

PROMOTING APPRENTICES' PROFESSIONAL DEVELOPMENT:

**Integrating formal and informal learning, HRM and
learning goal orientation in promoting apprentices'
competencies**

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Abstract

Whilst apprenticeships are gaining momentum in the UK with extensive resources directed to the programme, knowledge on the factors contributing to apprentices' professional development in the workplace is still limited. This research addresses this gap by introducing an organizational perspective that integrates the formal learning, informal learning and HRM literatures. In doing so, this study advances a holistic approach to apprenticeships.

Turning the focus to the work environment as enabler of apprentices' competence development, this study seeks to achieve two main objectives. Firstly, to develop and empirically test an apprenticeship development model that relates formal and informal learning factors to apprentices' competencies. Secondly, to investigate whether important boundary conditions such as the HRM system at contextual level and learning goal orientation at individual level influence apprentices' professional development.

To this end, the research presents a cross-sectional and a longitudinal study complemented by qualitative data on a sample of 233 apprentices operating in the engineering sector in England. The results evidence the factors that organisations can leverage to promote apprentices' development by means of formal and informal learning. Concerning the former, transfer design and supervisor support are critical for enabling apprentices to transfer the knowledge acquired at college and university to the workplace improving performance. Regarding the latter, challenging experiences in supportive environments, providing regular feedback, adequate task autonomy and task interdependence contribute to the development of critical competencies.

Additionally, identifying the high-commitment HR system as the strategy for managing the employment relationship with apprentices, the study provides novel insight into the influence of HRM in apprenticeship. In finding performance appraisal to moderate the relationship between critical informal learning factors and performance, the study underscores the importance of appraisal satisfaction in fostering engagement with informal learning and elucidates how appropriate HR practices can promote successful apprenticeships. Furthermore, the study evidences how apprentices with stronger learning orientations achieve higher levels of competence, explaining why individuals engage differently with the learning opportunities provided in the immediate work environment. Practical implications are discussed drawing attention to the role of line managers for securing effective apprenticeships.

List of outputs arising from this thesis

1. Pirrioni, S., Shipton, H. and Wu, N. 2016. 'On-the-job learning,' in A. Wilkinson & S. Johnstone (eds), *The Encyclopedia of Human Resource Management*, Edward Elgar Publishing Ltd, Cheltenham.
2. Shipton, H., Pirrioni, S. and Wu, N., 2016. Developing talent through apprenticeships. HR Review, 19th September 2016. Available at <http://www.hrreview.co.uk/hr-news/strategy-news/helen-shipton-developing-talent-apprenticeships/101114>
3. Pirrioni, S, Shipton, H and Wu, N. 2018. Developing emergent professionals' work role performance: the combined influence of the work environment and performance appraisal. Accepted as peer-reviewed paper presentation at the HRIC conference 2019, Human Resource Division of the Academy of Management.

Full copies of these publications are presented in Appendix 3.

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List of Acronyms

ASCL	-	Apprenticeship, Skills, Children and Learning Act
ATA	-	Apprenticeship Training Agencies
BIS	-	Department for Business, Innovation and Skills
CIPD	-	Chartered Institute for Personnel and Development
DCSM	-	Job Demand, Control, Support Model
DV	-	Dependent Variable
EFA	-	Exploratory Factor Analysis
EOR	-	Employee Organisational Relationship
ERR	-	Employee Rights and Responsibilities
FE	-	Further Education
GLH	-	Guided Learning Hours
HPWP	-	High Performance Work Practices
HPWS	-	High Performance Work System
HRM	-	Human Resource Management
ICT	-	Information and Communication Technology
IV	-	Independent Variable
LGO	-	Learning Goal Orientation
LTSI	-	Learning Transfer System Inventory
NAS	-	National Apprenticeship Service
NVQ	-	National Vocational Qualification
NTO	-	National Training Organisation
OCB	-	Organisational Citizenship Behaviour
PA	-	Performance Appraisal

PCA	-	Principal Component Analysis
PLA	-	Programme-Led Apprenticeship
PLTS	-	Personal Learning and Thinking Skills
POS	-	Perceived Organisational Support
RQF	-	Regulated Qualifications Framework
SASE	-	Specification of Apprenticeship Standards in England
SFA	-	Skill Funding Agency
SD	-	Standard Deviation
SME	-	Small-Medium Enterprise
TP	-	Training Providers
VET	-	Vocational Education and Training
YTS	-	Youth Training Schemes

Chapter 1:

Introduction and overview of apprenticeship in England

1.1 Introduction

Apprenticeship is an institution dating back to medieval times that has evolved over the centuries adapting to social, economic and political forces, maintaining its core features as a model of learning in employment. In England, apprenticeships are experiencing a revival and have been placed at the core of the Government's Vocational Education and Training (VET) policies so to contribute to the future skill needs in a rapidly evolving economy (Lee, 2012; Rowe, Moss, Moore and Perrin, 2017; Saraswat, 2016).

It is in this context of revitalisation that this research takes place, considering how in light of a host of related public and private investments, apprenticeships can provide optimal benefits to those participating in the programme. At a time of reform, the quality of apprenticeships has been placed under the spotlight and the relationship between the apprentice and the employer has risen to the fore (Department for Business, Innovation and Skills, 2015). These are the themes central to this research, around which an empirical model for apprentices' professional development is advanced. Turning the spotlight onto the work environment, this research seeks to understand how apprentices' competence development can be supported *in the workplace*. This is a critical consideration given that knowledge on the factors enhancing apprentices' competence development is still limited (Gambin and Hogarth, 2015).

Considering apprenticeships as model of learning rather than instrument of Government policy (Lewis, 2014), this study seeks to achieve two main objectives. Firstly, to develop and empirically test an apprenticeship development model that relates training intervention and work environment factors to apprentices' resultant competencies. Secondly, to investigate whether important boundary conditions such as the Human Resource Management system (HRM) at contextual level, and learning goal orientation at individual level, influence apprentices' professional development. In so doing, the research introduces an organisational perspective to the study of apprenticeship providing novel insights into the phenomenon.

Before introducing the theoretical framework of the study, this chapter starts with a brief historical analysis of how the institution of apprenticeship has evolved in England over the last decades. A historical overview is warranted to set the scene for the most recent policy developments, highlighting how apprenticeships have evolved over time as a result of the tensions between its use as a model of learning, as a vehicle for employers' needs, and as an instrument of State policy (Fuller and Unwin, 2009). In light of the prominent role assigned to employers in apprenticeship, the chapter reviews the introduction of the Modern Apprenticeship scheme and the most recent policy reform, highlighting the centrality of the relationship between the employer and the apprentice with implications for the effectiveness of the programme.

After briefly presenting a picture of apprentices' participation rates and evaluating the benefits and motivations leading both apprentices and employers to participate in the programme, the chapter introduces the organisational perspective to the study of apprenticeship. In so doing, the chapter introduces the research question guiding the project and the framework of the study. Ultimately, the main contributions of the study and the organisation of the thesis are outlined.

1.2 Historical review

Apprenticeship is once again at the heart of policy reform in England, and it is therefore important to understand how this model of learning has evolved over time as an institutional and social practice. As argued by Fuller and Unwin (2009), whilst maintaining its principle feature of model of learning, distinct vested interests have transformed the institution of apprenticeship with implications for its quality as a method of skill formation, personal development and employer needs. A historical overview of apprenticeship therefore requires a deliberation of how apprenticeships have been transformed over time to respond to social, economic and political forces, overlooking its underlying principles.

A brief consideration of the evolution of apprenticeship since the medieval period and the industrial revolution is here necessitated to review how apprenticeships have undergone processes of regulation and deregulation with consequences for the quality of the programme. With apprenticeship originating in the Middle Ages, Snell (1996) presents three phases spanning apprenticeship temporal dimensions, with 'guild apprenticeships' up until 1563; 'statutory apprenticeship' between 1563 and 1814; and 'voluntary apprenticeship'

from 1814 onwards. The first phase saw apprenticeship as an integral part of the guild system, whilst the second phase saw apprenticeship as being increasingly regulated by the State, and the latter as an arrangement between employers and unions.

Since the 12th century apprentices were bounded to a master for the purpose of learning a trade and were characterised by ‘time serving’, learning a craft observing a skilled master and participating in production (Rikowski, 1999). The 1563 Statute of Artificers established that written indentures had to be drawn, laying the rights and duties of apprentices, parents or guardians and employers. It also forbade anyone from exercising a trade without completing a 7 years apprenticeship, indicating the Government recognition of apprenticeship as a social practice and its intent to regulate it (Rikowski, 1999). As argued by Fuller and Unwin (2009), the Statute of Artificers is important in representing the Government engagement in apprenticeship until its repeal in 1814, the year marking the start of an unregulated approach to VET which among other factors contributed to apprenticeship decline. The practice of indentures was indeed abandoned at a time of industrialisation and urbanisation, coinciding with an increase in low skilled occupations requiring no training and formation via apprenticeship, and with the introduction of compulsory education (Rikowski, 1999).

While apprenticeship subsequently went through a revival during the 1950s and 1960s with public and private corporations employing apprentices in large numbers, the lack of State regulation along with conflicting industrial relations and increased public investments in general education, hindered its consistency as a sustainable model of learning (Fuller and Unwin, 2009). The economic crisis of the 1970s and the collapse of traditional industries saw apprentices’ number in stark decline and youth unemployment on the rise (Allen and Ainley, 2014).

As reported by Fuller and Unwin, the Government responded to the social crisis with the introduction of youth training schemes (YTS), described as ‘essentially a cheaper version of apprenticeship’ (2009, pp. 409). The scholars note how YTS were government-funded work experience programmes, lasting between 1 and 2 years and leading to level 2 National Vocational Qualifications (NVQs); additionally, in line with the traditionally unregulated approach to training, YTS maintained a voluntarist approach for employers. But the most important observation, is that the introduction of YTS in the UK marked the transition from an employer-led to a State- and training provider-led apprenticeship system, with the State

becoming the real employer and with employers adopting a passive role as training providers dealt with training and assessment (Fuller and Unwin, 2009).

The introduction of YTS in the 1970s and 1980s is presented by the scholars as training programmes that would in the long run degrade the quality of apprenticeship as in ‘(1) separating the recruitment of young people from long-term business needs; (2) divesting employers of the responsibility for training; and (3) diluting the concept of apprenticeship to mean little more than work experience.’ (Fuller and Unwin, 2009: 411). These considerations are central to the most recent policy developments (i.e. Richard Review, 2012) which, as described later, have addressed the shortcomings of apprenticeship as a model of learning in employment, and present the background into which Modern Apprenticeship was introduced.

