens through which to examine the role of motivation, self-regulated learning characteristics, and organisational contextual factors in affecting outcomes in workplace self-paced learning. It is evident that the findings of the current study have several implications for organisation leaders, training and development professionals, and employee learners planning to implement or currently studying WSPEL courses.

The first implication relates to the role of the employee learner in the WSPEL learning process. Although research continues to suggest that employee learners need to take on a more active role in WSPEL if they are to succeed, many employee learners may lack the ability to effectively study WSPEL courses. This lack of effectiveness may be due in part to

the fact that experiences in traditional learning environments, such as ILT, do not prepare learners well for WSPEL. Heavily influenced by the Confucian heritage, which emphasises that virtue is achieved primarily by learning from teachers, Hong Kong learners generally expect their teachers to instruct them, and they expect themselves to be instructed or ‘spoon-fed’. As a result, they rely strongly on teachers’ instructions for learning activities, and may have fewer opportunities for and experience in active participation in the learning process.

One way to facilitate learners in actively learning during the WSPEL is self-regulated learning (SRL). The findings in this study revealed that the use of self-regulated learning strategy is positively related to WSPEL outcomes. Considering that self-regulation is crucial for learning in the WSPEL environment and that SRL strategies can be taught, organisations should provide employee learners with information regarding the use of self-regulated learning strategies when studying WSPEL courses. The current study also revealed the important roles of time management (TIMEMGMT) and environment management (ENVMGMT) in influencing WSPEL outcomes, suggesting that organisations should seriously consider providing appropriate support in terms of time and space to facilitate employees’ learning at work.

Effective environment management involves taking steps to secure a quiet and interruption-free study environment. In the current study, 69.7% of the sample of Hong Kong employee learners reported that they often or mostly study WSPEL courses at work (see Table 3), suggesting that they often study WSPEL courses in their immediate work environment. Given the dynamic nature of today’s workplace, one can imagine the interruptions and distractions they face in this setting. As revealed in the current study, the more control the learner has over possible distractions while participating in WSPEL, the better the learner’s mastery and

retention of WSPEL. Hence, a work environment conducive to WSPEL, such as one that offers adequate quiet, privacy, and access to learning materials and technologies, is important for WSPEL success. One way to create such ‘WSPEL-friendly’ environments to support WSPEL learners is to provide new space or allocate existing space specifically for learning. This can easily be achieved by setting up a learning room, with the required facilities dedicated to studying WSPEL courses.

In addition to the need to study WSPEL courses in a ‘WSPEL-friendly’ work environment, findings in the current study revealed the need to properly manage one’s time to succeed in WSPEL. Given the fact that Hong Kong had the longest working hours in the world in 2015 (see section 1.3.2), lack of time is a common complaint among Hong Kong employee learners. However, not every employee learner is aware of the importance of effective time management for WSPEL success. Even when they do recognise the need for such time management strategies, they often lack the necessary skills to manage their time effectively.

Hence, organisations should offer training or at least advice on useful time management techniques for studying WSPEL courses at work. In terms of time management, employee learners should plan for and find their own times in which they can study WSPEL courses comfortably and free from distractions. Effective time management generally involves assessing how much time is required for certain tasks, accommodating and properly prioritising learner tasks along with other work tasks, evaluating time use and learning progress, and adjusting to the unexpected.

Possible coping strategies for employee learners that can help them secure quality time and an appropriate environment to study WSPEL courses at work include studying WSPEL

courses either before the working day starts or after the working day finishes. Since these periods are not part of the official workday, there will be no competing priorities. Distractions such as phone calls will be kept to a minimum, thereby providing an environment that is conducive to studying WSPEL courses. Another coping strategy is to take advantage of the relatively ‘peaceful’ lunch break period, when the likelihood of priority conflicts with learning is low.

Employee learners can also break down the WSPEL courses into small learning chunks and schedule themselves to complete studying these small course chunks during lunch regularly. As described in section 1.2.2, the typical seat time of a WSPEL course ranges from 30 minutes to a few hours. By breaking up the learning into small chunks of 15 minutes, it is possible to complete a WSPEL course with a seat time of 1 hour in 4 days’ time just by ‘stealing’ 15 minutes from lunchtime each day.

The current study also revealed a positive relationship between learner’s metacognitive self-regulation and perceived learning performance in WSPEL. With this point in mind, organisations should consider providing employee learners with explicit training on how to self-regulate their learning behaviours. This training should aim to help employee learners become motivated, proactive users of a metacognitive learning strategy (e.g., self-monitoring, self-evaluation).

Another key finding in the current study is the influence of organisational context on WSPEL outcomes. Formal organisational systems, such as appraisal and reward systems as well as support from supervisors, were found to play an important role in affecting WSPEL outcomes. Organisations can increase employees’ perceptions of organisational support for

WSPEL by institutionalising and legitimising WSPEL in the workplace. This can easily be achieved by recognising the time necessary for learning to occur within the workday and formally incorporating it into organisational policies. In addition, by asking for supervisor encouragement and acknowledgement of employees' learning, employee learners will be better equipped to weigh conflicting priorities and mitigate workplace distractions in studying WSPEL courses, thereby further increasing the chance of success.

## **5.7 Research limitations**

In any research study, no matter how carefully one orchestrates the design, there will inevitably exist limitations. In this study, some of the major limitations are exclusion of potential variables in the study model, selection bias, the use of an online self-report survey instrument, and the cross-sectional nature of the current study.

### **5.7.1.1.1 Exclusion of potential variables**

Exclusion of other potential variables in the conceptual framework is a limitation of the current study. This may include variables, such as task value, volition, cognitive strategy use, and peer support, that the literature suggests are salient. These exclusions may have reduced the amount of variance explained in the model. Although examination of additional variables would certainly provide a more comprehensive model, it would also lead to a much longer questionnaire. Survey participants would need longer to fill in the questionnaire, leading to fatigue and possibly errors in completion. By contrast, a more parsimonious framework

enables us to focus on just the key variables to explain WSPEL outcomes and to inform practice. Future research in this area may consider incorporating other potential variables in the framework to further increase its explanatory power.

#### **5.7.1.1.2 Non-random sampling**

This research study featured a non-random sampling design. This design was selected primarily because of the limited access to participants, as the researcher relied on the willingness and reliability of the contact persons in organisations to communicate with the participants. The lack of a true random sample restricts the ability to generalise any findings in the current study to the wider population.

A known limitation of snowball samples, which is the sampling strategy adopted in the current study, is the potential bias towards the inclusion of individuals with interrelationships (discussed in section 3.4.3.2). The relatively high proportion of the study sample with university education or above (93.3% with a bachelor's degree or above) suggested a potential influence of selection bias in the current study, which is to be expected with any non-random sampling strategy. Such bias in sampling may lead to a constant difference between the results from the sample and the theoretical results from the entire population and render the finding not generalisable outside of the current study sample.

However, the current research is exploratory in nature and does not aim at generalisability. Snowball sampling allowed the researcher to obtain basic data to empirically test the conceptual framework without the complications of using a randomised sample. Although the

study result may not be generalisable beyond the study sample, the information could still provide some fairly significant insights and serve as a good source of data in further research. In the future, these limitations may be partially addressed by obtaining larger samples as well as by replicating the results to strengthen any generalisation.

#### **5.7.1.1.3 Online questionnaire**

Participants in this study self-reported information based on an online questionnaire. One limitation of this method was that respondents could not ask questions about the wording of the survey. The lack of direct communication between a researcher and the respondents in regard to an online questionnaire may sometimes result in anomalies in the procedures and misinterpretation of the instructions by some participants. As this kind of survey is mainly administered online, those respondents who are more technologically confident may be more likely to complete the survey. This may potentially lead to biased data, as respondents who choose to participate will mean that the sample does not accurately reflect the entire target population.

The target population in the current study consisted of Hong Kong employee learners who had prior experience studying WSPEL courses. It is therefore reasonable to believe that they should, to a certain extent, be able to use computer technology comfortably for basic tasks such as filling out an online questionnaire.

#### **5.7.1.1.4 Cross-sectional research**

Due to the exploratory nature of the current research, a cross-sectional design was adopted.

Research adopting a cross-sectional design, the current study included, collects data at a single point in time to allow examination of relationships among variables. A key limitation of such design is that it fails to address the time element. In turn, it is difficult to determine the temporal relationship between the study variables and outcomes, which makes this approach less ideal for identifying predictive relationships. Thus, the practical significance of the findings in the current research may sometimes be uncertain.

Future studies in this area should consider adopting alternative designs, such as a longitudinal design. A longitudinal study will provide better support in identifying any predictive relationships among the exogenous and endogenous variables. Researchers in the future should conduct research studies by taking the limitations of this study into account.

### **5.8 Future research**

The current research comprises a preliminary study seeking to understand the relationships among motivation, self-regulated learning characteristics, organisational contextual factors, and workplace self-paced e-learning outcomes. In the future, additional research can be pursued based on this study to further explore the issues involved.

### **5.8.1.1 Methodology**

One limitation of the current study is related to the use of a cross-sectional self-administered survey method. Future research should consider pursuing a longitudinal study, an experimental design, or a qualitative approach. One possibility is to utilise the same group in a longitudinal study, if the participants are available, to determine whether the exogenous variables (i.e., motivation, self-regulated learning characteristics, and organisational contextual factors) are predictive of the endogenous variables (i.e., WSPEL course completion rate, learner satisfaction, and perceived performance). For example, does extrinsic goal orientation leads to time management strategy use in WSPEL? Does use of a time management strategy lead to learner satisfaction in WSPEL? Is there a solid and predictive relationship, or is the posited relationship merely an artefact of the study conditions? Well-planned experiments can strengthen links between the exogenous variables and endogenous variables in future study. Further research should also consider conducting in-depth interviews or adopting other similar qualitative approaches to elucidate the real-life challenges faced by employee learners studying WSPEL courses. Qualitative methods will provide opportunities for more in-depth study of the WSPEL environment and the organisational contextual factors at play.

### **5.8.1.2 Motivation types**

In the current study, the construct of motivation to learn was found to influence all three WSPEL outcomes of interest (i.e., WSPEL course completion rate, learner satisfaction, and perceived performance). The findings suggest that the more the employee learner is willing to

engage in training and development activities and desires to learn the content in WSPEL courses, the higher the WSPEL course completion rate, the more satisfied the employee learner, and the better the perceived performance in WSPEL. Central to this MTL–outcome relationship is the desire of the employee learner to learn the content in WSPEL courses. According to Knowles's (2011) andragogy theory, employee learners (i.e., adult learners) are most interested in learning what is considered to have immediate relevance and impact to their job or personal life. Hence, the degree of alignment between WSPEL content and job requirements deserves future consideration as a potential moderator of the MTL–outcome relationship.

In addition, motivation is far from a unitary construct. Recently, Bauer et al. (2016) conducted a meta-analysis investigating the impact of motivation type (i.e., intrinsic motivation, motivation to learn, motivation to transfer, expectancy motivation, and task value) on four training outcomes (i.e., reactions, learning, behaviour, and results) represented in the Kirkpatrick training evaluation framework (discussed in section 1.3). Although the results suggested that all types of motivation correlate with trainee reactions, learning, and transfer, there was variability in the strength of the motivation–outcome relationships across motivation type. This suggests that a single measure of motivation may not be adequate when multiple training outcomes are of interest, such as in the current study. Future research should consider including different types of motivation to determine which motivation types are most relevant to WSPEL training outcomes, and then provide recommendations about the types of motivation that should be used when specific WSPEL outcomes are of interest.

### **5.8.1.3 Autonomy**

Another finding in this study is the connection between perceived choice (CHOICE) and WSPEL outcomes. The findings revealed a positive relationship between the degree of freedom or autonomy perceived by employee learners in WSPEL participation and their satisfaction with WSPEL as well as their learning and performance in WSPEL courses.

Although this finding is expected, it is subject to a major limitation—namely, the current study did not distinguish between mandatory and non-mandatory participation. As pointed out by Johns (2006), the degree of autonomy, or freedom of action, that an individual has is one of the most omnipresent contextual factors. Johns (2006) further argued, ‘limited autonomy constrains behaviour, reducing the impact of individual differences, … ample autonomy is a key opportunity factor fostering human agency’ (p. 394). In accord with Johns' (2006) supposition, some effects of the influence of employee learners' motivation and self-regulated learning characteristics on WSPEL outcomes are likely to be muted or attenuated if employees' participation in WSPEL is mandatory. This suggests that comparative analysis of mandatory versus non-mandatory WSPEL environments may be required in such cases to clarify the underlying effects. This information is important for training and development professional and e-learning researchers, as they seek to devise appropriate measures to support employee learners in both mandatory and non-mandatory WSPEL settings.

### **5.8.1.4 Other aspects of WSPEL**

Since the current study focuses on the influence of learner characteristics and organisational contextual factors on workplace self-paced e-learning outcomes, aspects related to training

design such as the subject matter, pedagogy, content design, and degree of learner control were not considered. As revealed in section 4.5.4, content-related issues were cited as one of the top reasons for WSPEL non-completion in this sample of learners. Future research should examine aspects such as subject matter, content design, and degree of learner control in the instructional design in more detail to determine their relevance for WSPEL outcomes. For instance, WSPEL courses with high and low learner control assigned at random might be compared to identify whether WSPEL outcomes such as course completion rate, learner satisfaction, learning, and performance differ by the degree of learner control.

In addition, the fact that most employee learners described their overall experience in studying WSPEL courses as positive or highly positive (64.4%), yet only 25.2% preferred WSPEL over ILT (see sections 4.5.5 and 4.5.6), suggests that factors external to WSPEL may be at play. These may include factors such as the general perception of training as time off from work and opportunities for professional networking in ILT but not WSPEL. An examination of such organisational factors influencing behaviour and outcomes in WSPEL will assist organisation leaders, training and development professionals, and e-learning researchers in designing and properly implementing workplace self-paced e-learning and reaping the full benefits of anytime, anywhere learning in the workplace.

## **5.9 Conclusion**

The current research represents a step forward in the development of a formal model to understand the principal forces, including motivation, self-regulated learning, and organisational context, that drive key outcomes of workplace self-paced e-learning. The

findings generally support the relationship between motivation to learn and WSPEL outcome. The results also partially support the connection between employee learners' motivational beliefs and self-regulated learning strategy use as well as the connection between self-regulated learning strategy use and WSPEL outcomes. Among the organisational contextual variables, perceived choice was found to positively influence learner satisfaction. Likewise, both perceived choice and organisational support positively influenced perceived performance in WSPEL. Somewhat surprisingly, workload was also positively related to WSPEL course completion. In addition, the findings revealed two-way interactions between organisational contextual factors (i.e., perceived choice, workload, and supervisor support) and learners' use of a time management strategy in affecting completion rate in WSPEL courses. Furthermore, the current study has identified 18 hypotheses for future testing and model building.

This study has laid the foundations for a programme of future research in how motivation, self-regulated learning, and organisational contextual factors predict learning outcomes in workplace self-paced e-learning. Future research may build on the findings in the current study to engage in a more comprehensive analysis of additional factors that may potentially contribute to success in workplace self-paced e-learning.

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## Appendix A: Variables in survey instrument

### Dependent variables

<b>Completion rate (COMP)</b>				
No.	Indicator items	Question text	Cronbach's alpha	Source
8	Vcoursestrt	I try to learn as much as I can from training programs	N. A.	Wang (2010)
9	Vcoursecomp	I try to learn as much as I can from training programs		
<b>Learner satisfaction (SAT)</b>				
No.	Indicator items	Question text	Cronbach's alpha	Source
14(a)	SATISF1	All in all, I am satisfied with my experience studying self-paced e-learning course	0.792	Gunawardena, Linder- VanBerschot et al. (2010)
14(b)	SATISF2	I plan to take another self-paced e-learning course		
14(c)	SATISF3	I would recommend others to take self-paced e-learning course		
14(d)	SATISF4	On the whole, I felt a sense of accomplishment after finishing self-paced e-learning course		

14(e)	SATISF5	On the whole, self-paced e-Learning course kept me engaged until I finished		
<b>Learning performance (PERF)</b>				
No.	Indicator items	Question text	Cronbach's alpha	Source
19(a)	PERF1	All things considered, my job performance has or will improve as a result of the course		
19(b)	PERF2	I believe what I have learnt from the course has or will have a positive impact on my job performance		
19(c)	PERF3	I believe I have a strong grasp on the materials taught in the course		Sharma (2006)
19(d)	PERF4	I believe I have mastered most of the materials taught in the course	0.779	
19(e)	PERF5	Generally I can recall the materials that have been taught in the course		
19(f)	PERF6	Generally I remember what I have learnt from the course		

Table 28: Dependent variables and survey questions in instrument

### Independent variables

<b>Motivation to learn (MTL)</b>				
No.	Indicator items	Question text	Cronbach's alpha	Source

12(a)	MOTIVATE 1	I try to learn as much as I can from training programs		
12(b)	MOTIVATE 3	I am willing to exert considerable effort in training programs if they improve my skills		
12(c)	MOTIVATE 4	I believe I can improve my skills by participating in training programs		
12(d)	MOTIVATE 5	I believe I can learn the material presented in most training programs	0.752	Noe & Schmitt (1986)
12(e)	MOTIVATE 6	Participation in training programs is of little use to me because I have all the knowledge and skill I need to successfully perform my job		
12(f)	MOTIVATE 7	Taking training courses is not a high priority for me		

**Workplace self-paced e-learning self-efficacy (WSPELEFF)**

No.	Indicator items	Question text	Cronbach's alpha	Source
13(a)	SELFEFF1	I am confident in my ability to use a computer to study self-paced e-learning course	0.882	New
13(b)	SELFEFF2	I am confident that I can effectively participate and manage my learning in self-paced e-learning courses		

13(c)	SELFEFF3	I am confident that I can keep learning when distractions occur while I am studying self-paced e-learning courses		
13(d)	SELFEFF4	I am confident that I can learn the material presented in self-paced e-learning courses		
13(e)	SELFEFF5	I am confident that I can complete self-paced e-learning course according to plan		
13(f)	SELFEFF6	Generally, I am confident that I can do well in self-paced e-Learning courses		

#### **Learner satisfaction (SAT)**

No.	Indicator items	Question text	Cronbach's alpha	Source
14(a)	SATISF1	All in all, I am satisfied with my experience studying self-paced e-learning course	0.792	Gunawardena, Linder- VanBerschot, et al. (2010)
14(b)	SATISF2	I plan to take another self-paced e-learning course		
14(c)	SATISF3	I would recommend others to take self-paced e-learning course		
14(d)	SATISF4	On the whole, I felt a sense of accomplishment after finishing self-paced e-learning course		
14(e)	SATISF5	On the whole, self-paced e-Learning course kept me engaged until I finished		

#### **Time management (TIMEMGMT)**

No.	Indicator items	Question text	Cronbach's alpha	Source
15(a)	TIMEMGMT 1	On the whole, I was able to set aside regular times to study these e-Learning courses	0.779	MSLQ
15(b)	TIMEMGMT 2	I often found that I didn't spend enough time studying these e-learning courses because of other activities		
15(c)	TIMEMGMT 3	On the whole, I made good use of available time to study these e-Learning courses		
15(d)	TIMEMGMT 4	On the whole, I was able to adhere to my plan when studying these e-learning courses		

#### **Extrinsic goal orientation (EGO)**

No.	Indicator items	Question text	Cronbach's alpha	Source
16(a)	GOALEXT1	To me, participating in self-paced e-learning course is helpful to gain external rewards (e.g., compliance, promotion, improved performance, approval from others, etc.).	0.795	MSLQ
16(b)	GOALEXT2	To me, participating in self-paced e-learning course is a means to an end (e.g., approval from others, improved performance, promotion, etc.).		
16(c)	GOALEXT3	Generally, I would participate more in self-paced e-learning course if it helps me attain		

		external rewards (e.g., approval from others, improved performance, promotion, etc.).		
<b>Intrinsic goal orientation (IGO)</b>				
No.	Indicator items	Question text	Cronbach's alpha	Source
16(d)	GOALINT1	To me, participating in self-paced e-learning course is valuable in itself beyond any external rewards (e.g., approval from others, improved performance, promotion, etc.).		
16(e)	GOALINT2	To me, participating in self-paced e-learning course is valuable for personal reasons as opposed to external rewards.	0.786	MSLQ
16(f)	GOALINT3	Generally, participating in self-paced e-learning course is valuable for personal goals instead of external rewards.		
<b>Environment management (ENVMGMT)</b>				
No.	Indicator items	Question text	Cronbach's alpha	Source
17(a)	ENVMGMT 1	I will try to find a designated place that is relatively free from interruptions to study the course		
17(b)	ENVMGMT 2	I usually study where I can concentrate on the course	0.653	MSLQ
<b>Perceived choice (CHOICE)</b>				

No.	Indicator items	Question text	Cronbach's alpha	Source
18(a)	CHOICE1	I felt like it was not my own choice to do the course	0.881	Ryan (1982)
18(b)	CHOICE2	I believe I had some choice in selecting the course		
18(c)	CHOICE3	I did the course because I wanted to		
18(d)	CHOICE4	I did the course because I had to (I had no choice)		
<b>Learning performance (PERF)</b>				
No.	Indicator items	Question text	Cronbach's alpha	Source
19(a)	PERF1	All things considered, my job performance has or will improve as a result of the course	0.779	Sharma (2006)
19(b)	PERF2	I believe what I have learnt from the course has or will have a positive impact on my job performance		
19(c)	PERF3	I believe I have a strong grasp on the materials taught in the course		
19(d)	PERF4	I believe I have mastered most of the materials taught in the course		
19(e)	PERF5	Generally I can recall the materials that have been taught in the course		
19(f)	PERF6	Generally I remember what I have learnt from the course		

<b>Metacognitive self-regulation (METACOGSRL)</b>				
No.	Indicator items	Question text	Cronbach's alpha	Source
20(a)	METACOG1	While studying online, I often miss important points because I'm thinking of other things	0.719	MSLQ
20(b)	METACOG2	While studying online, I will find ways to help focus my learning		
20(c)	METACOG3	When I become confused about something in the course, I go back and try to figure it out		
20(d)	METACOG4	I will check to make sure I understand the material I have been studying in self-paced e-learning course		
20(e)	METACOG5	I often find that I have been studying the course but don't know what it was all about		
20(f)	METACOG6	I try to think through a topic and decide what I am supposed to learn from it rather than just reading it over when studying for the course		
20(g)	METACOG7	When studying for the course I try to determine which concepts I don't understand well		

20(h)	METACOG8	When I study for the course, I set goals for myself in order to direct my activities in each study period		
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#### **Organisational support (ORGSUPP)**

No.	Indicator items	Question text	Cronbach's alpha	Source
21(a)	ORGSUPP1	There is a performance appraisal system that ties rewards to use of newly acquired knowledge and skills	0.815	GTCS, Tracey & Tews (2005)
21(b)	ORGSUPP2	This organisation offers excellent training programs		
21(c)	ORGSUPP3	Employees are provided with resources necessary to acquire and use new knowledge and skills		
21(d)	ORGSUPP4	There are rewards and incentives for acquiring and using new knowledge and skills in one's job		
21(e)	ORGSUPP5	This organisation rewards employees for using newly acquired knowledge and skills on the job		

#### **Supervisor support (SUPERSUPP)**

No.	Indicator items	Question text	Cronbach's alpha	Source
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22(a)	SUPERSUPP 1	Supervisors give recognition and credit to those who apply new knowledge and skills to their work	0.815	GTCS, Tracey & Tews (2005)
22(b)	SUPERSUPP 2	Supervisors match associates' needs for personal and professional development with opportunities to attend training		
22(c)	SUPERSUPP 3	Independent and innovative thinking are encouraged by supervisors		
22(d)	SUPERSUPP 4	Top management expects high levels of performance at all times		
22(e)	SUPERSUPP 5	Top management expects continuing technical excellence and competence		

#### **Workload (WORKLOAD)**

No.	Indicator items	Question text	Cronbach's alpha	Source
23(a)	WORKLOA D1	Your job require you to work very fast most of the time	0.769	QWI, Spector & Jex (1998)
23(b)	WORKLOA D2	Your job requires you to work very hard most of the time		
23(c)	WORKLOA D3	Your job leave you with little time to get things done most of the time		
23(d)	WORKLOA D4	There is a great deal to be done most of the time		
23(e)	WORKLOA D5	You have to do more work than you can do well most of the time		

Table 29: Independent variables and survey questions in instrument

<b>Question</b>	<b>Variables</b>	<b>Items</b>
7	Overall experience in workplace self-paced e-Learning	Velrnexp
18e	Preference for ILT	PREFER1
21f	e-Learning culture in organisation	CULTURE1

Table 30: Miscellaneous variables in the survey instrument

<b>Question</b>	<b>Variables</b>	<b>Items</b>
24	Agreement to participate	INTAGREE
25	Name	INTNAME
26	Contact method	CONTACT1, CONTACT2, CONTACT3
27	Additional information / comment	COMMENT

Table 31: Invitation to participate in a follow-up telephone interview

## Appendix B: Descriptive statistics

**Descriptive Statistics**

	N	Minimum	Maximum	Mean	Std.	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Deviation	Statistic	Std. Error	Statistic	Std. Error
Vsex	119	1	2	1.40	.493	.399	.222	-1.873	.440
Vage_1	119	2.0	5.0	3.622	1.0167	-.165	.222	-1.064	.440
Vedulvl	119	2	6	4.49	.675	-.795	.222	.791	.440
Velrnexp	119	2	5	3.68	.596	-.490	.222	.308	.440
Vcoursestrt_1	119	.0	60.0	6.863	9.8221	2.729	.222	8.833	.440
Vcoursecomp_1	119	.0	60.0	6.667	9.6199	2.732	.222	9.055	.440
Completion_Rate	119	.00	1.00	.9025	.22149	-2.640	.222	6.666	.440
AtHome	119	1	4	2.08	.967	.476	.222	-.792	.440
InOffice_1	119	1.0	4.0	3.008	.8487	-.270	.222	-.988	.440
OtherLoc_1	119	1.0	3.0	1.252	.5557	2.137	.222	3.537	.440
CULTURE1_1	119	1.0	5.0	3.458	.9535	-.503	.222	-.223	.440
PREFER1	119	1	5	3.18	.956	.152	.222	-.580	.440
MOTIVATE1	119	2	5	4.13	.561	-.258	.222	1.438	.440
MOTIVATE3	119	2	5	4.29	.570	-.354	.222	1.084	.440
MOTIVATE4	119	2	5	3.98	.638	-.585	.222	1.387	.440
MOTIVATE5	119	2	5	3.77	.753	-.689	.222	.506	.440
MOTIVATE6	119	1	5	2.37	.872	.526	.222	-.019	.440
MOTIVATE7	119	1	4	2.19	.826	.541	.222	-.028	.440
SELFEFF1	119	1	5	4.09	.792	-1.104	.222	2.065	.440
SELFEFF2	119	1	5	3.86	.784	-.814	.222	1.261	.440
SELFEFF3	119	1	5	3.29	.940	-.230	.222	-.709	.440
SELFEFF4	119	1	5	3.82	.701	-1.231	.222	2.754	.440
SELFEFF5	119	1	5	3.75	.739	-.969	.222	1.623	.440
SELFEFF6_1	119	1.0	5.0	3.846	.7085	-1.218	.222	2.818	.440
SATISF1	119	1	5	3.66	.692	-1.311	.222	1.980	.440
SATISF2	119	2	5	3.68	.663	-.072	.222	-.128	.440
SATISF3	119	1	5	3.65	.732	-.657	.222	.990	.440
SATISF4	119	1	5	3.42	.753	-.267	.222	.232	.440

SATISF5	119	1	5	3.42	.765	-.536	.222	.050	.440
TIMEMGMT1	119	1	5	3.12	.904	-.376	.222	-1.030	.440
TIMEMGMT2	119	2	5	3.30	.879	-.254	.222	-1.056	.440
TIMEMGMT3	119	1	5	3.40	.785	-.851	.222	-.280	.440
TIMEMGMT4_1	119	1.0	5.0	3.288	.8036	-.576	.222	-.700	.440
GOALEXT1	119	1	5	3.23	.887	-.390	.222	-.448	.440
GOALEXT2	119	1	5	3.12	.949	-.360	.222	-.488	.440
GOALEXT3	119	1	5	3.58	.916	-.812	.222	.391	.440
GOALINT1	119	1	5	3.57	.776	-.739	.222	.497	.440
GOALINT3	119	2	5	3.56	.732	-.815	.222	.032	.440
ENVMGMT1	119	2	5	3.64	.831	-.677	.222	-.122	.440
ENVMGMT2	119	1	5	3.71	.835	-.928	.222	1.163	.440
CHOICE1R	119	1.00	5.00	3.0084	.90662	-.294	.222	-.837	.440
CHOICE2	119	1	5	3.52	.811	-1.037	.222	.637	.440
CHOICE3	119	1	5	3.48	.891	-.813	.222	.226	.440
CHOICE4R	119	1.00	5.00	2.7815	1.05090	.183	.222	-.973	.440
PERF1	119	2	5	3.43	.684	-.628	.222	-.461	.440
PERF2	119	2	5	3.66	.601	-1.376	.222	1.252	.440
PERF3	119	1	5	3.55	.697	-1.113	.222	1.067	.440
PERF4	119	2	5	3.59	.630	-1.064	.222	.384	.440
PERF5	119	2	4	3.54	.686	-1.178	.222	.083	.440
PERF6	119	2	5	3.54	.711	-.928	.222	-.008	.440
METACOG1	119	1	5	2.85	.870	.300	.222	-1.247	.440
METACOG2	119	2	5	3.50	.687	-.891	.222	-.162	.440
METACOG3	119	2	5	3.77	.630	-1.023	.222	1.626	.440
METACOG4	119	2	5	3.58	.644	-.690	.222	.150	.440
METACOG5	119	1	4	2.55	.744	.562	.222	-.454	.440
METACOG6	119	2	5	3.35	.787	-.507	.222	-.852	.440
METACOG7	119	2	5	3.46	.722	-.552	.222	-.352	.440
METACOG8	119	1	5	3.24	.781	-.241	.222	-.344	.440
ORGSUPP1	119	1	5	2.98	.957	-.202	.222	-.922	.440
ORGSUPP2	119	1	5	3.53	.790	-.623	.222	.247	.440
ORGSUPP3	119	2	5	3.65	.696	-1.079	.222	.713	.440
ORGSUPP4	119	1	5	3.09	.939	-.187	.222	-.755	.440

ORGSUPP5_1	119	1.0	5.0	2.992	.8877	-.131	.222	-.715	.440
SUPERSUPP1	119	1	5	3.08	.958	-.330	.222	-.967	.440
SUPERSUPP2	119	1	5	3.40	.795	-.756	.222	.247	.440
SUPERSUPP3	119	1	5	3.55	.861	-1.401	.222	2.023	.440
SUPERSUPP4	119	2	5	4.02	.610	-.463	.222	1.338	.440
SUPERSUPP5	119	2	5	4.00	.597	-.487	.222	1.567	.440
WORKLOAD1	119	2	5	3.79	.832	-.663	.222	.115	.440
WORKLOAD2	119	2	5	3.91	.689	-.669	.222	1.071	.440
WORKLOAD3	119	1	5	3.31	1.031	.003	.222	-.881	.440
WORKLOAD4_1	119	2.0	5.0	3.864	.7469	-.143	.222	-.415	.440
WORKLOAD5	119	2	5	3.25	1.019	.208	.222	-1.114	.440
Valid N (listwise)	119								

Table 32: Descriptive statistics of survey sample

## Appendix C: Main effect model

### Criteria for the evaluation of internal consistency reliability

Criteria	Value range	Definition	References
Cronbach's alpha	0.7 or higher	An estimate of the reliability based on the inter-correlations of the observed indicator variables; based on average inter-item correlation of an instrument	Cronbach (1951)
Composite reliability	0.70 or higher (in exploratory research, 0.60 to 0.70 is considered acceptable)	Determines reliability based on the outer loadings of the indicator variable	Hair et al. (2014; 2016)

Table 33: Criteria for the evaluation of internal consistency reliability

### Criteria for the evaluation of convergent validity

Criteria	Value range	Definition	References
Outer loadings (indicator reliability)	0.708 or higher (in exploratory studies, loadings of 0.40 are acceptable)	An indicator's correlation with the latent construct; the variation of an item explained by the construct	Hair et al. (2014; 2016)
Average variance extracted (AVE)	0.5 or higher	The grand mean value of the squared loadings of the indicators associated with the construct (i.e., the sum of the squared loadings divided by the number of indicators)	Hair et al. (2014; 2016)

Table 34: Criteria for the evaluation of convergent validity

### Criteria for the evaluation of discriminant validity

Criteria	Value range	Definition	References
Cross-Loadings	Each indicator should load highest on the construct it is intended to measure	An indicator's correlation on other constructs	Hair et al. (2014; 2016)

Fornell-Larcker criterion	Each construct's AVE should be higher than its squared correlation with any other construct	Compares the square root of the AVE values with the latent variable correlations	Hair et al. (2014; 2016)
Heterotrait-Monotrait Ratio (HTMT)	An HTMT value above 0.90 suggests a lack of discriminant validity	The mean of all correlations of indicators across constructs measuring different constructs (i.e., the heterotrait–heteromethod correlations) relative to the (geometric) mean of the average correlations of indicators measuring the same construct (i.e., the monotrait–heteromethod correlations; for a formal definition of the HTMT statistic, see Henseler et al., 2015).	Hair et al. (2014; 2016)