1.2.1 Modern Apprenticeship

Modern Apprenticeship was introduced by the Conservative Government in 1994 as an attempt to revive apprenticeship following its stark reduction since the economic recession and manufacturing decline of the 1960s, and since YTS absorbed much of its provision over 1970s and 1980s (Fuller and Unwin, 2007). The launch of the Modern Apprenticeship programme represents the renewed interest by the Government in apprenticeship as an institution and as an instrument of social policy, fitting an agenda of economic-growth, skill development and controlled youth unemployment (Fuller and Unwin, 2009).

Modern Apprenticeship was available to 16-25 year olds as a programme of training leading to level 3 NVQ qualifications. In 2000 level 2 YTS were rebranded as foundation apprenticeships in England, Wales and Northern Ireland, and since 2004 both Level 2 (foundation) and Level 3 (advanced) apprenticeship were branded as ‘Apprenticeship’ (Fuller and Unwin, 2007). As reported by Gospel and Fuller (1998), Modern Apprenticeship included traditional and new elements. As in traditional apprenticeships, the programme was a model of learning in employment including training both on- and off-the-job. In line with the tradition of indentures, the apprenticeship was regulated by agreements between the apprentice and the employer, with the former working for a reduced wage in exchange of training in an occupation. However, whilst traditionally the costs of training were shared between the apprentice and the employer, Modern Apprenticeship relied on public funds introducing the State as a third stakeholder.

A major implication of Modern Apprenticeship is the substitution of ‘time-serving’ with the introduction of competency-based NVQs and core skills specified in industry frameworks as proof of the apprenticeship successful completion (Gospel and Fuller, 1998). With various apprenticeship levels, completion of a level 2 apprenticeship is normally associated with a semi-skilled worker, with most occupation requiring a level 3 apprenticeship to be classified as skilled, and Higher Apprenticeships at level 4 and above introduced in 2006 (Oultram, 2012). Additionally, Modern Apprenticeship has been made available in a vast range of new sectors such as retailing, health and social care, providing access to large numbers of female apprentices, whilst traditional apprenticeships in manufacturing, construction and engineering attracted mainly males (Fuller and Unwin, 2003a).

Modern Apprenticeship saw increased State intervention, with the Government appointing National Training Organisations (NTOs) to design Modern Apprenticeship frameworks for each sector, requiring apprentices to have employed-status and train to a minimum level 3 NVQ and key skill units (Fuller and Unwin, 2003a). However, as noted by Fuller and Unwin (2003a), despite the attempt to regulate apprenticeship ensuring rigour and consistency, the lack of legislation in the UK resulted in hundreds of apprenticeship frameworks characterised by differences in level and duration of training, qualifications attained and pay.

Only fifteen years after the introduction of Modern Apprenticeship the Government enacted legislation in the Apprenticeship, Skills, Children and Learning Act (ASCL) of 2009, the first statute to set the apprenticeship minimum requirements since the repeal of the Statute of Artificers in 1814. The ASCL also established the National Apprenticeship Service (NAS), the dedicated government agency in England monitoring apprenticeship standards, and the Skill Funding Agency (SFA) overseen by the Department for Business Innovation and Skills (DBIS), responsible for apprenticeship funding.

In 2011 the Specification of Apprenticeship Standards in England (SASE) set the statutory requirements that apprenticeship frameworks must follow, and compliance with the SASE is a statutory requirement of the ASCL Act. The document identifies the minimum number of Regulated Qualifications Framework (RQF) credits required for each apprenticeship level, including competence and technical knowledge elements; a list of ‘Functional Skills’ requirements including English, Math and Information and Communications Technology (ICT); Employee Rights and Responsibilities (ERR) outcomes; a list of Personal Learning and Thinking Skills (PLTS); and the minimum number of Guided Learning Hours (GLH),

set at a minimum of 280, of which at least 100 or 30% (whichever is the greater) delivered off-the-job.

Although the SASE has been set to ensure that every apprenticeship provides competence in an occupation, underpinned by theoretical knowledge and transferable skills, scholars have found great variation among frameworks sets at the same level, questionable educational rigour and limited progression to higher education (Fuller and Unwin, 2011). Despite the introduction of legislation regulating the programme, apprenticeships in England present stark dissimilarities ranging from highly selective apprenticeships providing individuals with access to well-remunerated careers as in the engineering sector, to shorter programmes as in retailing with limited training and prospects for academic or professional progression.

It is therefore apparent that the regulatory focus underpinning Modern Apprenticeship is grounded in an agenda of social inclusion and economic growth, and that the apprenticeship's historical foundations hinder the rigorousness of the programme and undermine the role played by employers. The next section discusses how the restoration of Modern Apprenticeship has contributed to diluting the centrality of the relationship between the apprentice and the employing organisation, with implications for the quality of contemporary apprenticeships.

1.2.2 The role of employers in Modern Apprenticeship

The review of Modern Apprenticeship has highlighted how the State has engaged with apprenticeship since the early 1990s regulating apprenticeship standards and funding. Apprenticeship has increasingly been used as an instrument of government policy, with the aim of raising the country's level of skills and controlling youth unemployment (Fuller and Unwin, 2009). Increased state intervention has changed the dynamics of Apprenticeship as a method of skill formation traditionally led by employers. As reported by Fuller and Unwin (2003a, pp. 9):

‘Apprenticeships of the past were *demand* rather than *supply-led*. Employers decided when and if they needed apprentices. Today, the agencies of government orchestrate apprenticeship recruitment, supported by local networks of training providers.’

The use of apprenticeship as an instrument of state policy has therefore distanced the relationship between the apprentice and the employer, with training providers taking a leading role in Modern Apprenticeship. As reported by Fuller and Unwin (2007), a very small proportion of employers is in charge of their apprenticeship training contracting directly with state agencies to gain funding, whilst the large majority of employers contracts

with training providers (TP) acting as intermediaries. This has led to a situation where apprentices are employed and receive a wage from their employer, but the training is conducted and administered by the TP.

As defined by Laurie (2013), TP are external organisations encompassing FE, Sixth Form and special colleges, schools or Private Training Providers, but also some large employers, receiving public funds from the SFA to provide training. With vocational education and training becoming increasingly ‘marketised’ (Fuller and Unwin, 2009), the role of employers in apprenticeship has been progressively marginalised as these have come to act as customers to the TP (Oultram, 2012). The latter playing an intermediary role between the Government, employers and apprentices, deal with the educational and administrative aspects of the programme, and act as major point of contact for the apprentice. Additionally, TP play an important role in persuading employers to hire apprentices, even when the organisation does not present a real business need, promising to deal with apprentices’ recruitment, selection and training (Fuller and Unwin, 2003a). As observed by Laurie (2013), the development of markets in the delivery of VET has led to the ‘commodification’ of apprenticeship, with organisations such as TP profiting from the delivery of apprenticeship training via government funding.

Among the factors contributing to distancing the relationship between the apprentice and the employer are ‘Apprenticeship Training Agencies’ (ATA) acting as recruitment and employment agencies for apprentices. As reported by Allen and Ainley (2014), ATAs play a ‘middleman’ role, employing apprentices and hiring them out to host employers. Under this arrangement, if the host employer is unable to retain the apprentice for the full term of the apprenticeship, the agency as the main employer provides the apprentice with an alternative host employer in order to complete the programme (Allen and Ainley, 2014). Whilst under this arrangement, employment remains key to the apprenticeship, the relationship between the apprentice and the host employer is undermined by the prominent role of the agency.

These examples reflect the commodification of apprenticeship which, as observed by Laurie (2013) enables organisations such as ATAs and TP to profit from its trade, contributing to:

‘distancing apprenticeship from the best practices of learning embedded within companies, the ‘expansive apprenticeship’ (Fuller and Unwin, 2003b, 2008), as apprenticeship is seen as a way to tap into additional financial resources’ (Laurie, 2013, pp. 46).

The commodification of apprenticeship has therefore changed the role played by employers breaking with the tradition of apprenticeship as an investment in the organisation future talent, and has resulted in TP opening the door to apprentices in organisations that lack the infrastructure required to support their learning journey. As argued by Fuller and Unwin (2007, 2009) only those organisations which regard apprenticeship as central to their business strategy have put in place the structures to form, support and nurture apprentices. The State's striving to increase apprentices' participation rates, regardless of employers demand for intermediate skills, has proven problematic given the weak relationship between apprenticeship and occupation, especially in sectors such as business, retail and health care which lack a tradition of apprenticeship (Fuller and Unwin, 2003a).

As discussed by Fuller and Unwin (2003a), the UK multi-sector and social inclusion approach to apprenticeship has contributed to distancing the relationship between the apprentice and the employer, reinforcing the role of third parties such as TP, with implications for the apprenticeship as a model of learning. Whilst the most recent Government policies (i.e. Richard Review, 2012) have focused on addressing employers' engagement aiming to increase businesses' participation rates, the role and contribution of employers to apprenticeship has also featured highly. The next section considers the current apprenticeship reform, evaluating how this new wave of State intervention addresses the shortcomings outlined above attempting to revive the role of employers in what has traditionally been an employer-led programme.

1.3 Apprenticeship reform

The Richard Review (2012), commissioned by the Department for Business Innovation and Skills, drives the current English apprenticeship reform set to redefine the apprenticeship system. The reform tackles the inadequacy of qualifications in proving apprentices' competencies and stresses the need to deliver job competence along with transferable skills responding to a dynamic economy. More crucially, the reform aims to address the relationship between employers and apprentices, as stated in the Richard Review (2012, pp.4):

‘whereas historically, an apprenticeship was at its very heart a relationship between an employer and an apprentice, too often that is not the case today – apprenticeships instead becoming a government-led training programme, shaped by training professionals not employers. The relationship between an employer and an apprentice must once again rise to the fore.’