Table 35: Criteria for the evaluation of discriminant validity

### Initial measurement model (main effect model)

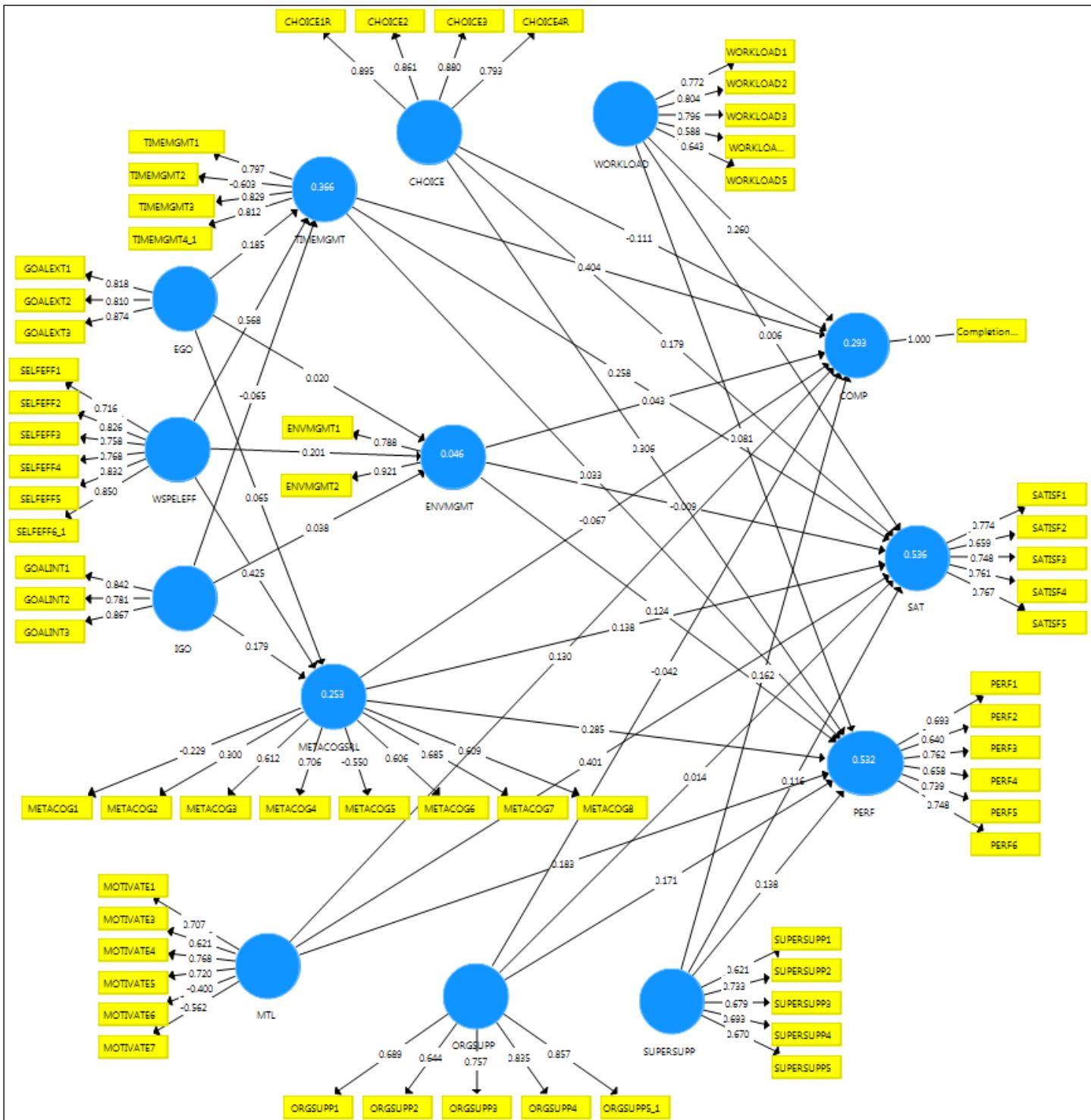


Figure 17: Initial measurement model (main effect model)

**Outer loadings (initial measurement model)**

	CHOICE	COMP	EGO	ENVMGMT	IGO	METACOGSR	MTL	ORGSUPP	PERF	SAT	SUPERSUPP	TIMEMGMT	WORKLOAD	WSPELEFF
CHOICE1R	0.89													
CHOICE2	0.86													
CHOICE3	0.88													
CHOICE4R	0.79													
Completion_Rate		1.00												
ENVMGMT1				0.79										
ENVMGMT2				0.92										
GOALEXT1			0.82											
GOALEXT2			0.81											
GOALEXT3			0.87											
GOALINT1					0.84									
GOALINT2						0.78								
GOALINT3						0.87								
METACOG1							-0.23							
METACOG2							0.30							
METACOG3							0.61							
METACOG4							0.71							
METACOG5							-0.55							
METACOG6							0.61							
METACOG7							0.68							
METACOG8							0.61							
MOTIVATE1								0.71						
MOTIVATE3									0.62					
MOTIVATE4										0.77				
MOTIVATE5											0.72			
MOTIVATE6												-0.40		
MOTIVATE7													-0.56	
ORGSUPP1												0.69		
ORGSUPP2												0.64		

ORGSUPP3						0.76					
ORGSUPP4						0.84					
ORGSUPP5_1						0.86					
PERF1							0.69				
PERF2							0.64				
PERF3							0.76				
PERF4							0.66				
PERF5							0.74				
PERF6							0.75				
SATISF1								0.77			
SATISF2								0.66			
SATISF3								0.75			
SATISF4								0.76			
SATISF5								0.77			
SELFEFF1											0.72
SELFEFF2											0.83
SELFEFF3											0.76
SELFEFF4											0.77
SELFEFF5											0.83
SELFEFF6_1											0.85
SUPERSUPP1								0.62			
SUPERSUPP2								0.73			
SUPERSUPP3								0.68			
SUPERSUPP4								0.69			
SUPERSUPP5								0.67			
TIMEMGMT1									0.80		
TIMEMGMT2									-0.60		
TIMEMGMT3									0.83		
TIMEMGMT4_1									0.81		
WORKLOAD1										0.77	
WORKLOAD2										0.80	
WORKLOAD3										0.80	
WORKLOAD4_1										0.59	

WORKLOAD5												0.64
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Table 36: Outer loadings: initial measurement model (main effect model)

## Revised measurement model

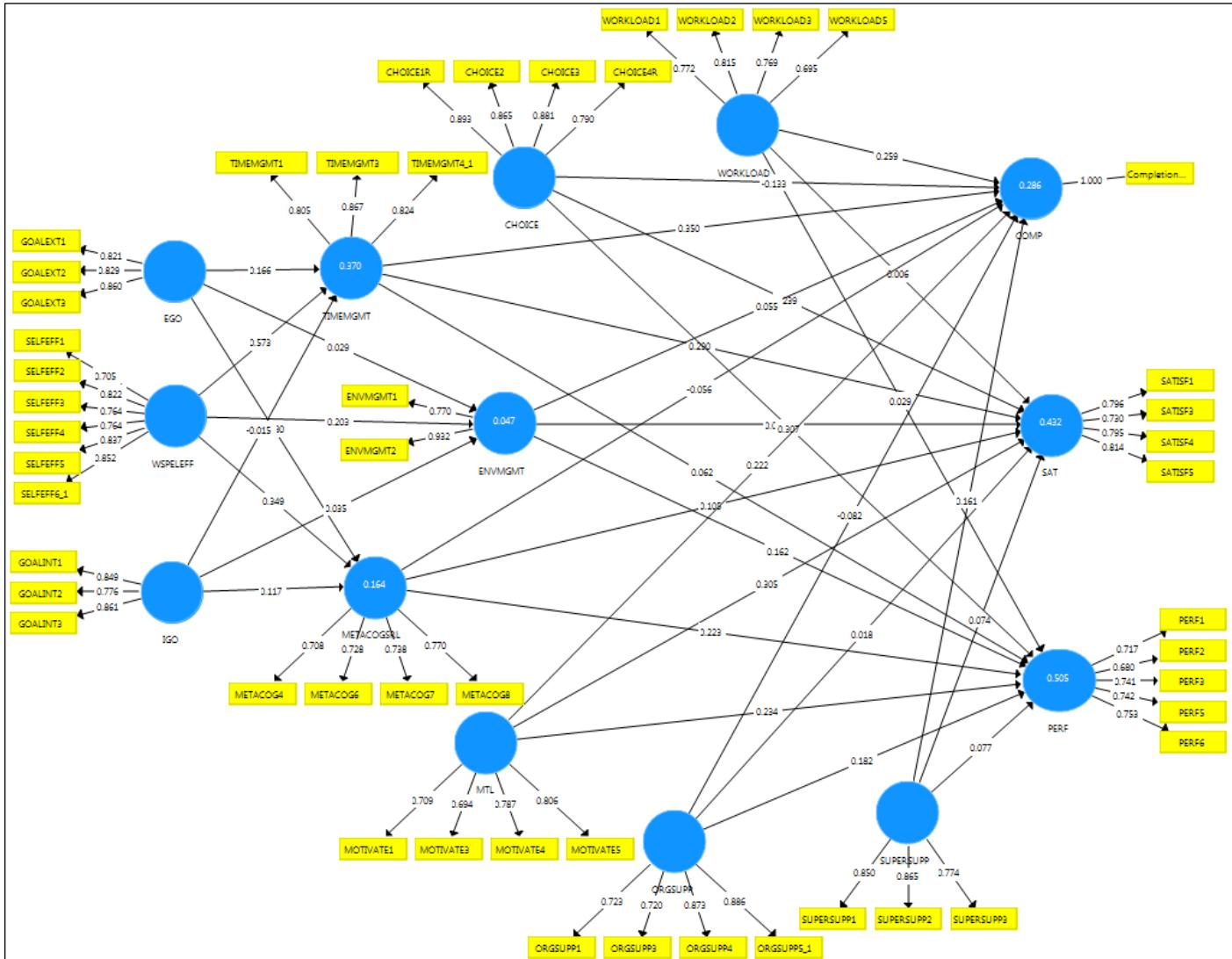


Figure 18: Revised measurement model (main effect model)

**Outer loadings (revised measurement model)**

	CHOICE	COMP	EGO	ENVMGMT	IGO	METACOGSRL	MTL	ORGSUPP	PERF	SAT	SUPERSUPP	TIMEMGMT	WORKLOAD	WSPELEFF
CHOICE1R	0.893													
CHOICE2	0.865													
CHOICE3	0.881													
CHOICE4R	0.790													
Completion_Rat e		1.000												
ENVMGMT1				0.770										
ENVMGMT2				0.932										
GOALEXT1			0.821											
GOALEXT2			0.829											
GOALEXT3			0.860											
GOALINT1				0.849										
GOALINT2					0.776									
GOALINT3					0.861									
METACOG4						0.708								
METACOG6						0.728								
METACOG7						0.738								
METACOG8						0.770								
MOTIVATE1							0.709							
MOTIVATE3								<b>0.694</b>						
MOTIVATE4								0.787						
MOTIVATE5								0.806						
ORGSUPP1								0.723						
ORGSUPP3								0.720						
ORGSUPP4								0.873						
ORGSUPP5_1								0.886						
PERF1									0.717					

PERF2							<b>0.680</b>			
PERF3							0.741			
PERF5							0.742			
PERF6							0.753			
SATISF1							0.796			
SATISF3							0.730			
SATISF4							0.795			
SATISF5							0.814			
SELFEFF1										0.705
SELFEFF2										0.822
SELFEFF3										0.764
SELFEFF4										0.764
SELFEFF5										0.837
SELFEFF6_1										0.852
SUPERSUPP1							0.850			
SUPERSUPP2							0.865			
SUPERSUPP3							0.774			
TIMEMGMT1								0.805		
TIMEMGMT3								0.867		
TIMEMGMT4_1								0.824		
WORKLOAD1									0.772	
WORKLOAD2									0.815	
WORKLOAD3									0.769	
WORKLOAD5									<b>0.695</b>	

Table 37: Outer loadings: revised measurement model (main effect model)

	CHOICE	COMP	EGO	ENVMGMT	IGO	METACOGSRL	MTL	ORGSUPP	PERF	SAT	SUPERSUPP	TIMEMGMT	WORKLOAD	WSPELEFF
CHOICE1R	<b>0.893</b>	-0.051	0.136	-0.004	0.107	0.164	0.203	0.110	0.400	0.385	0.114	0.046	-0.181	0.263
CHOICE2	<b>0.865</b>	-0.089	0.135	-0.004	0.079	0.116	0.050	0.121	0.341	0.237	0.055	0.106	-0.095	0.149
CHOICE3	<b>0.881</b>	-0.093	0.199	0.111	0.180	0.257	0.216	0.262	0.487	0.311	0.106	0.154	-0.103	0.219
CHOICE4R	<b>0.790</b>	-0.198	-0.030	0.109	0.011	0.178	0.072	0.080	0.247	0.244	0.026	-0.007	-0.274	0.146
Completion_Rate	-0.116	<b>1.000</b>	0.069	0.139	-0.077	0.130	0.314	0.044	0.176	0.135	0.139	0.390	0.175	0.286
ENVMGMT1	-0.053	0.105	-0.044	<b>0.770</b>	0.097	0.119	0.213	-0.059	0.153	0.085	-0.071	0.140	0.091	0.166
ENVMGMT2	0.113	0.131	0.094	<b>0.932</b>	0.048	0.363	0.126	0.081	0.341	0.169	0.081	0.141	0.010	0.196
GOALEXT1	0.112	0.030	<b>0.821</b>	-0.051	0.016	0.091	-0.024	0.170	0.141	0.145	0.154	0.144	-0.004	-0.008
GOALEXT2	0.052	0.061	<b>0.829</b>	0.116	-0.051	0.130	-0.004	0.183	0.214	0.090	0.118	0.118	0.093	-0.001
GOALEXT3	0.170	0.073	<b>0.860</b>	0.046	0.157	0.089	0.263	0.078	0.308	0.288	0.129	0.254	-0.163	0.185
GOALINT1	0.109	-0.062	0.212	0.022	<b>0.849</b>	0.200	0.146	0.154	0.292	0.320	0.021	0.137	0.133	0.272
GOALINT2	0.110	-0.089	0.006	0.103	<b>0.776</b>	0.093	0.168	0.068	0.090	0.194	-0.092	0.019	0.130	0.050
GOALINT3	0.085	-0.050	-0.111	0.089	<b>0.861</b>	0.144	0.118	0.084	0.094	0.233	-0.071	0.069	0.150	0.080
METACOG4	0.130	0.060	0.041	0.377	0.205	<b>0.708</b>	0.306	-0.002	0.304	0.287	-0.036	0.210	0.171	0.228
METACOG6	0.156	0.198	0.065	0.083	0.155	<b>0.728</b>	0.033	0.244	0.339	0.225	0.315	0.133	0.042	0.212
METACOG7	0.143	0.041	0.081	0.345	0.139	<b>0.738</b>	0.221	0.203	0.378	0.215	0.296	0.238	-0.130	0.327
METACOG8	0.195	0.091	0.159	0.131	0.069	<b>0.770</b>	0.185	0.153	0.379	0.287	0.269	0.255	0.043	0.334
MOTIVATE1	0.053	0.105	0.071	0.264	0.235	0.333	<b>0.709</b>	0.097	0.318	0.275	0.133	0.244	-0.028	0.414
MOTIVATE3	0.078	0.141	0.060	0.084	0.123	0.050	<b>0.694</b>	0.078	0.169	0.267	-0.048	0.193	-0.019	0.355
MOTIVATE4	0.168	0.349	0.117	0.145	0.088	0.213	<b>0.787</b>	0.218	0.410	0.379	0.225	0.271	-0.146	0.369
MOTIVATE5	0.170	0.268	0.117	0.077	0.105	0.158	<b>0.806</b>	0.092	0.347	0.500	0.066	0.375	-0.020	0.689
ORGSUPP1	0.065	-0.025	0.160	0.036	0.211	0.205	0.162	<b>0.723</b>	0.193	0.206	0.384	0.135	-0.060	0.110
ORGSUPP3	0.086	0.035	0.039	-0.003	0.105	0.044	0.135	<b>0.720</b>	0.347	0.162	0.324	0.166	-0.102	0.094
ORGSUPP4	0.250	0.017	0.157	0.044	0.069	0.224	0.175	<b>0.873</b>	0.301	0.185	0.533	0.102	-0.031	0.140
ORGSUPP5_1	0.153	0.096	0.168	0.039	0.071	0.203	0.089	<b>0.886</b>	0.340	0.164	0.521	0.098	-0.066	0.065
PERF1	0.396	0.197	0.297	0.235	0.189	0.345	0.434	0.311	<b>0.717</b>	0.399	0.279	0.266	-0.026	0.406
PERF2	0.356	-0.022	0.295	0.289	0.290	0.261	0.223	0.240	<b>0.680</b>	0.307	0.193	0.130	-0.124	0.311
PERF3	0.299	0.124	0.080	0.248	0.094	0.388	0.380	0.318	<b>0.741</b>	0.300	0.215	0.194	0.012	0.342
PERF5	0.225	0.106	0.166	0.161	0.062	0.366	0.165	0.201	<b>0.742</b>	0.345	0.206	0.247	-0.050	0.280
PERF6	0.307	0.203	0.178	0.190	0.138	0.367	0.309	0.270	<b>0.753</b>	0.484	0.242	0.276	-0.093	0.370
SATISF1	0.242	0.249	0.140	0.150	0.315	0.165	0.500	0.166	0.408	<b>0.796</b>	0.125	0.459	-0.061	0.631
SATISF3	0.296	-0.013	0.173	0.099	0.197	0.223	0.324	0.212	0.455	<b>0.730</b>	0.209	0.288	-0.104	0.420
SATISF4	0.298	0.070	0.306	0.028	0.215	0.276	0.376	0.196	0.362	<b>0.795</b>	0.219	0.305	-0.106	0.451

SATISF5	0.274	0.086	0.110	0.207	0.245	0.416	0.342	0.125	0.378	<b>0.814</b>	0.221	0.421	-0.131	0.502
SELFEFF1	0.261	0.061	0.064	0.071	0.261	0.214	0.453	0.048	0.355	0.481	0.061	0.312	-0.107	<b>0.705</b>
SELFEFF2	0.189	0.166	0.001	0.172	0.112	0.329	0.548	0.011	0.406	0.604	0.110	0.410	-0.097	<b>0.822</b>
SELFEFF3	0.215	0.233	0.073	0.142	0.101	0.329	0.393	0.222	0.412	0.488	0.242	0.561	-0.122	<b>0.764</b>
SELFEFF4	0.141	0.305	0.081	0.153	0.208	0.223	0.535	0.017	0.334	0.498	0.092	0.381	0.026	<b>0.764</b>
SELFEFF5	0.111	0.276	0.056	0.186	0.147	0.360	0.548	0.033	0.305	0.495	0.079	0.507	-0.100	<b>0.837</b>
SELFEFF6_1	0.220	0.272	0.161	0.247	0.132	0.302	0.526	0.205	0.455	0.521	0.138	0.534	-0.145	<b>0.852</b>
SUPERSUPP1	0.135	0.133	0.126	0.041	-0.065	0.243	0.099	0.589	0.293	0.168	<b>0.850</b>	0.205	-0.221	0.080
SUPERSUPP2	-0.022	0.178	0.049	0.016	-0.108	0.305	0.149	0.386	0.264	0.222	<b>0.865</b>	0.173	-0.145	0.187
SUPERSUPP3	0.139	0.016	0.240	0.015	0.092	0.168	0.112	0.396	0.230	0.220	<b>0.774</b>	0.163	-0.196	0.128
TIMEMGMT1	0.211	0.320	0.289	0.116	0.085	0.258	0.260	0.172	0.245	0.439	0.237	<b>0.805</b>	-0.172	0.431
TIMEMGMT3	0.095	0.325	0.121	0.189	0.126	0.246	0.362	0.100	0.325	0.423	0.141	<b>0.867</b>	-0.165	0.562
TIMEMGMT4_1	-0.089	0.332	0.139	0.087	0.042	0.210	0.310	0.116	0.188	0.317	0.167	<b>0.824</b>	-0.095	0.462
WORKLOAD1	-0.107	0.155	0.023	-0.034	0.232	0.079	0.036	-0.039	-0.022	0.018	-0.253	-0.089	<b>0.772</b>	0.010
WORKLOAD2	-0.211	0.231	-0.065	0.123	0.049	0.044	0.086	-0.084	-0.089	-0.022	-0.165	-0.055	<b>0.815</b>	-0.037
WORKLOAD3	-0.058	0.097	-0.031	0.025	0.158	-0.003	-0.174	0.000	0.030	-0.240	-0.124	-0.240	<b>0.769</b>	-0.172
WORKLOAD5	-0.179	0.004	-0.076	-0.044	0.117	0.009	-0.237	-0.151	-0.172	-0.113	-0.187	-0.153	<b>0.695</b>	-0.161

Table 38: Cross-loadings (revised measurement model)

## Evaluation criteria for the structural model

Criteria	Value range	Definition	References
Collinearity assessment (VIF Value)	VIF value must be less than 5 and a tolerance level below .20	Collinearity issues arises when two indicators are highly correlated with one another	Hair et al. (2016), Ringle et al. (2012)
Coefficient of determination ( $R^2$ value)	Range is 0 to 1 for predictive accuracy .25 is considered weak, .50 is moderate, and .75 is substantial	Represents the amount of explained variance of each endogenous latent variable and assesses the quality of a PLS model	Hair et al. (2016)
Cross-validated redundancy ( $Q^2$ value)	Helps determined predictive relevance .02 is considered a small effect, .15 is medium, and .35 is large	Used to determine if an omitted construct from a model had a significant impact on the endogenous constructs	Hair et al. (2016)
Path coefficient	Size: Range is -1 to 1; closer to 1 is better Significance: t-value is 1.96 and above for a two tailed test at the 5% level	The relationship linking the constructs	Hair et al. (2016)
$f^2$ effect size	.02 is considered a small effect, .15 is medium, and .35 is large	The effect of change in the $R^2$ value when a specific construct is eliminated from the model	Hair et al. (2016)

Table 39: Criteria for the evaluation of the structural model

### Structural model (main effect model)

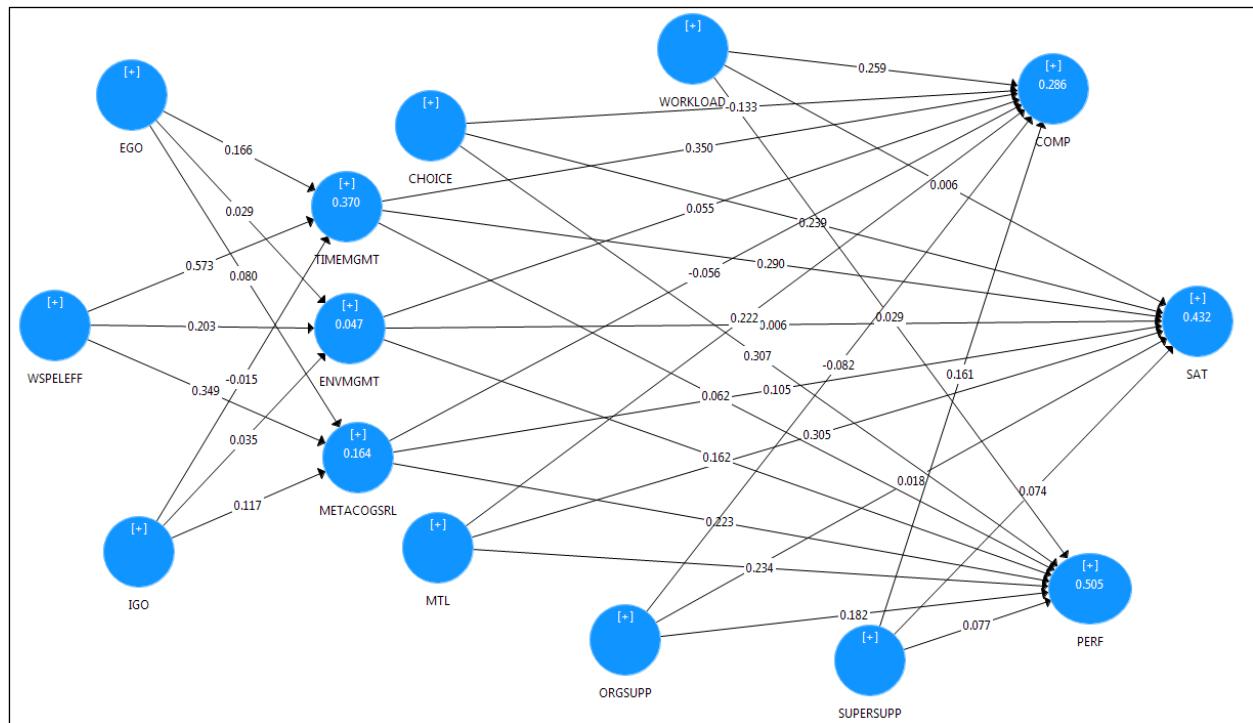


Figure 19: Structural model (main effect model)

### Structural model: main effect model (1a)

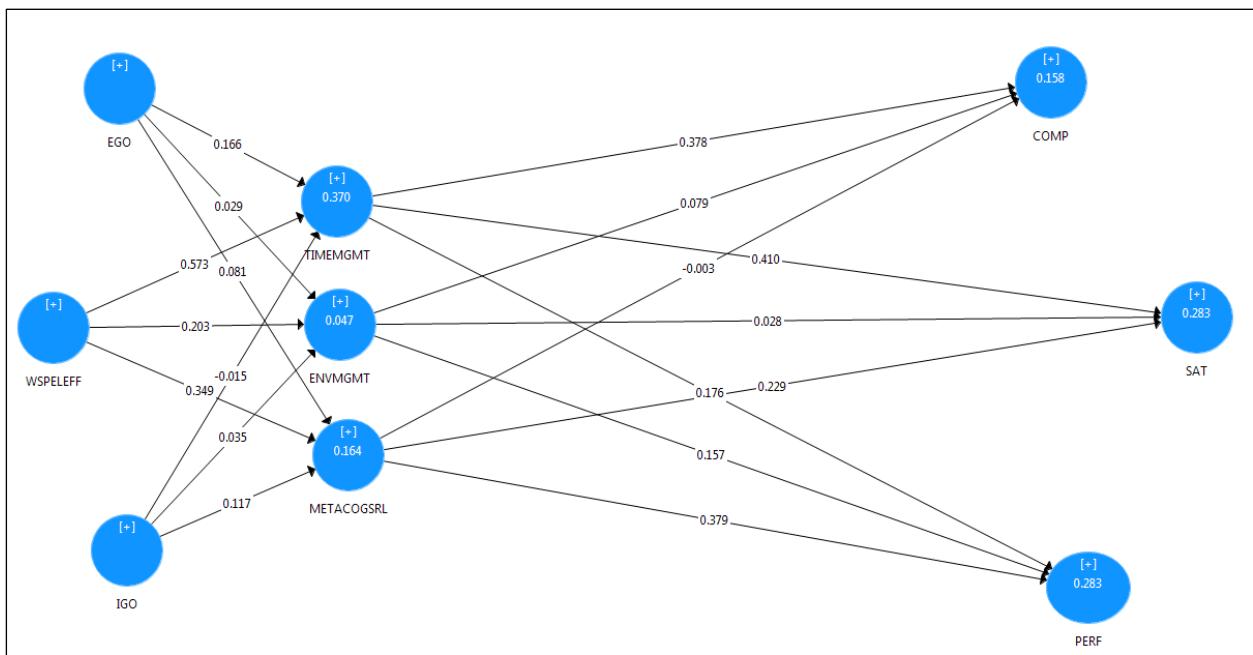


Figure 20: Structural model: main effect sub-model (1a)

Structural model: main effect model 1(b)

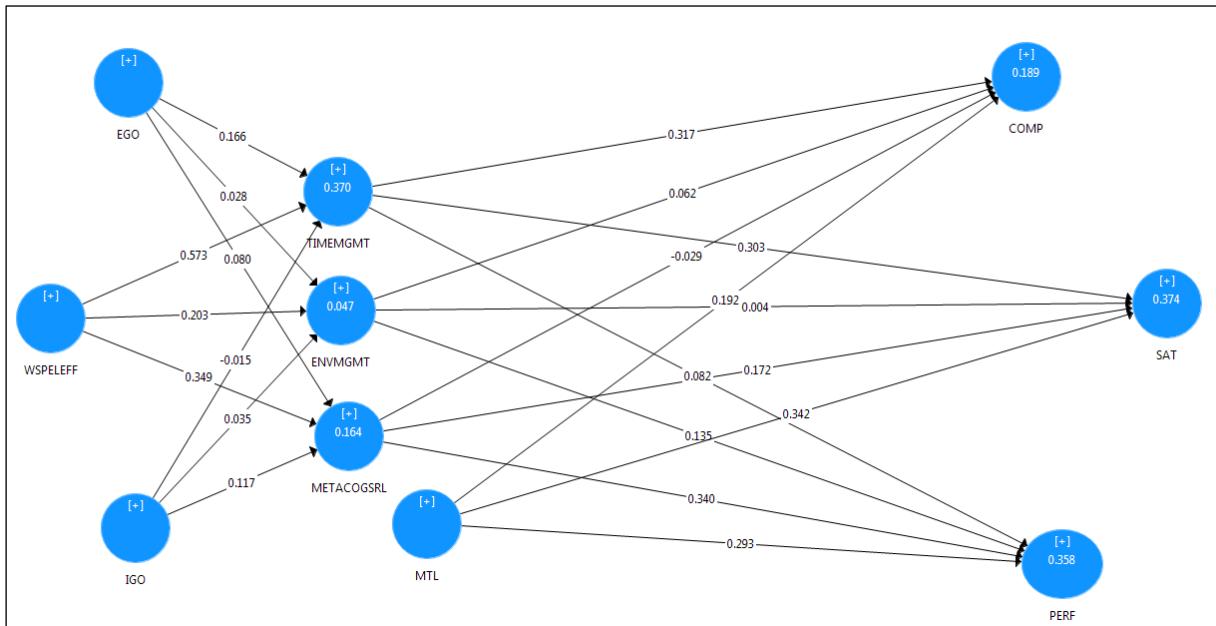


Figure 21: Structural model: main effect sub-model 1(b)

Structural model: main effect model 1(c)

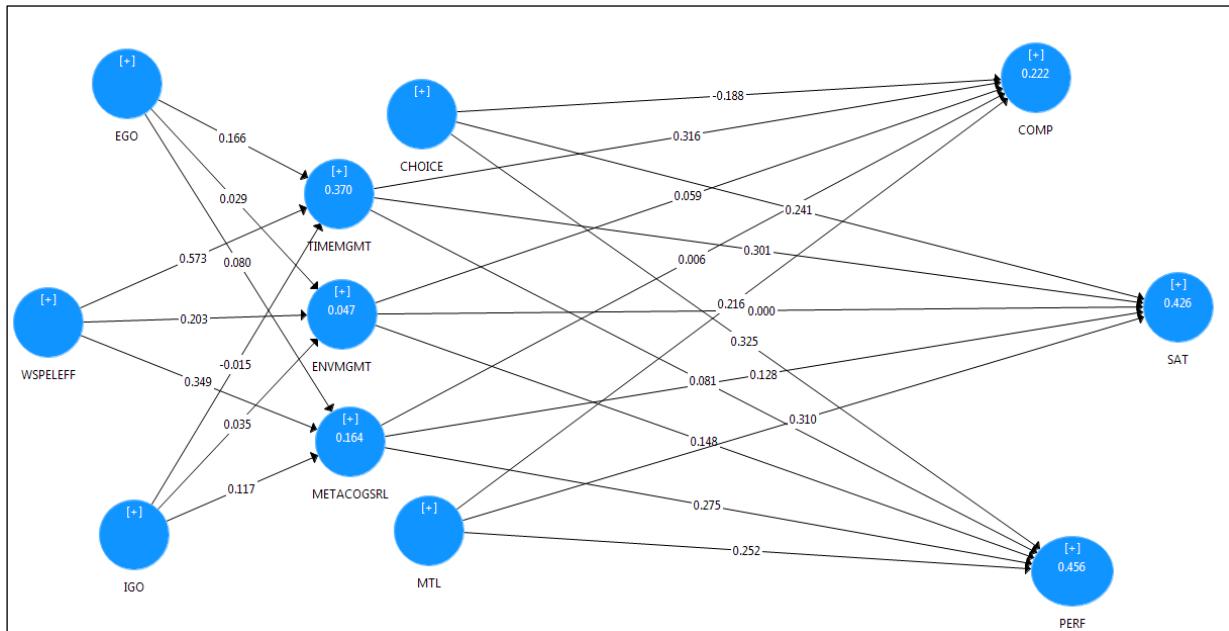


Figure 22: Structural model: main effect sub-model 1(c)

### Structural model: main effect model 1(d)

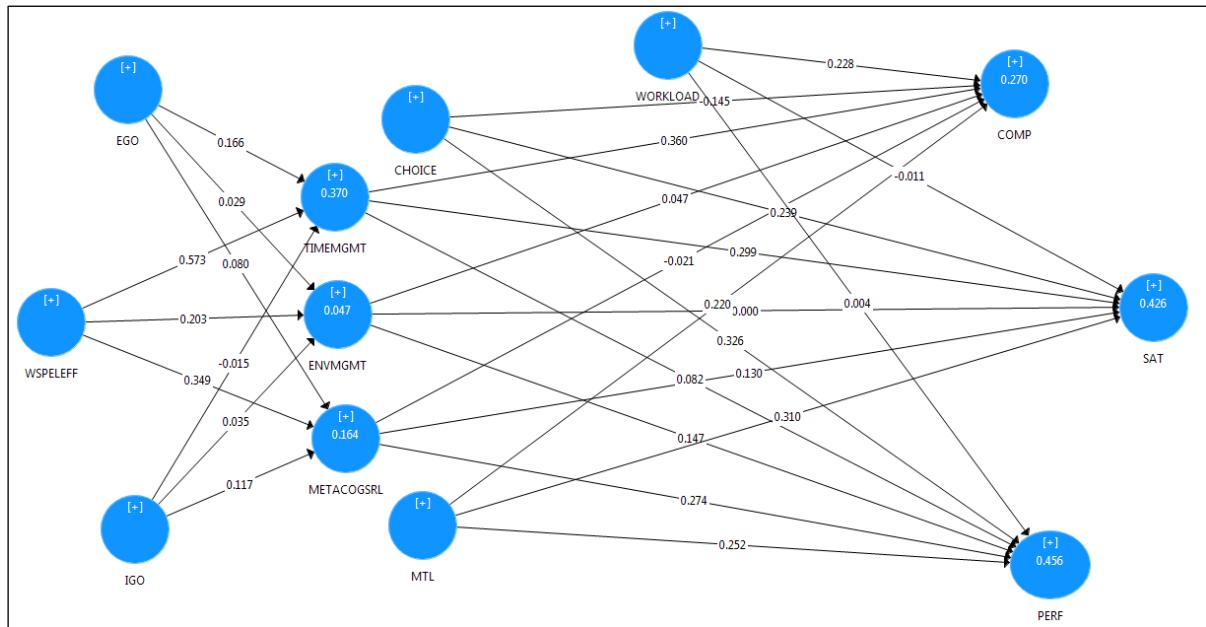


Figure 23: Structural model: main effect sub-model 1(d)

### Structural model: main effect model 1(e)

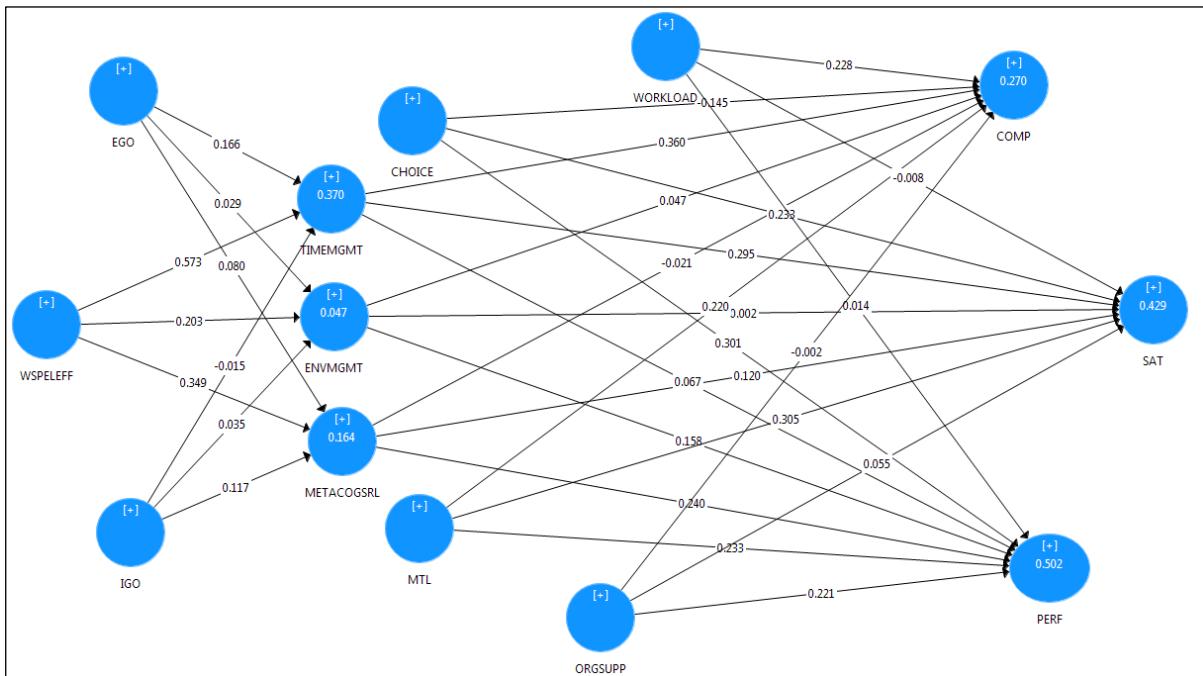


Figure 24: Structural model: main effect sub-model 1(e)