This statement reflects the issues previously discussed in relation to the commodification of apprenticeship (Laurie, 2013) and the leading role of TP as apprenticeship has increasingly become an instrument of government policy (Fuller and Unwin, 2009). The restructuring of the apprenticeship system is the overriding aim of the reform whereby employers lead and drive apprenticeships and training providers act as suppliers of training. An additional and interrelated phenomenon addressed by Doug Richard is the improper application of the apprenticeship model to forms of training that are either mere work experience to support entry into employment, or forms of on-the-job training where an employee is apprenticed for accrediting existing skills or undergoing training. At the centre of the reform is thus the redefinition of apprenticeship as in:

‘An Apprenticeship is a job that requires substantial and sustained training, leading to the achievement of an Apprenticeship standard and the development of transferable skills.’

This definition is underpinned by four principles:

- an Apprenticeship is **a job, in a skilled occupation**
- an Apprenticeship requires **substantial and sustained training**, lasting a minimum of 12 months and including off-the-job training
- an Apprenticeship leads to **full competency** in an occupation, demonstrated by the achievement of an **Apprenticeship standard** that is **defined by employers** and
- an Apprenticeship develops **transferable skills**, including English and maths, to progress careers.’ (BIS, 2013, pp. 9).

Key to the reform is the focus of apprenticeships on employer needs, guaranteed by placing employers in charge of defining apprenticeship standards. Employer groups called trailblazers are developing apprenticeship standards that indicate the knowledge, skills and behaviours required to undertake a particular occupation and operate confidently in a sector (Department for Business, Innovation and Skills, 2015). Apprenticeship standards are expected to progressively replace the existing apprenticeship frameworks from 2017-18 onwards. Additionally, degree apprenticeships leading to attainment of a Bachelor’s or Master’s Degree have been gradually introduced since 2015 as an alternative to the traditional academic courses (Saraswat, 2016). Furthermore, the funding of apprenticeships has changed with the introduction of the apprenticeship levy in April 2017. The levy represents a new business tax for large public and private employers, amounting to around

2% of businesses in the UK. The levy is payable on annual pay bills of more than £3 million and by 2019/20 funds raised with the levy along with government public funds are expected to double the level of spending on apprenticeship in 2010/11 (House of Commons Library, March 2016). In routing government funding via employers the reform aims to raise the quality of training, giving employers purchasing power over the content and quality of training delivered by training providers.

Overall the reform aims to increase the quality of apprenticeships as model of learning in employment, and is expected to reduce semi-skilled (level 2) apprenticeships and generate more programmes at level 3 and above leading to high skill jobs (Fuller and Unwin, 2012). With participation rates rising, the reform aims to secure greater employer ownership and high quality training to ensure apprenticeships contribute to the highly skilled workforce required for competitiveness (BIS, 2015).

1.4 Apprenticeship profile in England

Having presented the institutional context of apprenticeships in England, an overview of the apprenticeship profile and an evaluation of the motives leading apprentices and employers to engage in the programme follows.

1.4.1 Apprenticeship starts

Over 3.4 million apprenticeship starts between the academic years 2010/11 and 2016 /17 and 1.5 million apprenticeship completions between 2010/11 and 2015 /16 (House of Commons Library, January 2018) confirm the popularity of apprenticeships in England. Figures presented in a parliament's briefing paper in November 2016 (House of Commons Library, November 2016), indicate that in 2015/16 there was an increase of 9,500 apprenticeship starts in comparison to the previous year, with a total of 509,400 apprenticeship starts.

As indicated in Table 1.1, apprenticeship starts increased starkly between the years 2009/10 and 2010/11 amounting to a 63% increase following considerable Government investments in the programme. With the only exception of the academic year 2013/14 which saw around 440, 000 starts, apprenticeship starts levelled to approximately 500, 000 per year up to 2015/16. Most recent figures reveal that in the academic year 2016/17 there were 491,300 apprenticeship starts, representing a reduction of 18,100 starts from the previous year.

Table 1.1: Apprenticeship starts in England

Apprenticeship starts in England, thousands							
2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/15
280	457	521	510	440	500	509	491

Notes: data are for academic years (August 1st to July 31st); figures are rounded to the nearest hundred Source: House of Commons Library, 2016, 2018

As reported in a parliamentary briefing paper in January 2018 (House of Commons Library, January 2018), the stark reduction in apprenticeship starts concentrates in the last quarter of 2016/17 following the introduction of the Apprenticeship levy in May 2017 in accordance with the funding reform.

Remarkably, the academic year 2015/16 saw the highest volume of achievements with 271,700 apprentices completing the programme (House of Commons Library, 2018). In line with the overall positive trend, the Government has made a commitment to 3 million new apprenticeship starts in England between the years 2015 and 2020.

Starts by age

Apprenticeships are available from the age of 16, and since 2004/05 they have been made available to people aged over 24 with no upper age restriction. As indicated in Table 1.2, apprentices aged over 25 have increased since 2009/10 and have come to represent a large proportion of all apprentices. In the academic year 2016/17 46% of apprenticeship starts were aged 25 and over, 29% were aged between 19 and 24, and only 25% were aged under 19 (House of Commons Library, January 2018).

Notably, figures reported for the first quarter of the academic year 2017/18 reveal a different trend with 41% of apprenticeship starts aged under 19, 30% aged between 19 and 24 and 29% aged 25 and over (House of Commons Library, January 2018). The figures indicate that the first quarter of the academic year tend to have a higher percentage of apprenticeship starts aged under 19, revealing that young school leavers progress from school onto an apprenticeship.

Table 1.2: Apprenticeship starts in England by age as percentage of all starts

	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
Under 19	42%	29%	25%	22%	27%	25%	26%	25%
19-24	41%	31%	31%	32%	36%	32%	30%	29%
25+	18%	40%	44%	45%	37%	43%	44%	46%

Source: House of Commons Library, 2018

Starts by level

As indicated in Table 1.3, the largest proportion of apprenticeships starts is at level 2. However, since 2011/12 apprenticeship starts at advanced and higher levels have steadily increased, from 37% in 2011/12 to 47% in 2016/17. More specifically, in the academic year 2016/17, 53% of apprenticeship starts were at intermediate level, 40% were at advanced level and 7% at higher level. This represents a 12% decrease in intermediate apprenticeship starts over the last 4 years. As reported by the House of Commons Library (January 2018), the number of higher apprenticeship starts has risen from 20,000 in 2014/15 to 36,000 in 2016/17 revealing a generally positive trend.

Table 1.3: Apprenticeship starts in England by level as percentage of all starts

	09/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
Proportion								
Intermediate (Level 2)	68%	66%	63%	57%	65%	60%	57%	53%
Advanced (Level 3)	31%	34%	36%	41%	33%	36%	37%	40%
Higher (Level 4-7)	1%	0%	1%	2%	2%	4%	5%	7%

Source: House of Commons Library, 2018

Starts by sector and framework

The sectors attracting the majority of apprenticeship starters in 2015/16 were: Business, Administration and Law; Health, Public Services and Care; and Retail and Commercial Enterprise, representing 71% of the apprenticeship starts (House of Commons Library, November 2016). Similar figures were reported for the academic year 2016/17 with 86% of all apprenticeship starts found in four subject areas encompassing Health, Public Services and Care; Business, Administration and Law; Retail and Commercial Enterprise; Engineering and Manufacturing Technologies. Notably, the first two areas account for over half of apprenticeship starts.

Although in 2016/17 95% of apprenticeship starts were on frameworks, there were around 23,700 starts on apprenticeship standards, corresponding to an increase of 20,000 from the previous year (House of Commons Library, 2018). As indicated in Table 1.4, the most popular frameworks in 2016/17 reflect the popularity of the service sectors outlined above.

Table 1.4: Apprenticeship starts in England by framework, thousands

	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17
Health & Social Care	18	54	71	81	70	85	86	87
Management	10	30	45	48	33	43	46	47
Business Administration	27	39	45	49	44	49	50	46
Children's Learning & Development	20	27	26	26	24	22	24	27
Hospitality & Catering	21	30	36	36	32	32	32	25
Customer Service	29	54	59	45	31	31	26	20
Construction Skills	14	16	14	14	16	18	20	20
Industrial Applications	1	4	19	15	15	17	19	17
Engineering	15	18	13	14	16	18	17	15

Source: House of Commons Library, 2018

Starts by gender

Whilst apprenticeship in sectors as engineering and construction have traditionally attracted mainly male apprentices, when considering the total number of apprentices in England across all sectors, women represent an important figure (Table 1.5). In the academic year 2015/16, 53% of apprenticeship starters were indeed female, reflecting the expansion of frameworks in the service sectors. Figures that are more recent confirm this trend with 54% of women apprenticeship starts in 2016/17 accounting for 262,820 (House of Commons Library, January 2018). Overall, the percentage of women starting an apprenticeship has been higher than the percentage of man since the academic year 2010/11.

Table 1.5: Apprenticeship starts in England by gender

	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
% of total								
Women	49.6	53.8	53.1	54.7	52.9	53.0	52.8	53.5
Man	50.4	46.2	46.9	45.3	47.1	47.0	47.2	46.5

Source: House of Commons Library, 2018

1.4.2 Apprentices' motivations and satisfaction

The national survey conducted by Vivian and colleagues (2012) and commissioned by the Department for Business, Innovation & Skills is important in providing an understanding of the factors attracting apprentices to the programme and the overall level of satisfaction. The survey identified the principal motivator for engaging with apprenticeship as in the desire to progress with one career (48% of respondents). Acquiring a qualification (35% of respondents) and the opportunity to be paid whilst in training (13% of respondents) were also reported as factors attracting apprentices into the programme. As noted by the scholars, the motivators are linked to the entry route into the apprenticeship, as those already employed were predominantly motivated by the achievement of a qualification, whilst new recruits were motivated by the opportunity of a career.

Further research investigating the views of young learners and parents on the attractiveness of vocational education reveals that apprenticeships still retain a low status imagine in comparison to the traditional academic pathway (i.e. Chartered Institute of Personnel and Development, 2013; Swift and Fisher, 2012). However, findings of the CIPD (2013) indicate

that apprenticeships are generally perceived as a good career choice among parents, but more information is needed to reinforce the public views on apprenticeship as a reputable form of education.

When considering reported levels of satisfaction with apprenticeship, the survey conducted by Vivian and colleagues (2012) on a sample of 5,000 respondents in England found relatively high levels of satisfaction. More specifically, 89% of respondents reported to be satisfied and 71% to be very satisfied with the programme, whilst only 4% expressed dissatisfaction. This latter category identified lack of support from the TP, poor communication and organisation from the TP, and little support or training from the employer as main reasons for dissatisfaction. It is important to note that low satisfaction levels were associated with short duration apprenticeships (less than 6 months) or situations where the apprenticeship had been required by the employer.