### Structural model: main effect model 1(f)

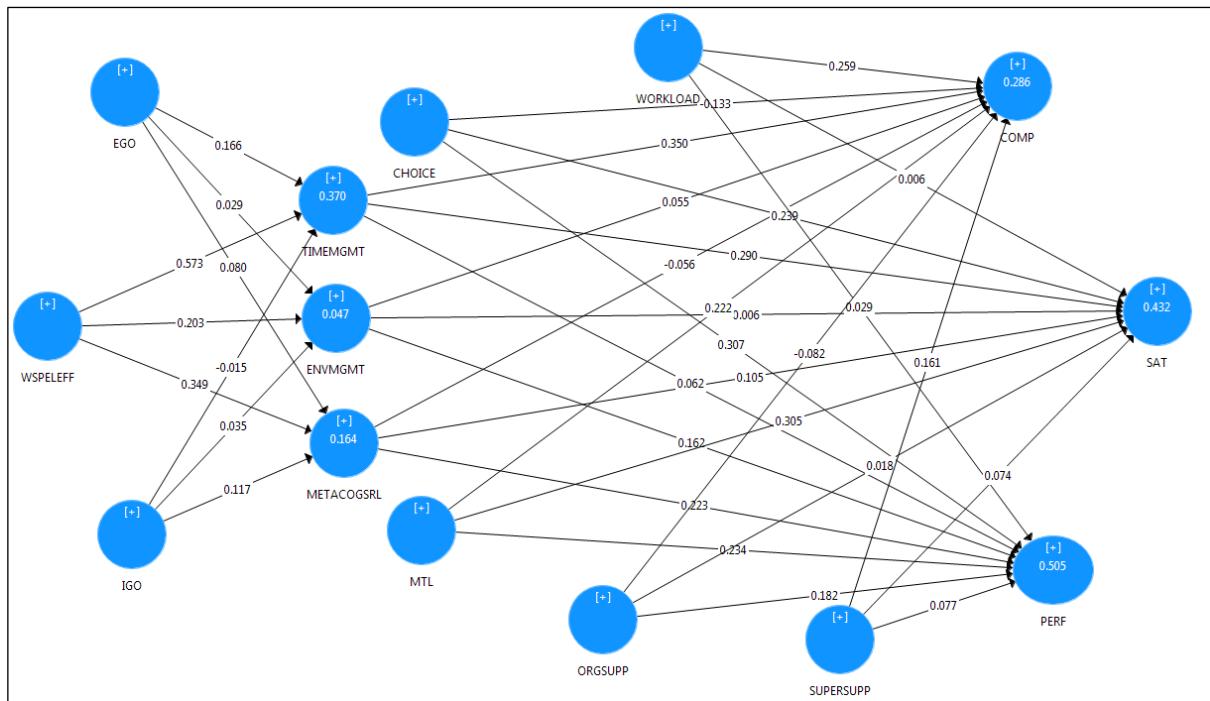


Figure 25: Structural model: main effect sub-model 1(f)

## **Appendix D: Interaction model**

### Measurement model (interaction model)

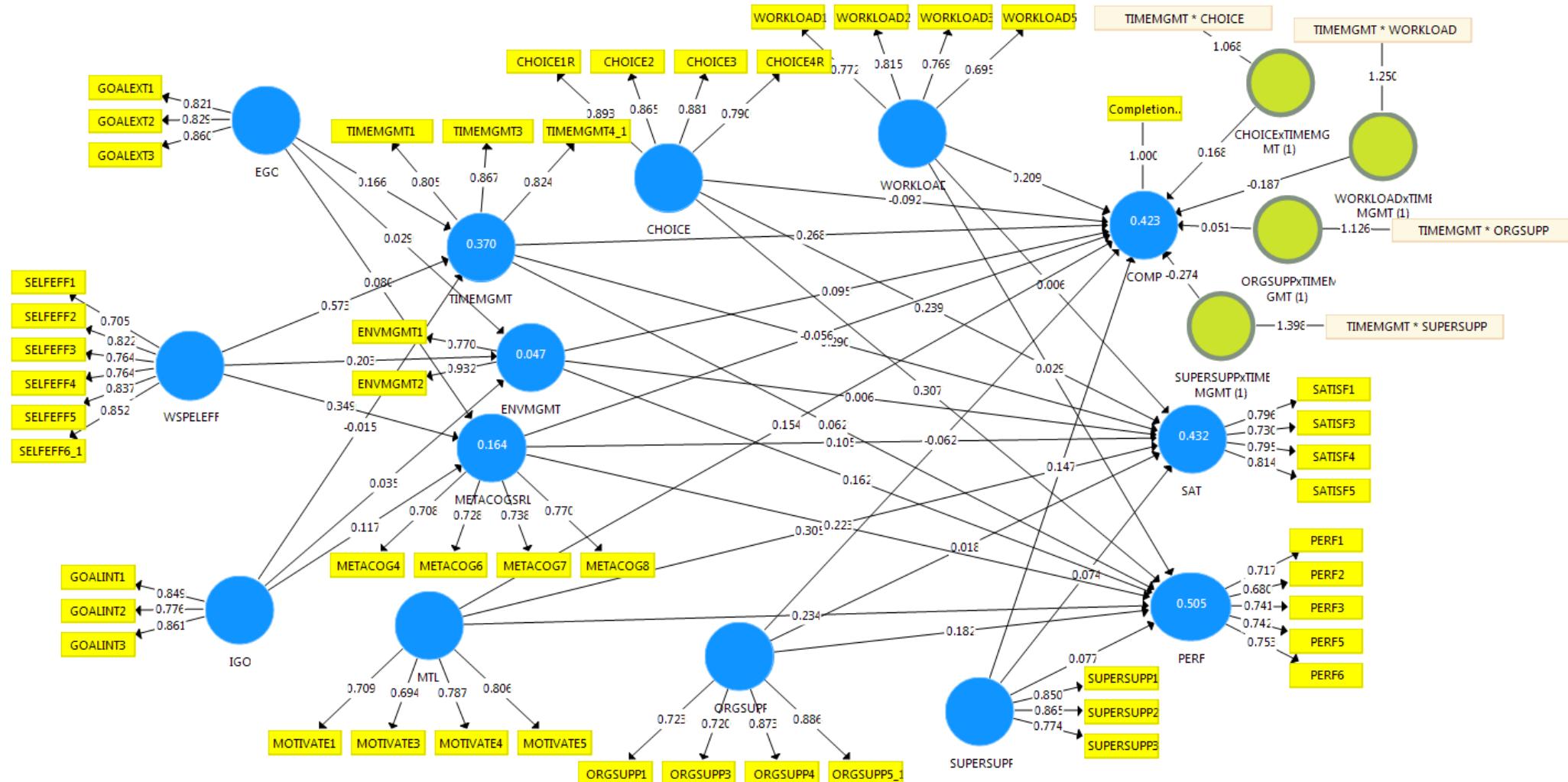


Figure 26: Measurement model (interaction model)

*Outer loadings, composite reliability, and average variance extracted (AVE)*

*(interaction model)*

Constructs	Indicator	Outer Loadings	Composite Reliability	Average Variance Extracted (AVE)
CHOICE	CHOICE1R	0.89	0.920	0.740
	CHOICE2	0.86		
	CHOICE3	0.88		
	CHOICE4R	0.79		
COMP	Completion_Rate	1.00	1.000	1.000
ENVMGMT	ENVMGMT1	0.77	0.840	0.730
	ENVMGMT2	0.93		
EGO	GOALEXT1	0.82	0.880	0.700
	GOALEXT2	0.83		
	GOALEXT3	0.86		
IGO	GOALINT1	0.85	0.870	0.690
	GOALINT2	0.78		
	GOALINT3	0.86		
METACOGSR	METACOG4	0.71	0.830	0.540
	METACOG6	0.73		
	METACOG7	0.74		
	METACOG8	0.77		
MTL	MOTIVATE1	0.71	0.840	0.560
	MOTIVATE3	0.69		
	MOTIVATE4	0.79		
	MOTIVATE5	0.81		
ORGSUPP	ORGSUPP1	0.72	0.880	0.650
	ORGSUPP3	0.72		
	ORGSUPP4	0.87		
	ORGSUPP5_1	0.89		
PERF	PERF1	0.72	0.850	0.530

	PERF2	0.68		
	PERF3	0.74		
	PERF5	0.74		
	PERF6	0.75		
SAT	SATISF1	0.80	0.860	0.620
	SATISF3	0.73		
	SATISF4	0.80		
	SATISF5	0.81		
WSPELEFF	SELFEFF1	0.70	0.910	0.630
	SELFEFF2	0.82		
	SELFEFF3	0.76		
	SELFEFF4	0.76		
	SELFEFF5	0.84		
	SELFEFF6_1	0.85		
SUPERSUPP	SUPERSUPP1	0.85	0.870	0.690
	SUPERSUPP2	0.86		
	SUPERSUPP3	0.77		
TIMEMGMT	TIMEMGMT1	0.81	0.870	0.690
	TIMEMGMT3	0.87		
	TIMEMGMT4_1	0.82		
WORKLOAD	WORKLOAD1	0.77	0.850	0.580
	WORKLOAD2	0.81		
	WORKLOAD3	0.77		
	WORKLOAD5	0.70		
CHOICE × TIMEMGMT (1)	TIMEMGMT × CHOICE	1.07	1.000	1.000
ORGSUPP × TIMEMGMT (1)	TIMEMGMT × ORGSUPP	1.13	1.000	1.000
SUPERSUPP × TIMEMGMT (1)	TIMEMGMT × SUPERSUPP	1.40	1.000	1.000
WORKLOAD × TIMEMGMT (1)	TIMEMGMT × WORKLOAD	1.25	1.000	1.000

Table 40: International consistency reliability and AVE (interaction model)

### Structural model (interaction model)

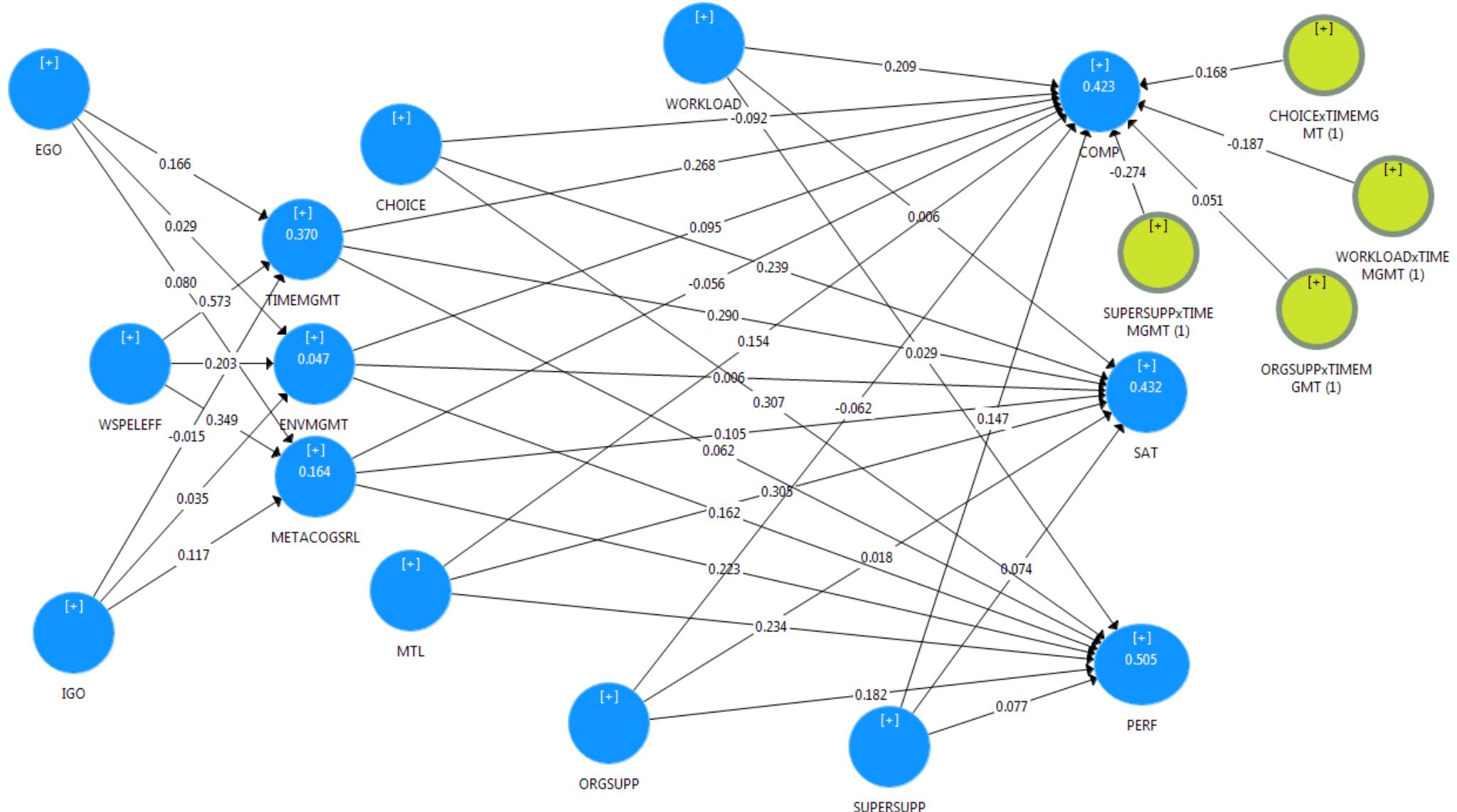


Figure 27: Structural model (interaction model)

**Cross-loadings (interaction model)**

	CHOICE	CHOICE × TIME <sub>1</sub> MGMT <sub>1,1</sub>	COMP	EGO	ENV <sub>1</sub> MGMT <sub>1,1</sub>	IGO	METACOGSRL	MTL	ORGSUPP	ORGSUPP × TIME <sub>1</sub> MGMT <sub>1,1</sub>	PERF	SAT	SUPERSUPP	SUPERSUPP × TIME <sub>1</sub> MGMT <sub>1,1</sub>	TIMEMGMT <sub>1,1</sub>	WORKLOAD	WORKLOAD × TIME <sub>1</sub> MGMT <sub>1,1</sub>	WSPELEFF <sub>1,1</sub>
CHOICE1R	0.89	-0.05	-0.05	0.14	0.00	0.11	0.16	0.20	0.11	-0.02	0.40	0.38	0.11	-0.03	0.05	-0.18	0.14	0.26
CHOICE2	0.86	-0.10	-0.09	0.14	0.00	0.08	0.12	0.05	0.12	-0.04	0.34	0.24	0.05	-0.03	0.11	-0.10	0.11	0.15
CHOICE3	0.88	-0.05	-0.09	0.20	0.11	0.18	0.26	0.22	0.26	-0.10	0.49	0.31	0.11	-0.06	0.15	-0.10	0.12	0.22
CHOICE4R	0.79	-0.07	-0.20	-0.03	0.11	0.01	0.18	0.07	0.08	-0.02	0.25	0.24	0.03	0.03	-0.01	-0.27	0.07	0.15
Completion_Rate	-0.12	0.33	1.00	0.07	0.14	-0.08	0.13	0.31	0.04	-0.13	0.18	0.13	0.14	-0.33	0.39	0.17	-0.10	0.29
ENVMGMT1	-0.05	-0.06	0.10	-0.04	0.77	0.10	0.12	0.21	-0.06	0.07	0.15	0.08	-0.07	0.04	0.14	0.09	-0.05	0.17
ENVMGMT2	0.11	-0.11	0.13	0.09	0.93	0.05	0.36	0.13	0.08	-0.04	0.34	0.17	0.08	0.01	0.14	0.01	-0.05	0.20
GOALEXT1	0.11	-0.01	0.03	0.82	-0.05	0.02	0.09	-0.02	0.17	0.13	0.14	0.14	0.15	-0.10	0.14	0.00	0.18	-0.01
GOALEXT2	0.05	0.06	0.06	0.83	0.12	-0.05	0.13	0.00	0.18	0.11	0.21	0.09	0.12	-0.11	0.12	0.09	0.08	0.00
GOALEXT3	0.17	-0.11	0.07	0.86	0.05	0.16	0.09	0.26	0.08	-0.05	0.31	0.29	0.13	-0.13	0.25	-0.16	0.16	0.19
GOALINT1	0.11	-0.08	-0.06	0.21	0.02	0.85	0.20	0.15	0.15	0.09	0.29	0.32	0.02	0.00	0.14	0.13	0.17	0.27
GOALINT2	0.11	-0.05	-0.09	0.01	0.10	0.78	0.09	0.17	0.07	0.04	0.09	0.19	-0.09	0.13	0.02	0.13	-0.07	0.05
GOALINT3	0.08	-0.08	-0.05	-0.11	0.09	0.86	0.14	0.12	0.08	-0.02	0.09	0.23	-0.07	0.13	0.07	0.15	-0.04	0.08

METACOG4	0.13	0.01	0.06	0.04	0.38	0.21	0.71	0.31	0.00	0.09	0.30	0.29	-0.04	0.06	0.21	0.17	-0.16	0.23
METACOG6	0.16	0.11	0.20	0.07	0.08	0.15	0.73	0.03	0.24	0.03	0.34	0.23	0.32	-0.12	0.13	0.04	0.13	0.21
METACOG7	0.14	-0.03	0.04	0.08	0.35	0.14	0.74	0.22	0.20	-0.08	0.38	0.21	0.30	-0.16	0.24	-0.13	0.23	0.33
METACOG8	0.20	0.08	0.09	0.16	0.13	0.07	0.77	0.19	0.15	-0.01	0.38	0.29	0.27	-0.02	0.25	0.04	0.03	0.33
MOTIVATE1	0.05	0.03	0.11	0.07	0.26	0.23	0.33	0.71	0.10	0.06	0.32	0.27	0.13	0.05	0.24	-0.03	-0.06	0.41
MOTIVATE3	0.08	0.04	0.14	0.06	0.08	0.12	0.05	0.69	0.08	-0.03	0.17	0.27	-0.05	-0.03	0.19	-0.02	0.03	0.35
MOTIVATE4	0.17	0.10	0.35	0.12	0.14	0.09	0.21	0.79	0.22	-0.06	0.41	0.38	0.22	-0.16	0.27	-0.15	-0.19	0.37
MOTIVATE5	0.17	0.06	0.27	0.12	0.08	0.11	0.16	0.81	0.09	-0.14	0.35	0.50	0.07	-0.17	0.37	-0.02	0.02	0.69
ORGSUPP1	0.06	-0.25	-0.03	0.16	0.04	0.21	0.21	0.16	0.72	-0.04	0.19	0.21	0.38	-0.07	0.13	-0.06	0.13	0.11
ORGSUPP3	0.09	0.06	0.03	0.04	0.00	0.11	0.04	0.14	0.72	-0.24	0.35	0.16	0.32	-0.22	0.17	-0.10	0.16	0.09
ORGSUPP4	0.25	-0.01	0.02	0.16	0.04	0.07	0.22	0.18	0.87	-0.12	0.30	0.18	0.53	-0.08	0.10	-0.03	0.11	0.14
ORGSUPP5_1	0.15	-0.05	0.10	0.17	0.04	0.07	0.20	0.09	0.89	-0.06	0.34	0.16	0.52	-0.06	0.10	-0.07	0.08	0.06
PERF1	0.40	-0.02	0.20	0.30	0.23	0.19	0.35	0.43	0.31	-0.06	0.72	0.40	0.28	-0.10	0.27	-0.03	0.07	0.41
PERF2	0.36	-0.15	-0.02	0.29	0.29	0.29	0.26	0.22	0.24	0.02	0.68	0.31	0.19	0.02	0.13	-0.12	0.11	0.31
PERF3	0.30	0.06	0.12	0.08	0.25	0.09	0.39	0.38	0.32	-0.03	0.74	0.30	0.21	-0.10	0.19	0.01	-0.09	0.34
PERF5	0.22	-0.02	0.11	0.17	0.16	0.06	0.37	0.16	0.20	-0.19	0.74	0.34	0.21	-0.17	0.25	-0.05	0.04	0.28
PERF6	0.31	-0.03	0.20	0.18	0.19	0.14	0.37	0.31	0.27	-0.20	0.75	0.48	0.24	-0.18	0.28	-0.09	0.10	0.37
SATISF1	0.24	-0.08	0.25	0.14	0.15	0.31	0.17	0.50	0.17	-0.18	0.41	0.80	0.13	-0.21	0.46	-0.06	0.09	0.63
SATISF3	0.30	-0.21	-0.01	0.17	0.10	0.20	0.22	0.32	0.21	-0.20	0.45	0.73	0.21	-0.11	0.29	-0.10	0.12	0.42
SATISF4	0.30	-0.11	0.07	0.31	0.03	0.22	0.28	0.38	0.20	-0.01	0.36	0.80	0.22	-0.12	0.31	-0.11	0.09	0.45
SATISF5	0.27	-0.16	0.09	0.11	0.21	0.24	0.42	0.34	0.13	-0.07	0.38	0.81	0.22	-0.05	0.42	-0.13	0.06	0.50
SELFEFF1	0.26	-0.06	0.06	0.06	0.07	0.26	0.21	0.45	0.05	-0.11	0.35	0.48	0.06	-0.09	0.31	-0.11	0.24	0.70

SELFEFF2	0.19	-0.12	0.17	0.00	0.17	0.11	0.33	0.55	0.01	-0.01	0.41	0.60	0.11	-0.06	0.41	-0.10	0.10	0.82
SELFEFF3	0.21	-0.04	0.23	0.07	0.14	0.10	0.33	0.39	0.22	-0.17	0.41	0.49	0.24	-0.30	0.56	-0.12	0.21	0.76
SELFEFF4	0.14	-0.07	0.31	0.08	0.15	0.21	0.22	0.53	0.02	-0.21	0.33	0.50	0.09	-0.27	0.38	0.03	0.14	0.76
SELFEFF5	0.11	-0.01	0.28	0.06	0.19	0.15	0.36	0.55	0.03	-0.15	0.31	0.49	0.08	-0.26	0.51	-0.10	0.13	0.84
SELFEFF6_1	0.22	-0.04	0.27	0.16	0.25	0.13	0.30	0.53	0.20	-0.25	0.46	0.52	0.14	-0.37	0.53	-0.15	0.24	0.85
SUPERSUPP1	0.13	-0.08	0.13	0.13	0.04	-0.07	0.24	0.10	0.59	-0.15	0.29	0.17	0.85	-0.13	0.20	-0.22	0.11	0.08
SUPERSUPP2	-0.02	0.00	0.18	0.05	0.02	-0.11	0.31	0.15	0.39	-0.13	0.26	0.22	0.86	-0.22	0.17	-0.15	0.11	0.19
SUPERSUPP3	0.14	-0.03	0.02	0.24	0.01	0.09	0.17	0.11	0.40	-0.16	0.23	0.22	0.77	-0.15	0.16	-0.20	0.28	0.13
TIMEMGMT × CHOICE	-0.07	1.00	0.33	-0.04	-0.11	-0.09	0.06	0.08	-0.06	0.06	-0.04	-0.17	-0.04	-0.13	0.08	0.15	-0.16	-0.07
TIMEMGMT × ORGSUPP	-0.06	0.06	-0.13	0.05	0.00	0.05	0.00	-0.07	-0.15	1.00	-0.12	-0.15	-0.17	0.64	-0.23	0.16	-0.39	-0.19
TIMEMGMT × SUPERSUPP	-0.03	-0.13	-0.33	-0.13	0.02	0.09	-0.08	-0.13	-0.14	0.64	-0.15	-0.16	-0.20	1.00	-0.34	0.17	-0.55	-0.30
TIMEMGMT × WORKLOAD	0.13	-0.16	-0.10	0.17	-0.05	0.06	0.08	-0.08	0.15	-0.39	0.06	0.12	0.19	-0.55	0.18	-0.27	1.00	0.22
TIMEMGMT1	0.21	0.00	0.32	0.29	0.12	0.09	0.26	0.26	0.17	-0.20	0.24	0.44	0.24	-0.24	0.81	-0.17	0.09	0.43
TIMEMGMT3	0.10	0.05	0.32	0.12	0.19	0.13	0.25	0.36	0.10	-0.20	0.33	0.42	0.14	-0.30	0.87	-0.17	0.19	0.56
TIMEMGMT4_1	-0.09	0.15	0.33	0.14	0.09	0.04	0.21	0.31	0.12	-0.18	0.19	0.32	0.17	-0.31	0.82	-0.09	0.18	0.46
WORKLOAD1	-0.11	0.11	0.15	0.02	-0.03	0.23	0.08	0.04	-0.04	0.20	-0.02	0.02	-0.25	0.11	-0.09	0.77	-0.23	0.01
WORKLOAD2	-0.21	0.20	0.23	-0.06	0.12	0.05	0.04	0.09	-0.08	0.10	-0.09	-0.02	-0.16	0.02	-0.06	0.81	-0.28	-0.04
WORKLOAD3	-0.06	0.09	0.10	-0.03	0.03	0.16	0.00	-0.17	0.00	0.14	0.03	-0.24	-0.12	0.20	-0.24	0.77	-0.15	-0.17
WORKLOAD5	-0.18	0.03	0.00	-0.08	-0.04	0.12	0.01	-0.24	-0.15	0.08	-0.17	-0.11	-0.19	0.25	-0.15	0.70	-0.14	-0.16

Table 41: Cross-loadings (interaction model)

Fornell-Larcker criterion (interaction model)

	CHOICE	CHOICE × TIMEMGMT (1)	COMP	EGO	ENVMGMT	IGO	METACOGSRL	MTL	ORGSUPP	ORGSUPP × TIMEMGMT (1)	PERF	SAT	SUPERSUPP	SUPERSUPP × TIMEMGMT (1)	TIMEMGMT	WORKLOAD	WORKLOAD × TIMEMGMT (1)	WSPELEFF
CHOICE	0.86																	
CHOICE × TIMEMGMT (1)	-0.07	1.00																
COMP	-0.12	0.33	1.00															
EGO	0.14	-0.04	0.07	0.84														
ENVMGMT	0.06	-0.11	0.14	0.05	0.85													
IGO	0.12	-0.09	-0.08	0.07	0.08	0.83												
METACOGSRL	0.21	0.06	0.13	0.12	0.31	0.19	0.74											
MTL	0.17	0.08	0.31	0.13	0.18	0.17	0.25	0.75										
ORGSUPP	0.18	-0.06	0.04	0.16	0.03	0.13	0.20	0.17	0.80									
ORGSUPP × TIMEMGMT (1)	-0.06	0.06	-0.13	0.05	0.00	0.05	0.00	-0.07	-0.15	1.00								
PERF	0.44	-0.04	0.18	0.28	0.31	0.22	0.48	0.44	0.38	-0.12	0.73							
SAT	0.35	-0.17	0.13	0.23	0.16	0.31	0.34	0.50	0.22	-0.15	0.51	0.78						
SUPERSUPP	0.09	-0.04	0.14	0.16	0.03	-0.04	0.29	0.15	0.55	-0.17	0.32	0.24	0.83					
SUPERSUPP × TIMEMGMT (1)	-0.03	-0.13	-0.33	-0.13	0.02	0.09	-0.08	-0.13	-0.14	0.64	-0.15	-0.16	-0.20	1.00				

TIMEMGMT	0.09	0.08	0.39	0.22	0.16	0.10	0.29	0.37	0.15	-0.23	0.31	0.48	0.22	-0.34	0.83		
WORKLOAD	-0.18	0.15	0.17	-0.05	0.04	0.16	0.04	-0.08	-0.08	0.16	-0.07	-0.13	-0.22	0.17	-0.18	0.76	
WORKLOAD × TIMEMGMT (1)	0.13	-0.16	-0.10	0.17	-0.05	0.06	0.08	-0.08	0.15	-0.39	0.06	0.12	0.19	-0.55	0.18	-0.27	1.00
WSPELEFF	0.23	-0.07	0.29	0.09	0.21	0.19	0.38	0.63	0.12	-0.19	0.48	0.65	0.16	-0.30	0.59	-0.12	0.22
																	0.79

Table 42: Fornell-Larcker criterion (interaction model)

Heterotrait-monotrait ratio (HTMT) (interaction model)

	CHOICE	CHOICE × TIMEMGMT (1)	COMP	EGO	ENVMGMT	IGO	METACOGSRL	MTL	ORGSUPP	ORGSUPP × TIMEMGMT (1)	PERF	SAT	SUPERSUPP	SUPERSUPP × TIMEMGMT (1)	TIMEMGMT	WORKLOAD	WORKLOAD × TIMEMGMT (1)
CHOICE																	
CHOICE × TIMEMGMT (1)	0.08																
COMP	0.13	0.33															
EGO	0.17	0.08	0.07														
ENVMGMT	0.13	0.12	0.17	0.12													
IGO	0.14	0.09	0.09	0.21	0.13												
METACOGSRL	0.26	0.09	0.16	0.16	0.46	0.25											
MTL	0.20	0.09	0.33	0.16	0.29	0.24	0.38										
ORGSUPP	0.20	0.13	0.06	0.22	0.11	0.17	0.29	0.21									
ORGSUPP × TIMEMGMT (1)	0.06	0.06	0.13	0.13	0.08	0.06	0.08	0.11	0.16								
PERF	0.51	0.09	0.20	0.33	0.40	0.27	0.63	0.52	0.45	0.15							
SAT	0.41	0.20	0.15	0.27	0.25	0.37	0.46	0.60	0.28	0.17	0.65						
SUPERSUPP	0.15	0.05	0.15	0.21	0.12	0.14	0.43	0.21	0.69	0.20	0.40	0.32					
SUPERSUPP × TIMEMGMT (1)	0.05	0.13	0.33	0.15	0.04	0.12	0.14	0.16	0.15	0.64	0.18	0.17	0.23				

TIMEMGMT	0.19	0.09	0.44	0.26	0.22	0.12	0.38	0.47	0.20	0.26	0.39	0.59	0.28	0.39			
WORKLOAD	0.24	0.16	0.18	0.15	0.15	0.23	0.21	0.25	0.14	0.19	0.18	0.20	0.31	0.21	0.23		
WORKLOAD × TIMEMGMT (1)	0.13	0.16	0.10	0.19	0.07	0.13	0.22	0.11	0.17	0.39	0.13	0.13	0.23	0.55	0.21	0.30	
WSPELEFF	0.26	0.08	0.29	0.15	0.27	0.22	0.46	0.75	0.16	0.20	0.56	0.77	0.20	0.30	0.68	0.20	0.24

Table 43: Heterotrait–monotrait ratio (HTMT) (interaction model)

## **Appendix E: Survey instrument**

### **E.1 Invitation email to contacts in organisations**

Dear e-Learner,

With the advancement of technology, e-learning as an important means for lifelong learning is becoming a global trend.

Due to e-learners' general lack of experience in such a learning mode, they often fail to gain the full benefits out of e-Learning programmes.

Designed by the University of Nottingham School of Education, this research hopes to advance the field of workplace e-Learning by identifying good practices through which e-learning can become more effective in the workplace (note 1).

You are cordially invited to contribute to the e-Learning body of knowledge through completing [this online questionnaire](#). This anonymous survey aims to capture your experience learning online as well as to understand the interplay among the various contextual factors behind the learning process in the workplace (Note 2).

The mobile enabled multi-language survey can be accessed by scanning the QR code below using our mobile phone or point your browser to the link <http://sgiz.mobi/s3/e-Learning> (Note 3). You will be shown the survey informed consent page with further instructions (Note 4).

If you have any question, please contact Mr. YK Chau ([ttxykc@nottingham.ac.uk](mailto:ttxykc@nottingham.ac.uk); (852) 6517 0439) or Professor Charles Crook ([Charles.Crook@nottingham.ac.uk](mailto:Charles.Crook@nottingham.ac.uk)) of the University of Nottingham.

Thank you for your support. Your participation will surely bring enormous benefits to the community of workplace e-Learners.

Y K Chau

University of Nottingham School of Education

Email : [txykc@nottingham.ac.uk](mailto:txykc@nottingham.ac.uk)

Phone : (852) 6517 0439

Note 1: This is a part of the workplace e-Learning study being conducted by Mr. YK Chau of the [University of Nottingham School of education](#).

Note 2: This is an anonymous survey and all data collected will be kept strictly confidential. The study is being conducted in accordance with the "[Code of Research Conduct and Research Ethics](#)" of the University of Nottingham.

Note 3: The online questionnaire is hosted on Surveygizmo.com's survey platform for data collection purposes.

Note 4: Select "Yes, I am willing to contribute to the research and share my workplace e-Learning experience" on the informed consent page will indicate your agreement to participate and begin the survey.



QR code (<http://sgiz.mobi/s3/e-Learning>)

Figure 28: Invitation email to contacts in organisations

## E.2 Informed consent

### 1) 有關這項研究 What is this research about?

我們衷心感謝您在百忙之中抽出寶貴時間參與這項關於由僱主提供的自學式網上課程的研究，這項研究旨在找出這種學習模式的成功關鍵因素。您的參與將有助我們增加對工作場所中的網上學習的認識，從而得知哪些做法對網上學習者最有裨益。  
We sincerely thank you for your time and willingness to participate in this research. This research is about finding predictors for success in studying employer provided self-paced e-learning courses. As a result of participating in this research, you will be enhancing the understanding of e-learning in the workplace hence enlighten e-learners on good practices.