Satisfaction levels also varied among frameworks, with those undertaking apprenticeships in Construction, Planning and Built Environment reporting highest levels, and those in Health, Public Services and Care and Leisure, Travel and Tourism reporting lower levels of satisfaction. However, Vivian and colleagues (2012) note that differences in satisfaction levels are associated with apprentices' characteristics such as age and type of contract. In some frameworks satisfaction levels were higher for younger apprentices, whilst across most frameworks satisfaction levels were lower for those employed on a fixed-term contract, those undertaking short duration apprenticeships and those undertaking the apprenticeship because required by the employer.

The survey identified positive attitudes towards the level of training received, the quality of assessment and the quality of feedback (Vivian et al., 2012). Variation was however found among frameworks, with apprentices in Construction, Planning and the Built Environment, as well as those in Agriculture, Horticulture and Animal Care satisfied with the provision of skills relevant and applicable to their job, whilst those in Business, Administration and Law and Retail and Commercial Enterprise being satisfied with the quality of training, but not with the transferability of skills to the workplace.

Vivian and colleagues (2012) also found good levels of satisfaction (80%) with the amount of training received and with the balance between training and working (83%). Whilst the survey found generally positive attitudes among apprentices about the role of employers in supporting them, it found that existing employees received less support from the employer

in the structure, delivery and content of the apprenticeship. Negative attitudes towards employers' support for those apprentices who had been asked by the employer to undertake the programme, also suggest that in these cases employees had been apprenticed only to accredit existing skills, with minimal engagement from their employer (Vivian et al., 2012).

An important finding is that most apprentices (84%) reported that the apprenticeship had provided them with the knowledge and skills required in their current or desired area of work, and 81% found the apprenticeship to have improved their career prospects. Whilst young apprentices were more likely to report skills improvements as a result of the programme, those who were doing the apprenticeship to get a qualification and certify existing skills, were less likely to do so.

Improved skill levels were associated with particular aspects of the apprenticeship programme, as the duration of at least 12 months, the quality and amount of training received, and support from the employer. Those who were dissatisfied with these aspects of the programme were indeed more likely to report lower levels of skill improvements. The survey found variations among frameworks in relation to the impact of the apprenticeship on skills improvement, however the scholars noted that frameworks reporting low skills improvement, such as Business, Administration and Law, attracted mainly existing employees rather than new recruits (Vivian et al., 2012).

These findings are significant in identifying the quality of training and the role of employers in apprenticeships as important factors for the success of the programme in improving apprentices' knowledge and skills. Overall the findings present a positive picture of apprenticeship as a valid method of skill formation, drawing attention on areas in need of improvement addressed by the current reform (Richard Review, 2012).

1.4.3 Employers' motivations and benefits

A study conducted by Winterbotham and colleagues (2012) on a sample of 4,075 employers in England with staff completing an apprenticeship over the course of the previous 18 months reveals good levels of satisfaction with apprenticeships and good propensity to recommend the programme to others. Notably, employers reported to value all elements of the apprenticeship, with 78% of respondents finding the competency element (accredited by an NVQ) as the most relevant, and transferable skills rated as the least valuable, although 60% of the sample rated them as very valuable. The knowledge element accredited by a technical certificate was rated as very valuable by 72% of the sample, and was particularly

of value to employers in Engineering and Manufacturing Technology, and Construction, Planning and the Built Environment.

Research indicates that employers derive notable benefits from engaging with apprenticeship and these are linked to the reasons for recruiting apprentices. The study conducted by Winterbotham and colleagues (2012) found around two-thirds of respondents to report improved productivity, improved staff morale, improved product or service, improved image in the sector, better staff retention and the introduction of new ideas into the organisation.

These findings are in line with those presented in the Fifth Net Benefits of Training to Employers Study conducted by Hogarth and colleagues (2012a) for the Department for Business, Innovation and Skills. The research, based on around 80 employer case studies in various sectors, including engineering, construction, retail, hospitality, business and administration, reveals that employers benefit from an inflow of young people to the organisation, the introduction of new skills to be shared with the workforce, an optimal fit between skills and business needs, staff motivation and retention and improved profile in the local community. When considering the motivators inducing employers to offer apprenticeship, employers indicated the provision of skills required in an occupation as the main reason, but also a history of engaging with apprenticeship, the willingness to bring young people into the organisation, the preference to train their own workforce and meet a fit between skills and business needs (Hogarth et al., 2012a).

It is important to note that variations were found between sectors, with employers in engineering and construction regarding apprenticeship as a licence to practice, hence a formal requirement for new recruits, and those in retail and hospitality providing workplace learning to existing employees in light of high levels of turnover in the sector, hence as a strategy for staff retention. When considering the costs faced by employers, those operating in construction and engineering and offering formal training over the course of a three to four year period reported the higher net costs. In contrast, sectors such as retail which provided lower level, on-the-job and short duration training, encountered much lower costs. Overall Hogarth and colleagues (2012a) estimated that employers are able to recoup such costs over a relatively short period, ranging between one and two years from the end of the training, provided that the trainee remains with the organisation.

Both studies reveal that employers engaging in apprenticeship report significant benefits, and although variations were identified among sectors, satisfaction with and commitment to

the programme are relatively high. Having reviewed the institutional context and the profile of apprenticeships in England, the focus turns to the research outlooks on apprenticeship considering how the phenomenon has been investigated in various disciplines.

1.5 Research outlooks on apprenticeship

The literature highlights different aspects of apprenticeships. Educational research (i.e. Esmond, 2018; Fuller and Unwin, 2009; Mazenod, 2016) has considered how the institutional arrangements within particular education and training systems shape apprentices' learning experience with implications for educational progression and career prospects. Recently, Mazenod (2016) examined how national education and training system influence the learning quality of apprenticeships. In comparing the English, French and Finnish apprenticeships, Mazenod (2016) discusses how national education systems determine particular conceptualisations of apprenticeship as education or training. Her study highlights how the cultural-historical, political and institutional context plays a determinant role in shaping vocational education (i.e. Mulder, Messman and Konig, 2015). Similarly, Jorgensen (2017) reviews progression from apprenticeship to higher education within an historical perspective considering policy implications in Denmark. Others have investigated issues of race and ethnicity (Avis, Orr and Warmington, 2017) analysing participation and experiences of minority ethnic students in VET. A proliferation of publications has considered policy developments, participation and completion rates, along with social and economic benefits of apprenticeships (Abdel-Wahab, 2012; Chankseliani and Relly, 2012; Hogarth, Gambin and Hasluck, 2012b; Lee, 2012). Altogether, these studies are important in advancing the understanding of the context in which apprenticeships take place presenting the cultural-historical, political and institutional background to the study of apprenticeships as particular model of learning (Mulder, Messman and Konig, 2015).

Another stream of research has adopted a process-based outlook on apprenticeships considering how apprentices learn and develop into competent professionals, although from disparate perspectives. Most recent studies range from identity construction (Brockmann and Laurie, 2016), apprentices' social integration during organisational entry (Nagele and Neuenschwander, 2016), to apprentices' sense of belonging as determinant of commitment and engagement (Chan, 2016). Lately, Moon (2018) explored the processes and activities that contribute to apprentices' professional development from onboarding to proficiency, furthering the understanding of how apprentices acquire knowledge and skills. Drawing

from cognitive apprenticeship and situated learning theories, Moon (2018) identifies effective learning activities that enable apprentices' professional development including training, scaffolding, brainstorming and empowerment.

Other studies centred on the learning process in apprenticeship have investigated how mimesis, learning through observation, imitation and practice contributes to learning a trade (Chan, 2015) and how the social context of the apprenticeships contributes to experiencing a sense of thriving (Conway and Foskey, 2015). The widely acknowledged expansive-restrictive framework of apprenticeship advanced by Fuller and Unwin (2003b) considers how the work environment enables apprentices' learning and the development of an occupational identity positioned towards a clear career projection. Among the key features contributing to an expansive apprenticeship, the scholars identify the explicit status of the apprentice as learner, access to formal training, the opportunity to participate in multiple communities of practice and clear career progression.

Overall, these studies share commonalities and are complementary in relation to explaining the phenomenon of apprenticeship. Although addressing different research questions, these studies share the view that learning in apprenticeship is embedded within the work context and involves both participation in practice and social interaction. Various theoretical frameworks have informed this research. The work of Fuller and Unwin (2003b) draws on situated learning in communities of practice (Lave and Wenger, 1991) and Engestrom's activity theory (1994); more recently, the study of Poortman, Illeris and Nieuwenhuis (2011) on apprenticeships in the Netherlands elaborates on Illeris' (2003) workplace learning theory in comprising a cognitive, a social and an emotional dimension. In researching collective guidance in apprenticeships, Filliettaz (2011) adopts a Vygotskian perspective in assuming psychological development as resulting from interactions with the cultural environment and from experienced individuals, and refers to the work of Billett (2001) as central workplace learning theory. The latter has recently reviewed the theoretical foundations of apprenticeship as model of learning, providing a rich account of how learning in apprenticeships arises from a practice curriculum and how it can be enhanced by practice pedagogies (Billett, 2016).

Government commissioned research projects in England have evaluated the quality of apprenticeships adopting various indicators (Gambin, 2013). The most informative study conducted by Vivian and colleagues (2012) considered the balance between formal and

informal learning, asking apprentices whether they had received either or both forms of training and enquiring about the duration of such training. An important finding is that apprenticeships that do not offer any training or last less than six months are less likely to improve apprentices' knowledge and skills and impact on the ability to perform the job. As reported by Gambin (2013), subjective measurements to estimate the quality of apprenticeships enquired about satisfaction with the amount of training received, the balance between training and working, the quality of feedback and assessment from TP, and employer involvement with the programme (Vivian et al., 2012). Overall, these reports present an overview of apprentices' satisfaction with the programme and identify critical elements related to the structure of apprenticeships.