這項研究的三大目標是：

找出有助學習者成功完成這些課程的因素

改善學習者修讀這些課程時的學習體驗

找出能支援學習者修讀這些課程的良好做法的例子

This research has three broad aims:

To find the factors that help learners successfully complete these courses

To improve learners experiences in studying these courses

To identify examples of good practice in supporting learners on these courses

### 您的參與 Do you have to take part?

參與這項研究純屬自願性質。您必須明白完成這份問卷是完全自願的，在回答問卷的過程中，您可以隨時選擇退出這項研究。我們會把您在問卷中所作的回應保密並安全地貯存起來，您的回應將有助我們總結所得的結果。我們可能會發布經整理後的研究結果，但別人將無法識別您個人所作的回應，我們也不會與任何第三方共享您的回應，包括您所屬機構的成員。我們致力根據英國諾丁漢大學的科研操守與科研倫理守則 (<http://tinyurl.com/knx5tb>) 進行這項研究。

Your participation is entirely voluntary. It is important to understand that completing this survey is completely voluntary and if you do complete it, you can withdraw your contribution at any time. Your survey responses will be electronically and securely stored and will contribute to summaries of findings that we may publish or circulate. But your own responses will not be identified and will not be shared with any third party, including members of your own organisation. We are committed to carrying out our research according to the University of Nottingham Code of Research Conduct and Research Ethics (<http://tinyurl.com/knx5tb>).\*

請選出最佳的答案或大部分時間都是正確的答案。

Please check the best answer or the answer that is right most of the time when completing this survey.

	是 Yes
我明白這項研究的性質及目的 <i>I understand the nature and purpose of this research</i>	<input type="checkbox"/>
我已獲取足夠有關參與這項研究計畫的資訊讓我能作出適當的決定 <i>I have received enough information to make an informed decision about participating</i>	<input type="checkbox"/>
我明白我可以對這項研究計畫提出問題、批評及建議 <i>I understand that I can raise questions, offer criticisms and make suggestions about the project</i>	<input type="checkbox"/>
我明白同意參與這項研究計畫後，我可以隨時決定退出 <i>I understand that I can decide not to participate in this project at any time after agreeing to</i>	<input type="checkbox"/>

2) 繼續以下的問卷調查，表示您在知情的情況下，同意參與這項研究。作出這決定前，您已考量所提供的資訊，並且明白您可隨時提出問題，以及隨時決定不再參與研究。

By continuing with the survey, you are giving us your informed consent. Your informed consent indicates that you have decided to take part in this project after considering the information provided, and that you know you can raise questions and decide not to participate at any time.

完成這項問卷調查需時約 **15分鐘**。完成問卷調查後，我們將致電部分同意分享更多網上學習經驗的參與者，進行簡短的跟進電話訪談。The survey takes approximately **15 minutes** to complete. A short follow up telephone conversation will be conducted with selected participants who agree to share additional information regarding their own e-learning experience.

如需更多資訊，請聯絡 For more information, contact:

YK Chau (研究員 Researcher), 英國諾丁漢大學教育學院 University of Nottingham School of Education, [ttxykc@nottingham.ac.uk](mailto:ttxykc@nottingham.ac.uk) (852) 6517 0439 或或 Professor Charles Crook (研究導師 Supervisor), [Charles.Crook@nottingham.ac.uk](mailto:Charles.Crook@nottingham.ac.uk) 或或 Dr. Tony Fisher (研究導師 Supervisor), [Tony.Fisher@nottingham.ac.uk](mailto:Tony.Fisher@nottingham.ac.uk). 您也可向科研倫理辦公室提出您的疑問 You can also raise issues with the research ethics office: 教育學院科研倫理協調員 School of Education Research Ethics Coordinator, [educationresearchethics@nottingham.ac.uk](mailto:educationresearchethics@nottingham.ac.uk)

我願意為這項研究作出貢獻，分享我的網上學習體驗。Yes, I am willing to contribute to the research.

我不願意為這項研究作出貢獻。No thanks.

Figure 29: Section of the survey instrument containing the informed consent

### E.3 Invitation to the follow up telephone interview

誠邀閣下進一步分享您對網上學習的想法和意見 Follow up telephone conversation

24) 誠意邀請您參加簡短的電話訪談 Invitation to participate in a short telephone conversation  
感謝您抽空參與本研究計畫。為了令調查結果更加完整，我們誠意邀請您參加一個簡短的電話訪談。通過電話訪談，我們希望能了解更多有關您對網上學習的想法和意見，以及學習時面對的挑戰等。您的參與，不僅能讓其他網上學習者受益於您的寶貴經驗，同時也會增加我們對網上學習的整體認識。  
參與電話訪談是完全自願的，參與後您也可以隨時退出。訪談期間，您可以拒絕回答任何問題。為保障您的私隱，我們將對整個電話訪談中收集到的資料加以保密。研究分析及報告中，訪談資料的所有名字及名稱將以化名取代。無論現在還是將來，所有能辨認您的身份的資訊都不會出現在研究報告中。  
Thank you for your time participating in the research. As a follow up to the survey, we would like to invite you to participate in a short telephone conversation to share your views, thoughts, challenges encountered while studying online. Through participating in the conversation, you will not only allow other e-learners to benefit from your valuable experience but also help to contribute to the e-learning body of knowledge.

Your participation is entirely voluntary. You may withdraw at any time and you may refuse to answer any question for any reason. Steps will be taken to respect your privacy and confidentiality throughout the conversation. A pseudonym will be used to identify you, both in the analysis and in reports. No identifiable information will appear in the research report, now or in the future.\*

我願意通過簡短的電話訪談，分享我對工作場所中網上學習的體驗、想法和意見 Yes, I would be willing to contribute my views and experience in workplace e-Learning through a short telephone conversation

我不願意參加簡短的後續電話訪談 No, thanks

(如需更多資訊，請聯絡: YK Chau 英國諾丁漢大學教育學院, [ttxykc@nottingham.ac.uk](mailto:ttxykc@nottingham.ac.uk) Tel: (852) 6517 0439) For further information, please contact YK Chau, University of Nottingham School of Education, ttxykc@nottingham.ac.uk (852) 6517 0439)

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安排電話訪談的聯絡方式 Contact Information

我們衷心感謝您對這項研究的支持，為了讓我們能跟您聯繫以便安排後續電話訪談，請在下面選擇您喜歡的聯絡方式並填上有關資料。（所提供的資料只會用作安排電話訪談。）  
Thank you for your support. To facilitate arrangement for the short telephone conversation, please leave your preferred contact method below. (Information provided will be used for arrangement of the telephone conversation only.)

25) 姓名： My name:\*

---

26) 聯絡方法（請選擇您喜歡的聯絡方式）： Choice of contact method:\*

電郵地址： \_\_\_\_\_

電話號碼： \_\_\_\_\_

手提電話號碼： \_\_\_\_\_

27) 其他資料 / 意見： Additional information/comment:

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Figure 30: Section of the survey instrument containing invitation to the follow-up telephone interview

## E.4 Survey instrument

### 提升網上學習效益的研究 e-Learning Experience Research

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研究如何能夠幫助提升工作場所中網上學習體驗的問卷調查(需時約 15 分鐘)

Survey to help improving workplace e-Learners' experience learning online (Est. 15 Minutes)

#### 1) 有關這項研究 What is this research about?

我們衷心感謝您在百忙之中抽出寶貴時間參與這項關於由僱主提供的自學式網上課程的研究，這項研究旨在找出這種學習模式的成功關鍵因素。您的參與將有助我們增加對工作場所中的網上學習的認識，從而得知哪些做法對網上學習者最有裨益。

We sincerely thank you for your time and willingness to participate in this research. This research is about finding predictors for success in studying employer provided self-paced e-learning courses. As a result of participating in this research, you will be enhancing the understanding of e-learning in the workplace hence enlighten e-learners on good practices.

這項研究的三大目標是：

找出有助學習者成功完成這些課程的因素

改善學習者修讀這些課程時的學習體驗

找出能支援學習者修讀這些課程的良好做法的例子

This research has three broad aims:

To find the factors that help learners successfully complete these courses

To improve learners experiences in studying these courses

To identify examples of good practice in supporting learners on these courses

#### 您的參與 Do you have to take part?

參與這項研究純屬自願性質。您必須明白完成這份問卷是完全自願的，在回答問卷的過程中，您可以隨時選擇退出這項研究。我們會把您在問卷中所作的回應保密並安全地貯存起來，您的回應將有助我們總結所得的結果。我們可能會發布經整理後的研究結果，但別人將無法識別您個人所作的回應，我們也不會與任何第三方共享您的回應，包括您所屬機構的成員。我們致力根據英國諾丁漢大學的科研操守與科  
研倫理守則 (<http://tinyurl.com/knx5tb>) 進行這項研究。

Your participation is entirely voluntary. It is important to understand that completing this survey is completely voluntary and if you do complete it, you can withdraw your contribution at any time. Your survey responses will be electronically and securely stored and will contribute to summaries of findings that we may publish or circulate. But your own responses will not be identified and will not be shared with any third party, including members of your own organisation. We are committed to carrying out our research according to the University of Nottingham Code of Research Conduct and Research Ethics (<http://tinyurl.com/knx5tb>).\*

請選出最佳的答案或大部分時間都是真確的答案。

Please check the best answer or the answer that is right most of the time when completing this survey.

	是 Yes
我明白這項研究的性質及目的 I understand the nature and purpose of this research	<input type="checkbox"/>
我已獲取足夠有關參與這項研究計畫的資訊讓我能作出適當的決定 I have received enough information to make an informed decision about participating	<input type="checkbox"/>
我明白我可以對這項研究計畫提出問題、批評及建議 I understand that I can raise questions, offer criticisms and make suggestions about the project	<input type="checkbox"/>
我明白同意參與這項研究計畫後，我可以隨時決定退出 I understand that I can decide not to participate in this project at any time after agreeing to	<input type="checkbox"/>

2) 繼續以下的問卷調查，表示您在知情的情況下，同意參與這項研究。作出這決定前，您已考量所提供的資訊，並且明白您可隨時提出問題，以及隨時決定不再參與研究。

**By continuing with the survey, you are giving us your informed consent. Your informed consent indicates that you have decided to take part in this project after considering the information provided, and that you know you can raise questions and decide not to participate at any time.**

完成這項問卷調查需時約 **15分鐘**。完成問卷調查後，我們將致電部分同意分享更多網上學習經驗的參與者，進行簡短的跟進電話訪談。

The survey takes approximately **15 minutes** to complete. A short follow up telephone conversation will be conducted with selected participants who agree to share additional information regarding their own e-learning experience.

如需更多資訊，請聯絡 For more information, contact:

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[Tony.Fisher@nottingham.ac.uk](mailto:Tony.Fisher@nottingham.ac.uk). 您也可向科研倫理辦公室提出您的疑問 You can also raise issues with the research ethics office: 教育學院科研倫理協調員 School of Education Research Ethics Coordinator, [educationresearchethics@nottingham.ac.uk](mailto:educationresearchethics@nottingham.ac.uk)

我願意為這項研究作出貢獻，分享我的網上學習體驗。 Yes, I am willing to contribute to the research.

我不願意為這項研究作出貢獻。 No thanks.

3) 本研究計畫的目標是找出學習由僱主提供的自學式網上課程的成功因素。

The aim of this study is to examine factors contributing to success in employer provided self-paced e-learning courses.

這項調查中的「**自學式網上課程**」所指的是學習者完全通過網上平台自我修習的電子學習項目。這些學習項目具備有系統的課程設計，學習者通過網上平台取得所有學習資源，並且按個人的進度，隨時隨地學習，並通常在一定時間內完成課程。課程內容通常包括指導性的文本，並可能輔以互動圖像、相片、影片、音頻、動畫、模擬程式、角色扮演、小遊戲、測驗及評估等。

“**Self-paced e-learning courses**” in this survey refers to web-based learning programs with a structured curriculum to be delivered completely online. Learners will study these courses solely on their own, at their own pace, anytime, anywhere and usually within a certain time period. The course content will typically consist of instructional text and may be supported by interactive graphics, photo, video, audio, animation, software simulation, role play, mini games, quizzes, assessments, etc.

您過去曾否參加由僱主提供的「**自學式網上課程**」？\*

**Have you participated in employer provided self-paced e-learning course in the past?\***

是，我曾經參加或現正參加由僱主提供的「**自學式網上課程**」 Yes. I have participated or is currently participating in employer provided self-paced e-learning course

否，我從未參加由僱主提供的「**自學式網上課程**」 No, I have never participated in employer provided self-paced e-learning

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請回答下列**所有**問題，並在每一個問題勾選出一個最佳的或大部分時間真確的答案。

Please check the best answer or the answer that is right most of the time for **ALL** the questions below.

**4) 性別 Gender\***

男 Male

女 Female

**5) 年齡組別 Age group\***

<20

21 – 30

31 – 40

41 – 50

50+

**6) 最高教育程度 Highest education level attained\***

小學 Primary

中學 Secondary

大專 Post-secondary

學士 Bachelor

碩士 Master

博士 Doctorate

其他 (請說明) : Something else (*what is it?*): \_\_\_\_\_

7) 總的來說，我修讀由僱主提供的「自學式網上課程」的體驗是 Overall, my experience studying employer provided self-paced e-learning courses have been

非常負面的 Highly Negative

負面的 Negative

中性的 Neutral

正面的 Positive

非常正面的 Highly Positive

8) 在過去 3 年，您合共開展了多少個由僱主提供的「自學式網上課程」的學習？ How many employer provided self-paced e-learning courses have you started in the past 3 years?\*

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9) 在過去 3 年，您合共完成了多少個由僱主提供的「自學式網上課程」？ How many employer provided self-paced e-learning courses have you completed in the past 3 years?\*

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10) 您多常選擇在下列地方學習由僱主提供的「自學式網上課程」？ How often do you choose the following places to study your employer provided "self-paced e-learning course"?\*

	從未 Never	很少 Rarely	常常 Often	大部分時間 Mostly
在家中 At home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
在辦公室中 At work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
在其他地方 (請在下面的備註框中註明) : Other place ( <i>Please specify in the comments box below:</i> )	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

備註： Comments:

11) 如果您曾經未能按計劃完成由僱主提供的「自學式網上課程」，主要原因是甚麼？ If you have not completed any self-paced e-learning course as planned, what are the main reasons for not completing?

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我們期望您能對下列問題中的所有描述語句作出回應，您可能會覺得其中一些較難回答，但也請您選出最接近您的想法的選項。All statements in the following questions expect an answer – sometimes this may be difficult but please tick the button that you feel is closest to your feeling.

12) 下列語句描述有關您對「培訓及發展」的一般想法，請為每一語句選出最能表達您的想法的一項： The following set of statements relate to your beliefs concerning training and development in general. Please rate each statement using the scale indicated.\*

	非常不同意 Strongly Disagree	不同意 Disagree	沒有意見 Neutral	同意 Agree	非常同意 Strongly Agree
我會盡力從培訓課程中學習到最多 I try to learn as much as I can from training programs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
如果培訓課程能幫助我提升我的技能，我願意加倍努力學習 I am willing to exert considerable effort in training programs if they improve my skills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
我相信我能通過修讀培訓課程提升我的技能 I believe I can improve my skills by participating in training programs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
我相信我能吸收大部分培訓課程所提供的材料 I believe I can learn the material presented in most training programs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
由於我已掌握成功完成我的工作所需的知識及技能，修讀培訓課程對我沒有多大用處 Participation in training programs is of little use to me because I have all the knowledge and skill I need to successfully perform my job	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
修讀培訓課程對我來說是不重要的 Taking training courses is not a high priority for me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

13) 下列語句描述有關您對修習「自學式網上課程」的想法，請為每一語句選出最能表達您的想法的一項： The following set of statements relate to your beliefs concerning “self-paced e-learning”. Please rate each statement using the scale indicated\*

	非常不同意 Strongly Disagree	不同意 Disagree	沒有意見 Neutral	同意 Agree	非常同意 Strongly Agree
我有信心我能很好的通過使用電腦進行網上學習	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

I am confident in my ability to use a computer to study self-paced e-learning course	<input type="checkbox"/>				
我有信心我能有效地進行網上學習及管理我的學習進度 I am confident that I can effectively participate and manage my learning in self-paced e-learning courses	<input type="checkbox"/>				
即使有事情讓我分心，我有信心能夠持續我的網上學習 I am confident that I can keep learning when distractions occur while I am studying self-paced e-learning courses	<input type="checkbox"/>				
我有信心我能吸收「自學式網上課程」提供的材料 I am confident that I can learn the material presented in self-paced e-learning courses	<input type="checkbox"/>				
我有信心能按計劃完成「自學式網上課程」 I am confident that I can complete self-paced e-learning course according to plan	<input type="checkbox"/>				
總的來說，我有信心我能很好的通過「自學式網上課程」進行學習 Generally, I am confident that I can do well in self-paced e-Learning courses	<input type="checkbox"/>				

14) 回想您曾修讀的「自學式網上課程」，然後請為以下每一語句選出最能表達您的想法的一項：Thinking about the “self-paced e-learning course(s)” you took in the past, rate each statement using the scale indicated.\*

	非常不同意 Strongly Disagree	不同意 Disagree	沒有意見 Neutral	同意 Agree	非常同意 Strongly Agree
整體而言，我對「自學式網上課程」的體驗是滿意的 All in all, I am satisfied with my experience studying self-paced e-learning course	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
我會再次參加「自學式網上課程」 I plan to take another self-paced e-learning course	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
我會向其他人推薦「自學式網上課程」 I would recommend others to take self-paced e-learning course	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
總體上，完成「自學式網上課程」後，我覺得有成就感 On the whole, I felt a sense of accomplishment after finishing self-paced e-learning course	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

總體上，「自學式網上課程」都能讓我投入學習 On the whole, self-paced e-Learning course kept me engaged until I finished	<input type="checkbox"/>				
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15) 回想您曾修讀的「自學式網上課程」，然後請為以下每一語句選出最能表達您的想法的一項：Thinking about the self-paced e-learning course(s) you took in the past, rate each statement using the scale indicated:\*

	非常不同意 Strongly Disagree	不同意 Disagree	沒有意見 Neutral	同意 Agree	非常同意 Strongly Agree
總的來說，我能夠有規律地騰出時間修習這些網上課程 On the whole, I was able to set aside regular times to study these e-Learning courses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
我常常覺得由於有其他活動的關係，我沒有花足夠時間在這些網上課程上 I often found that I didn't spend enough time studying these e-learning courses because of other activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
總體上，我能夠善用可用的時間修習這些網上課程 On the whole, I made good use of available time to study these e-Learning courses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
總體上，我能夠堅持預定的計劃修習這些網上課程 On the whole, I was able to adhere to my plan when studying these e-learning courses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