Whilst such research has its value, the dominant outlook has been on the educational and policy elements of apprenticeships giving primacy to the apprenticeship institutional arrangements. Considering that employers are critical actors in the apprenticeship tripartite system along with the government and educational institutions, an organisational perspective to the study of apprenticeship is here introduced turning the focus onto the work environment as enabler of apprentices' professional development. In so doing, this study addresses the critical need to advance knowledge on the factors enhancing apprentices' competence development *in the workplace*. As discussed by Gambin and Hogarth (2015), apprenticeship policy and research has predominantly focused on the motives leading apprentices and employers to participate in the programme and on the returns available, overlooking the factors that during the apprenticeship contribute to its success. This research extends knowledge on this gap and directing attention to apprentices' experiences in the workplace responds to recent calls for studies investigating the organisational conditions that foster apprentices' engagement with workplace learning (Moon, 2018). Accordingly, the foundational argument of this thesis is that introducing an organisational perspective to the study of apprenticeship can expand our understanding of the factors supporting apprentices' professional development in the workplace and therefore ensure the success of the programme. These are imperative considerations in light of the expansion of apprenticeships in England and the host of public and private investments directed to the programme (BIS, 2015).

1.6 Introducing an organisational perspective on apprenticeship

In focusing on apprenticeship as model of learning in employment this research investigates apprentices' experiences in the workplace. Considering that apprenticeships are classified as jobs (BIS, 2015) and in light of the fact that apprentices spend a considerable proportion of their time in the workplace provide a prima facie case for an organisational study of apprenticeships. Despite extensive research on the topic of apprenticeships, there exist no comprehensive theory that systematically explores how apprentices can be supported in the workplace to develop into competent professionals. Noting that apprentices undergo formal training at college and University whilst being employed full time, this research draws on the training transfer and the informal learning domain to explore and clarify the factors fostering apprentices' competence development. In so doing, the research advances and empirically tests an apprenticeship development model that relates formal and informal learning factors to apprentices' resultant competencies.

Consideration of training transfer is particularly important in apprenticeship given that learning occurs across different contexts, as the educational institutions and the workplace. As discussed by Mulder and colleagues (2015), the relationship between school and work is a critical determinant of the quality of vocational education and training. Whilst this has recently received attention in the context of apprenticeships (Messman and Mulder, 2015) and in the context of vocational education more generally (Pineda-Herrero et al., 2015; Sappa, Choy and Aprea, 2016), research needs to be further developed. As argued by Renta Davids, Van den Bossche, Gijbels and Garrido (2017), learners in vocational education need to integrate diverse educational and workplace learning experiences in order to develop professionally. This process involves transfer of learning between contexts and requires particular support structures (Renta Davids et al., 2017; Rowe, 2018). Directing attention to the work environment, this study aims to identify the factors that can facilitate apprentices in transferring the knowledge and skills acquired at college and University to the workplace. In that way, the study aims to illustrate particular aspects that ought to be considered in order to support apprentices in the transfer process and maximise the use of knowledge and skills in the workplace.

Added to this, in light of growing consensus that learning in the workplace contributes to professional development (Becker and Bish, 2017; Eraut, 2007; Felstead et al., 2005; Janssens et al., 2016), it is important to understand how the work environment can support apprentices in learning the interrelated knowledge and skills required for effectiveness. As

discussed by Raemdonck, Gijbels and van Groen (2014), learning and competence development are largely dependent on the characteristics of the job. Accordingly, insights into the work environment are critical in understanding how to stimulate informal learning so to create powerful learning experiences (Gijbels, Raemdonck and Vervecken, 2010). In line with a growing field of research considering the antecedents of informal learning (Cerasoli, Alliger, Donsbach, Mathieu and others, 2018; Jeong, Han, Lee and others, 2018; Segers, Messman and Dochy, 2018; Tews, Michel and Noe, 2017), this study explores the work environment as enabler of apprentices' competence development. Conceptualising the work environment as driver for professional development, the study identifies factors that organisations can leverage to promote learning in the workplace and enhance the development of critical competencies.

Furthermore, although extensive research has documented apprenticeships, little is known about the role of the human resource management (HRM) system in supporting apprentices' development. As indicated in previous studies, notwithstanding the significance of the quality of apprenticeships other organisational factors play a determinant role in ensuring the success of the programme. A study on large employers in Britain identified practices as selective staffing, career development and socialisation in association with apprentices' retention (Ryan et al., 2007), whilst similar practices were detected by Fuller and Unwin (2007) in organisations successfully offering Engineering and Business Administration apprenticeships. As discussed by Hogarth and colleagues (2012b), such evidence points to the need to investigate the link between the apprenticeship and the HRM practices in place in the organisation, recognising that the design and execution of the apprenticeship is strongly influenced by the HRM system embedding the programme. Accordingly, considering both the formal and informal learning processes at the basis of apprentices' professional development and accounting for the influence of HRM, this study advances a holistic approach to apprenticeship research and presents novel practical and theoretical implications.

Building on the work of Lewis (2014) who discusses how human capital theory and HRM theory inform employers' decision to participate in apprenticeships based on the returns available, this study presents novel insight into the influence of HRM in apprenticeships. Specifically, Lewis (2014) argues that whilst human capital theory suggest that training apprentices may lead to high turnover rates as external skills certifications enhance skills transferability resulting in low returns for employers, HRM theory points to the opposite

possibility. According to the HRM perspective, providing apprentices with certificated training accompanied by career opportunities may reduce turnover intentions, justifying investing in the programme. Hasluck and Hogarth (2010) present empirical evidence for this proposition revealing that employers can recoup the costs of investing in apprenticeship in a relatively short period of time, provided that apprentices remain with the company. In light of this evidence, the employment relationship between the apprentice and the employer emerges as critical to ensuring the success of the programme and bringing maximum benefits for the organisation.

In exploring the influence of HRM in apprenticeship, this research considers how the employment relationship as portrayed by the HRM system shapes apprentices' competence development. Given that HR practices signal the organisation's intention to establish a particular employment relationship with employees (Sun et al., 2007), this study poses to investigate how apprentices' perceptions of HR practices influence apprentices' professional development. With limited scholarly knowledge on HR systems in apprenticeship, this study draws on the human resource architecture model advanced by Lepak and Snell (1999; 2002) to identify the high-commitment HR system as the configuration most suited for managing the employment relationship with apprentices as highly valued employees.

Given that employers engage with apprenticeship to address the need for qualified staff and to develop their talent as corporate resource (Winterbotham et al., 2013), apprentices represent core employees of high strategic value. Building on the view that particular employment groups require different HR practices to be managed effectively (Kinnie et al., 2005; Liao et al., 2009), the high-commitment HR system is presented as the strategy for managing the employment relationship with apprentices (i.e. Lepak and Snell, 1999, 2002; Sun, Aryee and Law, 2007). In examining the influence of HRM in apprenticeships, the study presents novel insight furthering the understanding of why the relationship between the apprentice and the employer matters and how it can be nurtured by means of HR practices. These are critical considerations given the primacy placed by the latest wave of reform on the relationship between the apprentice and the employer (BIS, 2015) and poses important practical and theoretical implications.

Ultimately, research in the formal (Baldwin and Ford, 1988; Bell et al., 2017; Blume et al., 2010) and informal (Cesaroli et al., 2018; Noe, Tews and Marand, 2013; Schulz and Rossnagel, 2010; Tannenbaum et al., 2010) learning domain has considered both personal

and situational factors as determinants of learning. As discussed by Cesaroli and colleagues (2018), individual predispositions represent powerful drivers for explaining engagement in learning behaviours. The construct of learning goal orientation is particularly insightful in explaining individuals' intentions to engage in both formal and informal learning and is an exceptionally fertile construct in organisational studies (i.e. Belschak and den Hartog, 2010; De Clercq, Rahman and Belausterguigoitia, 2015). As reported by VandeWalle (2003), understanding individual orientations towards learning presents various implications for organisations ranging from personnel decisions to the management of the work environment as in the design of training programmes, reward structures and cultures. Accordingly, this study investigates the influence of learning goal orientation in apprenticeship presenting further insight into how organisations can foster apprentices' competence development. Given that learning in the workplace is the result of the interaction between the characteristics of the job and those of the individual (Raemdonck, Gijbels and van Groen, 2014), in accounting for both individual and contextual dimensions, this study presents a rounded view on apprenticeships. Altogether, an organisational perspective to the study of apprenticeship is set to shed new light on the factors enhancing apprentices' professional development and to provide evidence-based recommendations for supporting apprentices' development using a combination of formal and informal learning.

1.7 Theoretical framework of the study

Having introduced the organisational perspective to the study of apprenticeship as the lens guiding the research, the theoretical framework of the study is outlined next.

1.7.1 Research question and objectives

In view of the sustained expansion of apprenticeships in England and given that workplace learning remains a distinct employer responsibility (Rowe et al., 2017), there is an urgent need to advance knowledge on how best to support apprentices' professional development in the workplace. Accordingly, this research addresses the following question:

How can organisations support apprentices to develop into competent professionals?

In investigating the research question, the study presents the following **objectives**:

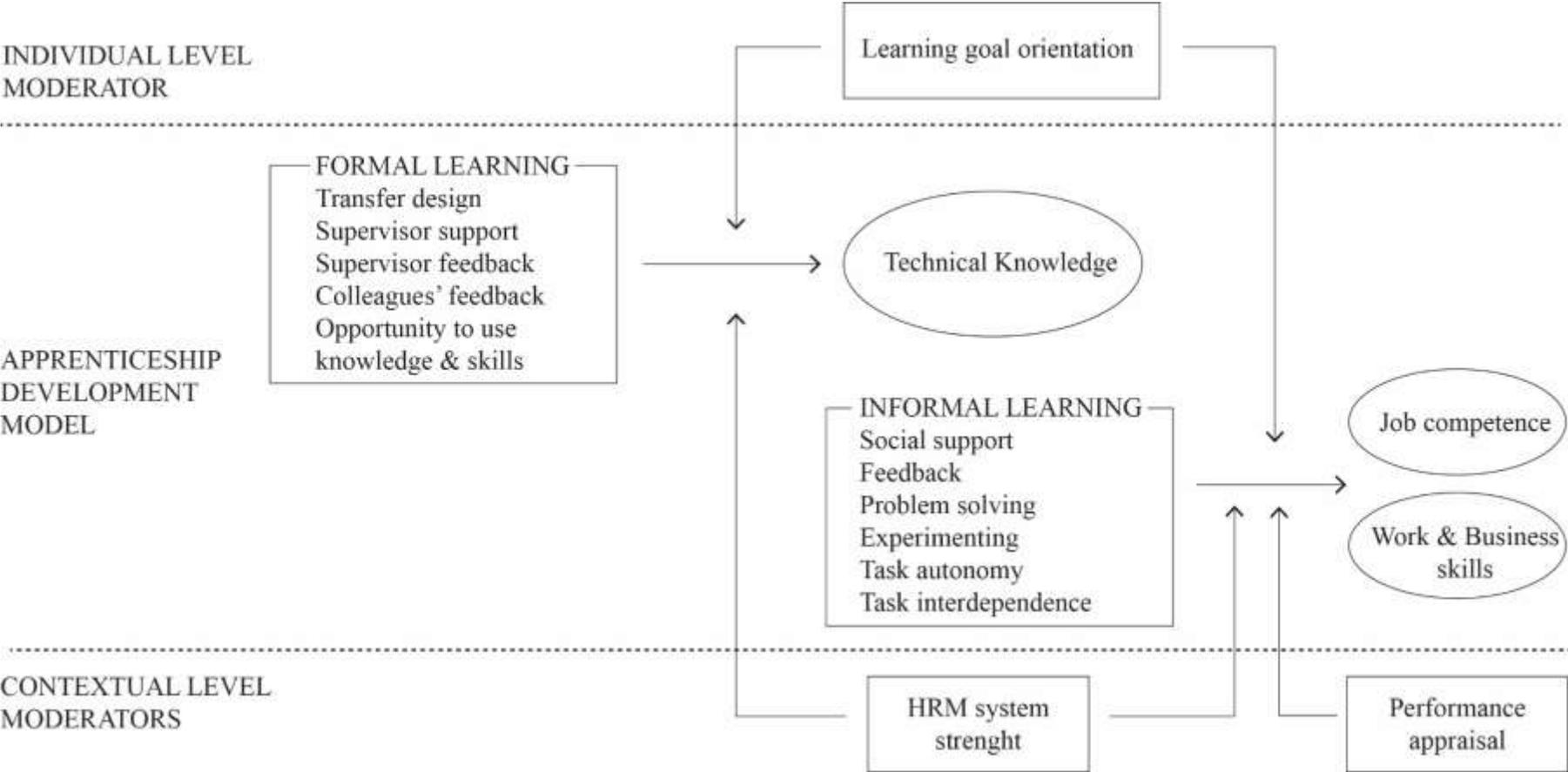
- to determine the relationship between formal and informal learning factors in apprenticeship and apprentices' resultant competencies

- to test boundary conditions inherent to apprenticeship such as perceptions of HRM implementation and individual learning goal orientation, assessing their impact on apprentices' competence development
- to determine changes in perceptions of the apprenticeship formal and informal learning factors and apprentices' competencies over time, investigating the causal link between the apprenticeship and apprentices' performance
- to provide research-informed evidence to the organisations under study about the factors supporting informal learning, those enhancing training transfer, and about the role of HRM implementation and learning goal orientation in shaping the apprenticeship effectiveness.

In line with these objectives, Figure 1.1 illustrates the conceptual framework of the study featuring the apprenticeship development model and the boundary conditions tested in this research.

The first objective of the study is to develop and empirically test an apprenticeship development model that specifies the formal and informal learning factors contributing to the development of apprentices' end-state competencies. In doing so, the study reviews formal training (Baldwin, Ford, Blume, 2017; Bell et al., 2017; Blume et al., 2010; Taylor et al., 2005) and informal learning literatures (Cerasoli et al., 2018; Cheetham and Chivers, 2001; Conlon, 2004; Jeong et al., 2018) to identify critical factors fostering apprentices' professional development. Additionally, based on the apprenticeship statutory requirements in England (SASE, 2017) and in line with competency models presented in the literature (Le Deist and Winterton, 2005), the study advances a categorisation of the apprenticeship resultant competencies. Presenting apprentices' competencies as learning outcomes, these are classified in technical knowledge, job competence and work and business skills. As illustrated in Figure 1.1 and further discussed in Chapter 2, technical knowledge in apprenticeship is mainly developed off-the-job attending formal learning at college and University. Conversely, job competence and work and business skills are primarily acquired on-the-job and are therefore presented as informal learning outcomes.

Fig. 1.1 Theoretical framework of the study



Given apprentices' dual status of worker and learner (Fuller and Unwin, 2003b), the apprenticeship development model introduced in Chapter 2, integrates the formal learning and informal learning literatures. Drawing on Baldwin and Ford's (1988) model of the transfer process, this study identifies training intervention (transfer design) and work environment factors (supervisor support, supervisor feedback, colleagues' feedback, opportunity to use knowledge and skills) fostering transfer of knowledge between school and work. These are here presented as formal learning factors related to the development of apprentices' technical knowledge (Fig. 1.1).

Additionally, the job demand-control-support (JDCS) model (Johnson and Hall, 1988; Karasek and Theorell, 1979), discussed further in Chapter 2, informs the identification of specific job characteristics (social support, feedback, problem solving, experimenting, task autonomy, task interdependence) promoting apprentices' professional development. These are here presented as informal learning factors related to the development of apprentices' job competence and work and business skills (Fig. 1.1). By testing the model empirically, the study elucidates how organisations might design the work environment to foster apprentices' professional development facilitating both formal and informal learning.

Secondly, following the work of Dragoni and colleagues (2009), the research incorporates both contextual factors and individual differences in the apprenticeship development model as important 'boundary conditions' advancing the understanding of how the HRM system and apprentices' learning goal orientation influence competence development. As reported by the scholars, failing to account for contextual and individual factors may lead to the assumption that developmental assignments - such as apprenticeships - produce competent professionals under all organisational conditions and for all individuals (Dragoni et al., 2009).

As illustrated in Figure 1.1, at contextual level the study tests the influence of the HRM system strength and performance appraisal (PA) on the apprenticeship development model. Accounting for these dimensions, the research provides insight into the influence of the organisational context as determinant of the employment relationship on apprentices' professional development. This focus is justified as HRM research indicates that employees' responses to developmental practices such as training depend on the quality of the employee-organisational relationship (i.e. Kuvaas, 2008), whilst apprenticeship research points to the

relevance of the organisational context in influencing the quality of the programme (i.e. Fuller and Unwin, 2003c).

As discussed in Chapter 3, in line with strategic human resource management research (i.e. Lepak and Snell, 1999, 2002; Sun, Aryee and Law, 2007; Tsui et al., 1997), this study considers the HRM system as the organisational strategy for managing the employment relationship with apprentices and identifies the high-commitment configuration as the most suited for apprentices as highly valued employees (i.e. Lepak and Snell, 1999; 2002). In so doing, the study turns the spotlight to HRM – not as a set of practices, but rather, following recent developments in the strategic HRM literature (Bowen and Ostroff, 2004, 2016; Sanders, Shipton and Gomes, 2014) according to how such practices are perceived by employees.

Accordingly, the research examines the role of the HRM system strength, intended as the effectiveness of the HRM system in communicating messages unambiguously and enabling the clear interpretation of such messages (i.e. Bowen and Ostroff, 2004; 2016), in sustaining a high quality employment relationship with apprentices and consequently enhancing apprentices' learning and performance. As apprentices develop knowledge and skills attending formal training courses at college and University and engaging in informal learning in the workplace, this research investigates how apprentices' engagement in both forms of learning is enhanced by perceptions of HR practices. As illustrated in Figure 1.1, the study tests the influence of the HRM system strength on both formal and informal learning in the apprenticeship development model.

Additionally, the research investigates the role of PA as facilitator of informal learning. Whilst HRM research has long promoted a system view of HRM in investigating the impact of HRM systems rather than single practices on individual and organisational outcomes (Combs et al., 2006; Delery, 1998; Lepak et al., 2006), the influence of PA as particular HR practice in apprenticeship is considered. Given employers reporting challenges in securing apprentices' performance, engagement and retention (Rowe et al., 2017) and acknowledging the need to deliver support and guidance to apprentices in the workplace (Mulkeen et al., 2017), PA is here considered as support mechanism for developing and motivating apprentices.

Building on the assumption that different groups of employees need to be managed differently according to their needs and expectations (Kinnie et al., 2005), PA is deemed

crucial for apprentices as high-value employees. PA is a salient practice for supporting employees' competence development and fostering employees' identification with the organisation (Ostroff and Bowen, 2000). In light of compelling evidence that PA satisfaction is associated with organisational commitment for professional employees (Kinnie et al., 2005), PA is here investigated as critical determinant of a positive employment relationship for apprentices as emergent professionals.

As discussed by Kinnie and colleagues (2005), PA is particularly important for professional employees in aligning individual and organisational interests. In so doing, PA responds to the particular needs of professional employees providing the form of organisational support that is important for them. Added to this, quality PA promotes participation in informal learning activities (Bednall et al., 2014) emerging as facilitator of informal learning. Accordingly, PA is investigated as the HR practice shaping the organisational employment relationship for apprentices as emergent professionals and supporting apprentices' competence development in the workplace. As discussed in Chapter 3, this study considers the interaction of PA with problem solving, task autonomy and feedback as critical informal learning factors, presenting fresh insight into PA as support mechanism in apprenticeship.

Furthermore, as illustrated in Figure 1.1 and further elaborated in Chapter 3, this study investigates the influence of learning goal orientation on both formal and informal learning in the apprenticeship development model. Considering the individual characteristic of learning goal orientation provides a nuanced understanding on how apprentices perceive and respond to learning opportunities, showing how individual dispositions towards learning affect apprentices' competence development. According to the argument presented here, goal orientation forms the basis for deeper motivational processes that determine how apprentices approach formal and informal learning. As the construct of goal orientation has proven particularly insightful in predicting individual level outcomes (i.e. Chiaburu and Marinova, 2005; Kozwloski et al., 2001; VandeWalle and Cummings, 1997), it presents the potential to explain individual differences in learning behaviours and consequent competence development in apprenticeship. With apprentices being exposed to formal and informal developmental activities, it is important to examine how apprentices' learning goal orientation influences their competence development, providing valuable insight to organisations investing in the programme.

Thirdly, employing a positivist epistemology the research adopts a quantitative research strategy. In so doing, the research presents a cross-sectional (N= 233) and a longitudinal study (N= 90) testing the validity of the apprenticeship development model. Whilst originally set up exclusively as longitudinal study based on panel data collected over two waves, issues of sample attrition reduced the sample size to 90 observations limiting the power for statistical inference tests (Hair et al., 2014). As discussed by Bryman and Bell (2015), longitudinal research designs are advantageous in comparison to cross-sectional designs in allowing insight into the time order of variables and therefore allowing inferences about causality, but are problematic in relation to sample attrition. Accordingly, this research is centred on a cross-sectional study complemented by a longitudinal study. Whilst the former seeks to explain patterns of associations between the apprenticeship development model and apprentices' resultant competencies identifying the relative importance of different sources of learning, the latter allows mapping social change over time providing a preliminary basis for inferring causality (Keeves, 1988).