16) 下列語句描述有關您對修習「自學式網上課程」的想法，請為每一語句選出最能表達您的想法的一項：The following set of statements relate to your beliefs concerning studying employer provided “self-paced e-learning course”. Please rate each statement using the scale indicated \*

	非常不同意 Strongly Disagree	不同意 Disagree	沒有意見 Neutral	同意 Agree	非常同意 Strongly Agree
對我來說，參加「自學式網上課程」主要是因為它可以幫助我獲取外在回報（例如滿足崗位要求、晉升機會、表現提升及別人的認同等） To me, participating in self-paced e-learning course is helpful to gain external rewards (e.g., compliance, promotion, improved performance, approval from others, etc.).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

對我來說，「自學式網上課程」主要是一種能讓我獲取外在回報（例如滿足崗位要求、晉升機會、表現提升及別人的認同等）的手段  To me, participating in self-paced e-learning course is a means to an end (e.g., approval from others, improved performance, promotion, etc.).	<input type="checkbox"/>				
一般而言，如果參加「自學式網上課程」能令我獲得外在回報（例如滿足崗位要求、晉升機會、表現提升及別人的認同等），我會更加投入  Generally, I would participate more in self-paced e-learning course if it helps me attain external rewards (e.g., approval from others, improved performance, promotion, etc.).	<input type="checkbox"/>				
對我來說，修讀「自學式網上課程」本身的價值比起從中獲得的外在回報（例如滿足崗位要求、晉升機會、表現提升及別人的認同等）更加重要  To me, participating in self-paced e-learning course is valuable in itself beyond any external rewards (e.g., approval from others, improved performance, promotion, etc.).	<input type="checkbox"/>				
對我來說，修讀「自學式網上課程」主要是因為課程本身對我個人來說有價值而非為了獲得外在回報  To me, participating in self-paced e-learning course is valuable for personal reasons as opposed to external rewards.	<input type="checkbox"/>				
一般而言，我主要是為了達到個人目標而修讀「自學式網上課程」，並非為了獲得外在回報  Generally, participating in self-paced e-learning course is valuable for personal goals instead of external rewards.	<input type="checkbox"/>				

17) 回想您最近期修讀的「自學式網上課程」，然後請為以下每一語句選出最能表達您的想法的一項： Thinking about the most recent self-paced e-learning course you took, rate each statement using the scale indicated:\*

	非常不同意 Strongly Disagree	不同意 Disagree	沒有意見 Neutral	同意 Agree	非常同意 Strongly Agree
我盡量找一個固定的、相對能免受騷擾的地方進行網上學習	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

I will try to find a designated place that is relatively free from interruptions to study the course	<input type="checkbox"/>				
我通常在可以讓我集中精神的地方進行網上學習 I usually study where I can concentrate on the course	<input type="checkbox"/>				

18) 回想您最近期修讀的「自學式網上課程」，然後請為以下每一語句選出最能表達您的想法的一項：Thinking about the most recent self-paced e-learning course you took, rate each statement using the scale indicated:\*

	非常不同意 Strongly Disagree	不同意 Disagree	沒有意見 Neutral	同意 Agree	非常同意 Strongly Agree
我覺得修讀這個網上課程不是我的自主選擇 I felt like it was not my own choice to do the course	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
我認為在選擇修讀這個網上課程上，我有一定的選擇自由 I believe I had some choice in selecting the course	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
修讀這個網上課程是我的意願 I did the course because I wanted to	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
修讀這個網上課程是我必須做的 (我沒有選擇的自由) I did the course because I had to (I had no choice)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
我寧願以傳統的面授方式修讀同樣的課程 (而不是「自學式網上課程」) I would prefer to undertake the same course as a traditional face-to-face course (instead of a self-paced e-learning course)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

19) 回想您最近期修讀的「自學式網上課程」，然後請為以下每一語句選出最能表達您的想法的一項：Thinking about the most recent self-paced e-learning course you took, rate each statement using the scale indicated:\*

	非常不同意 Strongly Disagree	不同意 Disagree	沒有意見 Neutral	同意 Agree	非常同意 Strongly Agree
綜合各方面來看，這個網上課程提升了或將提升我的工作表現 All things considered, my job performance has or will improve as a result of the course	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
我認為我從這個網上課程所學到的東西，對我的工作表現已產生或將產生正面的影響	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

I believe what I have learnt from the course has or will have a positive impact on my job performance					
我認為我對這個網上課程所教授的內容有充分理解	<input type="checkbox"/>				
I believe I have a strong grasp on the materials taught in the course	<input type="checkbox"/>				
我認為我已掌握這個網上課程所教授的大部分內容	<input type="checkbox"/>				
I believe I have mastered most of the materials taught in the course	<input type="checkbox"/>				
總的來說，我能回憶起這個網上課程所教授的材料	<input type="checkbox"/>				
Generally I can recall the materials that have been taught in the course	<input type="checkbox"/>				
總的來說，我能記住我從這個網上課程所學到的東西	<input type="checkbox"/>				
Generally I remember what I have learnt from the course	<input type="checkbox"/>				

20) 回想您最近期修讀的「自學式網上課程」，然後請為以下每一語句選出最能表達您的想法的一項：Thinking about the most recent self-paced e-learning course you took, rate each statement using the scale indicated:\*

	非常不同意 Strongly Disagree	不同意 Disagree	沒有意見 Neutral	同意 Agree	非常同意 Strongly Agree
進行網上學習時，我經常因為思考其他事情而錯過內容的重點  While studying online, I often miss important points because I'm thinking of other things	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
進行網上學習時，我嘗試用不同的方法幫助自己集中精神學習  While studying online, I will find ways to help focus my learning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
當我對這個網上課程的一些內容感到不明白時，我會再次閱讀，嘗試把它揣摩出來  When I become confused about something in the course, I go back and try to figure it out	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
我在修讀這個網上課程的過程中作自我檢視，以確定我明白課程的內容  I will check to make sure I understand the material I have been studying in self-paced e-learning course	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

儘管我按計劃進行網上學習，我還是沒法掌握課程的內容 I often find that I have been studying the course but don't know what it was all about	<input type="checkbox"/>				
進行網上學習時，我不僅僅只閱讀課程的內容，還嘗試事先思考將學習的課題以促進學習成效 I try to think through a topic and decide what I am supposed to learn from it rather than just reading it over when studying for the course	<input type="checkbox"/>				
在修讀這個網上課程的過程中，我嘗試主動找出哪些我不太明白的概念 When studying for the course I try to determine which concepts I don't understand well	<input type="checkbox"/>				
在修讀這個網上課程的過程中，我為自己訂下學習目標，以引導及幫助我的學習 When I study for the course, I set goals for myself in order to direct my activities in each study period	<input type="checkbox"/>				

21) 下列語句描述有關您工作的機構，請為每一語句選出最能表達您的想法的一項：Thinking about the organisation you are working in, rate each statement using the scale indicated:\*

	非常不同意 Strongly Disagree	不同意 Disagree	沒有意見 Neutral	同意 Agree	非常同意 Strongly Agree
機構有一套績效評估系統，能運用新學到的知識及技能的員工會獲到獎勵 There is a performance appraisal system that ties rewards to use of newly acquired knowledge and skills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
機構為員工提供優良的培訓計畫 This organisation offers excellent training programs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
機構為員工提供所需的資源，讓員工能學習和運用新的知識及技能 Employees are provided with resources necessary to acquire and use new knowledge and skills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
機構會為學習及運用與工作有關的新知識及技能的員工提供獎賞和鼓勵 There are rewards and incentives for acquiring and using new knowledge and skills in one's job	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

機構會獎勵員工在工作中應用新學到的知識及技能 This organisation rewards employees for using newly acquired knowledge and skills on the job	<input type="checkbox"/>				
網上學習已經成為這個機構學習文化的一部分 e-Learning is part of the culture in this organisation	<input type="checkbox"/>				

22) 下列語句描述有關您工作的機構，請為每一語句選出最能表達您的想法的一項： Thinking about the organisation you are working in,

rate each statement using the scale indicated:\*

	非常不同意 Strongly Disagree	不同意 Disagree	沒有意見 Neutral	同意 Agree	非常同意 Strongly Agree
上司會讚賞並表彰那些能在工作中使用新學到的知識及技能的員工 Supervisors give recognition and credit to those who apply new knowledge and skills to their work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
上司會針對員工的個人及專業發展需要提供適切的培訓機會 Supervisors match associates' needs for personal and professional development with opportunities to attend training	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
上司鼓勵獨立及創新的思維 Independent and innovative thinking are encouraged by supervisors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
公司的管理層期望員工任何時候都有良好的工作表現 Top management expects high levels of performance at all times	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
公司管理層期望員工持續地擁有卓越的技能及競爭力 Top management expects continuing technical excellence and competence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

23) 下列語句描述有關您工作的機構，請為每一語句選出最能表達您的想法的一項： Thinking about the organisation you are working in,

rate each statement using the scale indicated:\*

	非常不同意 Strongly Disagree	不同意 Disagree	沒有意見 Neutral	同意 Agree	非常同意 Strongly Agree
我經常需要以非常快的速度工作 Your job require you to work very fast most of the time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

我經常需要非常努力地工作 Your job require you to work very hard most of the time	<input type="checkbox"/>				
我經常只有很少時間把事情做好 Your job leave you with little time to get things done most of the time	<input type="checkbox"/>				
我經常有大量的工作要做 There is a great deal to be done most of the time	<input type="checkbox"/>				
我的工作量經常超出我所能應付的 You have to do more work than you can do well most of the time	<input type="checkbox"/>				

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誠邀閣下進一步分享您對網上學習的想法和意見 Follow up telephone conversation

#### 24) 誠意邀請您參加簡短的電話訪談 Invitation to participate in a short telephone conversation

感謝您抽空參與本研究計畫。為了令調查結果更加完整，我們誠意邀請您參加一個簡短的電話訪談。通過電話訪談，我們希望能了解更多有關您對網上學習的想法和意見，以及學習時面對的挑戰等。您的參與，不僅能讓其他網上學習者受益於您的寶貴經驗，同時也會增加我們對網上學習的整體認識。

參與電話訪談是完全自願的，參與後您也可以隨時退出。訪談期間，您可以拒絕回答任何問題。為保障您的私隱，我們將對整個電話訪談中收集到的資料加以保密。研究分析及報告中，訪談資料的所有名字及名稱將以化名取代。無論現在還是將來，所有能辨認您的身份的資訊都不會出現在研究報告中。

Thank you for your time participating in the research. As a follow up to the survey, we would like to invite you to participate in a short telephone conversation to share your views, thoughts, challenges encountered while studying online. Through participating in the conversation, you will not only allow other e-learners to benefit from your valuable experience but also help to contribute to the e-learning body of knowledge.

Your participation is entirely voluntary. You may withdraw at any time and you may refuse to answer any question for any reason. Steps will be taken to respect your privacy and confidentiality throughout the conversation. A pseudonym will be used to identify you, both in the analysis and in reports. No identifiable information will appear in the research report, now or in the future.\*

我願意通過簡短的電話訪談， 分享我對工作場所中網上學習的體驗、想法和意見 Yes, I would be willing to contribute my views and experience in workplace e-Learning through a short telephone conversation

我不願意參加簡短的後續電話訪談 No, thanks

(如需更多資訊，請聯絡: YK Chau 英國諾丁漢大學教育學院, [ttxykc@nottingham.ac.uk](mailto:ttxykc@nottingham.ac.uk) Tel: (852) 6517 0439) For further information, please contact YK Chau, University of Nottingham School of Education, [ttxykc@nottingham.ac.uk](mailto:ttxykc@nottingham.ac.uk) (852) 6517 0439)

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安排電話訪談的聯絡方式 Contact Information

我們衷心感謝您對這項研究的支持，為了讓我們能跟您聯繫以便安排後續電話訪談，請在下面選擇您喜歡的聯絡方式並填上有關資料。  
(所提供的資料只會用作安排電話訪談。)

Thank you for your support. To facilitate arrangement for the short telephone conversation, please leave your preferred contact method below.  
(Information provided will be used for arrangement of the telephone conversation only.)

25) 姓名 : My name:\*

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26) 聯絡方法 (請選擇您喜歡的聯絡方式) : Choice of contact method:\*

電郵地址 : \_\_\_\_\_

電話號碼 : \_\_\_\_\_

手提電話號碼 : \_\_\_\_\_

27) 其他資料 / 意見 : Additional information/comment:

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謝謝 ! Thank You!

感謝您參與這個調查，您的反饋對我們非常重要。

Thank you for taking our survey. Your response is very important to us.

## E.5 Research ethics approval

2014/32/MO

**School of Education – Research Ethics Approval Form**

Name: Yat Kwong Chau  
Main Supervisor: Charles Crook  
Course of Study: EdD  
Title of Research Project: Adult learners' experience in work-related e-Learning Programmes  
Is this a resubmission? Yes Date statement of research ethics received by PGR Office: 22/01/15

Research Ethics Coordinator Comments:

Thank you for addressing the points about data storage and demographic data.

I approve the research for this application providing the following conditions are met:

1. The online and word versions of the information sheet and consent form both need to include names and contact details of the student, supervisors and research ethics office.
2. Additionally the online and word versions need to refer to the University of Nottingham Code of Research Conduct and Research Ethics as this governs the research and is particular important as you will be conducting your research overseas. BERA does not account for this.

I consider this research to be above minimum risk

*Final responsibility for ethical conduct of your research rests with you and your supervisor. The Codes of Practice setting out these responsibilities have been published by the British Educational Research Association (BERA) and the University Research Ethics Committee. <http://www.educationsstudentintranet/researchethics/index.aspx> <http://www.bera.ac.uk/publications/Ethical%20Guidelines>. If you have any concerns during the conduct of your research then you should consult those Codes of Practice and refer again to the School of Education's Research Ethics Committee.*

*Independently of the Ethics Committee procedures, supervisors also have responsibilities for the risk assessment of projects as detailed in the safety pages of the University web site. Ethics Committee approval does not alter, replace, or remove those responsibilities, nor does it certify that they have been met.*

Outcome:  
Approved  Revise and Resubmit

Signed: **Mary Oliver** Name: Dr Mary Oliver  
(Research Ethics Coordinator) Date: 23/01/2015

Figure 31: Research ethics approval

## **Appendix F: Definition of key terms**

### **Self-paced e-learning courses**

Self-paced e-learning courses in the current study refer to web-based learning programmes with a structured curriculum to be delivered completely online. Learners will study workplace self-paced e-learning courses solely on their own, at their own pace, anytime, anywhere and usually within a certain time period. The course content will typically consist of instructional text and may be supported by interactive graphics, photo, video, audio, animation, software simulation, role play, mini games, quizzes, assessments, and so forth.

### **Workplace self-paced e-learning (WSPEL) courses**

Workplace self-paced e-learning courses are self-paced e-learning courses provided by employers.

### **Workplace self-paced e-learning (WSPEL)**

The learning experiences or process enabled by WSPEL courses.

### **Completion rate (COMP)**

The ratio of the number of workplace self-paced e-learning courses that a learner has completed in the last 3 years to the number of workplace self-paced e-learning courses that the learner has attempted during the same period.

### **Learner satisfaction (SAT)**

The degree of enjoyment and gratification that a learner experience through participation in workplace self-paced e-learning.

### **Perceived performance (PERF)**

The learner's mastery and retention of content taught in workplace self-paced e-learning courses and job performance as a result of participation in workplace self-paced e-learning.

### **Motivation to learn (MTL)**

A specific desire of the learner to learn the content in workplace learning courses.

### **Intrinsic goal orientation (IGO)**

The extent to which a learner participates in workplace self-paced e-learning so as to meet a personal challenge, satisfy personal curiosity, and/or attain personal mastery over the elements of the task.

### **Extrinsic goal orientation (EGO)**

The extent to which a learner participates in workplace self-paced e-learning for the reason that it is a means to an end such as job performance, rewards, or promotion.

### **Workplace self-paced e-learning self-efficacy (WSPELEFF)**

A learner's belief about his or her effectiveness in workplace self-paced e-learning. Workplace self-paced e-learning self-efficacy (WSPEL), a new construct of specific self-efficacy, is defined as an individual's expectation that he or she is capable of learning and succeeding in workplace self-paced e-learning. Students feel they can learn effectively utilising self-paced online courseware (Artino & McCoach, 2008).

### **Metacognitive self-regulation (METACOGSRL)**

A learner's use of metacognitive strategies such as planning, monitoring, and regulating while participating in workplace self-paced e-learning.

### **Time management (TIMEMGMT)**

The ability of a learner to manage his or her time for workplace self-paced e-learning through scheduling, planning, and ensuring effective use of the learning time. This term refers to the act of consciously thinking about, planning, monitoring, and evaluating one's use of personal time.

### **Environment management (ENVMGMT)**

Selecting environments in which the learner has control over possible distractions while participating in workplace self-paced e-learning.

### **Perceived choice (CHOICE)**

The extent to which a learner perceives that he or she has flexibility in making decisions, including opportunities to choose among different options in workplace self-paced e-learning.

### **Workload (WORKLOAD)**

The extent to which an individual must work at a rapid pace or work very hard to complete a high volume of work.

### **Supervisor support (SUPERSUPP)**

The extent to which an individual perceives that his or her supervisors reinforce and support the use of learning on the job.

### **Organisational support (ORGSUPP)**

The extent to which an individual perceives that his or her employing organisation values the usefulness and benefits of learning and the reinforcement of the use of the learning on the job.