Additionally, the research draws on a qualitative data set collected along the quantitative data by means of an open question in the survey. Although quantitative and qualitative data have been analysed separately, they form an integrated data corpus and provide a strong basis for data triangulation. Maintaining a positivist epistemology, qualitative data has been employed with an objectivist orientation and analysed using thematic analysis. As discussed by Braun and Clarke (2006), thematic analysis can be applied across a range of epistemologies and is compatible with the essentialist paradigm assuming a straightforward link between language and experience. Accordingly, the themes identified in the qualitative data set complement and reinforce the validity of the quantitative cross-sectional and longitudinal findings. Overall, implementing a rigorous methodology this research empirically tests the theoretically derived apprenticeship development model advancing knowledge on the factors contributing to a positive apprenticeship experience.

1.7.2 Context of the study

In view of increased progression routes into Higher and Degree Apprenticeship along with the integration between traditional education and vocational training (Lee, 2012; Rowe et al., 2017; Saraswat, 2016), this research explores Advanced (Level 3) and Higher (Level 4 and above) Apprenticeships in knowledge-intensive industries. The study targets organisations operating in the engineering sector, a sector leading in the delivery of Higher Apprenticeship whose skills are best acquired on-the-job (Keeps and James, 2011),

highlighting the importance of integrating formal and informal learning for effective performance.

The focus on knowledge-intensive industries is warranted as apprenticeships are particularly suited to the demands of the postmodern society where learning and production are re-integrated. As argued by Nielsen and Pedersen (2011), knowledge intensive industries require an increasing volume of knowledge along with an increasing variety of knowledge, as necessitated by regular technological innovations. Accordingly, the scholars argue that traditional academic systems are unable to attend to the demands of the postmodern society, requiring apprenticeship-like forms of training to integrate learning with working activities. This research is therefore set to provide greater insight into how organisations operating in knowledge-intensive industries can foster learning and innovation, and to validate apprenticeship as valid method of skill formation.

1.7.3 Contributions of the study

This study presents several important implications for theory and practice. Firstly, despite the centrality of apprenticeships as vehicle of vocational training on an international scale (Fuller and Unwin, 2011), the literature is lacking an empirically supported theory on apprenticeship as human capital development programme. This study addresses this gap, theoretically developing and empirically testing a comprehensive apprenticeship development model. In so doing, this study advances a holistic approach to apprenticeships that in accounting for both formal training at college and University and informal learning in the workplace identifies critical factors supporting apprentices' development.

Secondly, categorising apprentices' resultant competencies into job competence, technical knowledge and work and business skills in accordance with the English statutory requirements (SASE, 2017), this study discerns particular training intervention and work environment factors associated with the competencies required for effective performance. In so doing, the findings extend previous apprenticeship research (i.e. Messman and Mulder, 2015) which only considered learning as outcome of interest validating the apprenticeship as method of skill formation. In going beyond associating job characteristics with engagement with informal learning by demonstrating an association with the enhancement of apprentices' competencies, this research presents novel insight into how the work environment can support apprentices' professional development.

Thirdly, introducing the HRM system as determinant of the apprenticeship employment relationship this study presents original insight into the influence of HRM in apprenticeship. Whilst the findings do not support the hypothesis related to the HRM system strength (Bowen and Ostroff, 2004, 2016), the influence of PA on apprentices' engagement with informal learning is innovative. In finding PA satisfaction to moderate the relationship between both problem solving and feedback with apprentices' resultant competencies, this study extends knowledge on the influence of HR on employees' professional development. In particular, the research illustrates the mechanisms required for establishing a positive employment relationship in apprenticeship, and demonstrates how satisfaction with PA fosters engagement with informal learning and contributes to better functioning of the team and the organisation. Overall, the results lend support to previous research which found the effectiveness of HRM to be dependent on the nature of specific employment groups (i.e. Kinnie et al., 2005; Lepak and Snell, 2002; Liao et al., 2009) and reveal how the provision of appropriate HR practices is likely to enhance the effects of informal learning on performance.

Added to this, investigating the individual difference of learning goal orientation this study identifies an important personal factor illustrating why apprentices may differently respond to the learning opportunities provided in the work environment with implications for resultant performance. In accounting for both contextual and individual boundary conditions the research is informative regarding when and for whom particular informal learning drivers play a determinant role in apprenticeships.

Ultimately, the study presents several contributions to practice. Firstly, the study reveals the critical support mechanisms that organisations ought to put in place to enable apprentices in transferring the technical knowledge acquired at college or university to the workplace. Among these, the content and the structure of the training intervention along with the role of the supervisor in the workplace are pivotal.

Secondly, apprentices' competence development can be directly supported in the workplace when organisations adopt appropriate interventions. Presenting apprentices with the right level of challenge along with regular feedback and support from colleagues and supervisors is critical. Additionally, crafting apprentices' work in ensuring the right level of autonomy and interdependence within the work system enhances apprentices' learning and performance.

Thirdly, organisations investing in apprenticeship as strategy for talent development need to invest in HR practices in order to establish and sustain a high quality employment relationship with the apprentice. In particular, PA is instrumental for supporting a positive employment relationship and in turn fostering engagement in informal learning and ensuring apprentices contribute to better functioning of the team and the organisation. In light of these practical implications, the role of the line manager has emerged as crucial in determining positive apprenticeship experiences. Lastly, the study identifies a series of interventions aimed at fostering apprentices' learning orientation and further support their competence development.

1.8 Organisation of the thesis

Chapter 2 (*Introducing the apprenticeship development model*) reviews the apprenticeship as model of learning and defines the developmental quality of the apprenticeship in contributing to the knowledge and skills required for effective performance. The chapter reviews the formal training and informal learning literature to identify relevant factors and develop a theoretically derived apprenticeship development model. Lastly, it presents the hypotheses that explicate how formal and informal learning factors relate to particular apprentices' competencies.

Chapter 3 (*The influence of HRM and learning goal orientation on apprentices' development*) introduces critical boundary conditions in the apprenticeship development model. It first reviews the HRM literature to identify the high-commitment HR strategy as the most suited for apprentices as high value employees. In line with the process approach to HRM it then considers the communicative function of the HR system and evaluates how the latter contributes to a positive employment relationship. Secondly, the chapter introduces PA as critical HR practice fostering apprentices' engagement with informal learning. Thirdly, the chapter reviews the goal orientation literature and discusses how this can inform our understanding of apprentices' development. Lastly, it advances hypotheses to test the influence of these contextual and individual factors in apprenticeships.

Chapter 4 (*Research design and method*) presents the research paradigm and provides a detailed account of the project design, procedure, sample and ethical issues. It includes a description of the measures of the study variables and of the procedure adopted to analyse quantitative and qualitative data.

Chapter 5 (*Testing the apprenticeship development model: how formal and informal learning contribute to competence development*) presents the results of two studies testing the validity of the apprenticeship development model. A cross-sectional study complemented by qualitative data and a longitudinal study based on panel data test the hypotheses advanced in Chapter 2.

Chapter 6 (*The role of the HRM system strength, PA and learning goal orientation in apprenticeship*) tests the hypotheses advanced in Chapter 3. It presents three studies complemented by qualitative data considering the influence of the HRM system strength, PA and learning goal orientation in apprenticeship.

Chapter 7 (*Discussion*) summarises the findings of the research and discusses implications for theory, practice and policy. The chapter draws attention to the limitations of the study and directions for future research, before presenting an overall conclusion of the project.

1.9 Summary

This chapter has introduced the context of the research presenting an overview of apprenticeships in England. In light of the current reform, it has identified the themes central to the research and the related gaps in the extant literature. The chapter has presented the objectives and potential contribution of the study along with an outline of the structure of the thesis.

Chapter 2

Introducing the apprenticeship development model

2.1 Introduction

Having introduced the context of the research, this chapter turns the focus on the apprenticeship as a tool for human capital development. In doing so, the concept of the apprenticeship and its theoretical foundations are reviewed, before defining the developmental quality of the apprenticeship as precursor of apprentices' competence development.

Whilst educationalists have looked at the academic content and the social processes at the basis of apprentices' skill formation, this chapter turns the focus to the work environment as an important determinant of apprentices' learning experience. In adopting an organisational perspective, the chapter considers facets of the work environment that have been associated with training transfer and workplace learning, and evaluates their relevance to the context of apprenticeships. Drawing on formal (i.e. Baldwin, Ford, Blume, 2017) and informal learning (i.e. Cerasoli et al., 2018) literatures, the chapter explores factors promoting apprentices' learning in order to construct an empirical model for apprentices' competence development.

Whilst formal and informal learning are treated as analytically distinct in order to identify key factors supporting professional development, the research argues that the combined influence of formal and informal learning is pivotal for apprentices' professional development. After developing a typology of apprentices' competencies on the basis of the apprenticeship's statutory requirements in England, a review of the formal and informal learning literature is conducted to inform the research hypotheses. In so doing, the study identifies factors contributing to the developmental quality of the apprenticeship providing much needed insights for practitioners and academics.

In sum, the chapter lays the theoretical foundations of the study that seeks to demonstrate the impact of the apprenticeship on the development of observable end-state competencies critical for effective performance.

2.2 Apprenticeship as a concept

As reported by Nielsen and Pedersen (2011), the interest on apprenticeship as a model of learning has grown in recent years with a focus on how social models of learning can enhance learning in the workplace and support the transfer of knowledge between education and work settings. The scholars make a compelling case on how the growing interest on apprenticeship is not ill-founded, but is aligned with the postmodern conception of knowledge. In a society dominated by specialised, flexible and constantly changing forms of production, learning local and pragmatic kinds of knowledge becomes essential, whilst the cognitive conception of knowledge centred on the learner as a passive receiver of educational establishments loses traction. This shift entails a reconceptualization of learning from an individualised activity to a social and interactive process, where knowledge does not reside with the individual but is rather socially distributed (Nielsen and Pedersen, 2011). Such reconceptualization is evident in the apprenticeship conceived as a vehicle for learning in the workplace, and stands at the basis of the situated learning and the expansive-restrictive theories of apprenticeship discussed next.

2.2.1 Situated learning

Introducing a situated perspective on learning, the work of anthropologists Lave and Wenger (1991) is pivotal for a conceptual understanding of apprenticeship. Central to the situated learning approach are the concepts of legitimate peripheral participation and identity formation, which present an analytical viewpoint on apprenticeship as a model of learning in employment (Lave and Wenger, 1991).

With legitimate peripheral participation, the scholars refer to the process by which newcomers become part of a community and, by having access to the practices of the community, develop their competence and identity. Learning is therefore the result of being located in the social world and engaging in social practice, rather than a process of internalisation by cognitive transmission (Cox, 2005). Presenting learning as a journey that newcomers undertake from the periphery to the centre of the community, Lave and Wenger (1991) present participation in the community of practice as the epistemological principle of learning.

Peripherality, intended as source of access to the social world, enables participation that allows exposure to the practice of the community (Wenger, 1998), and can present itself as an empowering or disempowering resource in placing the individual at the centre or at the periphery of the community (Lave and Wenger, 1991). Accordingly, as individuals engage

in practice, they are exposed to the curriculum of the community, which unfolds itself as opportunities for practise arise (Wenger, 1998). As discussed by Nielsen and Pedersen (2011), situated learning presents a decentered perspective on apprenticeship in which knowledge is socially distributed among actors, tools and the structure of work. It follows that learning in apprenticeship is dependent on access to the community; on learning from practice, with a gradual transition to more complex tasks; on the opportunity to observe experts in production; and on having access to the narratives of the trade (Nielsen and Pedersen, 2011).

The concept of legitimate peripheral participation is intrinsically linked to the concept of identity formation, with full participation at the basis of identity development. As argued by Wenger (2000), CoP correspond to social ‘containers’ of competence, encompassing a shared repertoire of communal resources as language, stories, artefacts, routines. Participation in the CoP enables the understanding of both its explicit components, as language, roles, procedures and regulations, and of its implicit values, assumptions and conventions (Handley et al., 2006) allowing deep and broad meaning and understanding. As the implicit aspects of practice may never be fully articulated in the community, only broad and extended participation can foster identity- development (Wenger, 1998), enabling individuals to learn how to act, respond, discuss and function as competent members of the community. The formation of identity is therefore a composite process involving deep connections with members of the community through a sense of belonging, mutual commitment and shared repertoire (Wenger, 2000).

The epistemological stand of situated learning theory, which views learning in terms of the whole person acting in the world (Lave and Wenger, 1991), provides the foundation for understanding apprentices’ competence development, as the results of participating in the work processes and interacting with other members of the community. Whilst developing the concept of situated learning analysing traditional societies, the work of Lave and Wenger (1991) presents ground for exploring apprenticeship in more modern contexts, and has been referred to as the foundation of recent discussions on the topic.

2.2.2 The apprenticeship Expansive and Restrictive Framework

Educationalists Fuller and Unwin have led the debate on apprenticeship in England, exploring the practice of Modern Apprenticeship through the lens of Lave and Wenger’s (1991) situated learning theory. The scholars employ the concepts of legitimate peripheral participation and community of practice to analyse how apprentices become competent in

an occupation, however find the situated learning perspective to be too simplistic for the context of the Modern Apprenticeship.

Fuller and Unwin (2003b, 2003c) identify three main shortcomings in Lave and Wenger's (1991) viewpoint on apprenticeship when applied to contemporary industrialised settings: - the lack of a role for off-the-job training in formal education institutions; - the relevance of institutional arrangements; - and the conceptualisation of the apprentice's journey from novices to experts. Based on traditional societies, situated learning theory does not indeed account for the formal training delivered at college or University, disregarding an important community of practice for the apprentice. Additionally, the institutional arrangements of the Modern Apprenticeship introduce new elements to the traditional apprenticeship as in the requirement of attaining formal qualifications.

Furthermore, whilst Fuller and Unwin (2003c) recognise that modern apprentices have the opportunity to become legitimate peripheral participants, they question the relevance of the journey from novice to expert in contemporary settings. The scholars argue that the pedagogical relations between modern apprentices and older employees transcend those depicted by Lave and Wenger (1991) between novices and experts. Whereas situated learning presents experts as passing their knowledge to novices ensuring the reproduction of the community of practice, research conducted by Fuller and Unwin (2003c) has found that apprentices play a key role in passing their knowledge to existing employees, depicting a more intricate perspective on learning in apprenticeship.

Given the limitations of the concepts advanced by Lave and Wenger (1991) in capturing the complexity of institutionalised apprenticeship in modern settings, Fuller and Unwin (2003b, 2003c) have advanced a conceptual framework based on the notions of expansive and restrictive to analyse the learning environments shaping apprentices' experiences. The scholars have developed a categorisation of approaches to apprenticeship based on a list of features ranging from expansive to restrictive, which enables the identification of barriers and opportunities to learning.

The expansive or restrictive nature of the apprenticeship is associated with the form of participation in communities of practice, the underlying institutional arrangements and the ways in which personal development is enabled (Fuller and Unwin, 2003b). As argued by Fuller and Unwin (2003b, 2013), apprenticeships characterised by expansive features provide access to a wide range of learning opportunities, enabling apprentices to progress

with their career and education, whilst restrictive apprenticeships present limited opportunities for educational progression and career development (Table 2.1).

The work of Fuller and Unwin is important in contributing to elaborate an innovative approach to apprenticeship intended as a dynamic vehicle of learning set to enable vertical progression in higher education and horizontal progression between jobs. The expansive-restrictive framework is significant in evaluating the nature of the learning environment, intended as workplace and vocational education site, in shaping apprentices' learning experiences. It provides valuable insight in pointing to key aspects of the apprenticeship arrangements as in apprentices having a dual status of worker and learner, participating in different communities of practice inside and outside the organisation, gaining qualifications and developing expertise for progression.

An important consideration advanced by Fuller and Unwin (2003b) for the quality of apprenticeship is the configuration of formal and informal learning processes, an aspect central to this research. As discussed in an earlier publication (Fuller and Unwin, 1998), formal and informal learning are pivotal to skill formation, and an integrated approach to training on- and off-the-job is essential for apprentices' development. The scholars reject the formal and informal learning dualism that entails the superiority of learning in educational institutions over learning in the workplace, and advance an interdependent viewpoint of learner-centred and teacher-centred activities. Such approach lays the foundations for the conceptualisation of apprenticeship presented in this research, and guides the search for theories related to both the formal and informal learning literature to develop a model of apprentices' competence development.

Drawing from Engeström's activity theory (1994), Fuller and Unwin elaborate on the concept of learning as socially situated, whilst recognising the value of structured teaching in making learning purposeful. In doing so the scholars (1998) recognise the pedagogical value of the daily interactions of apprentices with members of the community of practice, explicating that teacher-centred activities do not necessitate a qualified teacher, a didactic method and an authoritarian relationship between 'teacher' and 'learner'. The scholars argue that:

'The key to the development of learners is seen to be the quality of interactions which accompany the undertaking of authentic tasks. Such interactions are likely to include incidental, as well as more structured, planned and goal-orientated, learning experiences.' (Fuller and Unwin, 1998, pp. 164)

Table 2.1: Expansive – Restrictive Apprenticeship Framework (Fuller and Unwin, 2013, pp. 4)

EXPANSIVE	RESTRICTIVE
C1 Apprenticeship is a vehicle for aligning goals of individual development and organisational capability	Apprenticeship used to tailor individual capability to immediate organisational need
C2 Workplace, training provider and (where present) trade union share post-Apprenticeship vision: progression for career	Post-Apprenticeship vision: static for job
C3 Apprentice has dual status as learner and employee	Status as employee dominates: status as learner restricted to minimum required to meet statutory ‘Apprenticeship Framework’
C4 Apprentice makes gradual transition to productive worker, gaining expertise in occupational field	Fast transition to productive worker with limited knowledge of occupational field; existing productive workers given minimal development
C5 Apprentice treated as member of occupational and workplace community with access to community’s rules, history, knowledge and expertise	Apprentice treated as extra pair of hands who only needs access to limited knowledge and skills to perform job
C6 Apprentice participates in different communities of practice inside and outside the workplace	Participation restricted to narrowly-defined job role and work station
C7 Workplace maps everyday work tasks against qualification requirements – qualification valued as extending beyond immediate job requirements	Weak relationship between workplace tasks and qualifications – no recognition for skills and knowledge acquired beyond immediate work tasks
C8 Qualifications develop knowledge for progression to next level and platform for further education	Qualifications accredit limited range of on-the-job competence
C9 Apprentice has time off-the-job for study and to gain further perspective	Off-the-job simply a minor extension of on-the-job
C10 Apprentice’s existing skills and knowledge recognised, valued and used as platform for new learning	Apprentices regarded as ‘blank sheets’ or ‘empty vessels’
C11 Apprentice’s progress closely monitored – regular constructive feedback from range of employer and provider personnel who take a holistic approach	Apprentice’s progress monitored for job performance with limited feedback – provider involvement restricted to formal assessments for qualifications

With situated learning and ‘activity theory’ at the basis of Fuller and Unwin’s work, the scholars contribute to the reconceptualization of apprenticeship in modern settings, reconciling the social aspects of learning with an interdependent learner-centred and teacher-centred pedagogy. Whilst the expansive-restrictive framework is valuable in identifying critical features that contribute to positive apprenticeship experiences (i.e. dual status of worker and learner; training off-the-job; qualifications for career progression), deeper insight into specific factors steering apprentices’ development is needed. Accordingly, this study builds on the expansive approaches to apprenticeships advocated by Fuller and Unwin and explores formal and informal learning drivers contributing to apprentices’ knowledge and skills.

Recognising the role played by the individual as self-directed learner, and the facilitative function played by colleagues, peers, experts, instructors in both the educational and the workplace settings, the developmental quality of the apprenticeship is discussed next as central to apprentices’ competence development.

2.3 The developmental quality of apprenticeship

In discussing the developmental quality of the apprenticeship this research focuses on the combined influence of formal and informal learning in shaping apprentices’ competence development. As argued by Poortman and colleagues (2011), a comprehensive theoretical framework for discussing workplace learning requires the reconciliation of the social and cognitive dimensions of learning. This statement is supported by Guile (2011, pp. 454) who discusses how Lave and Wenger’s conceptualisation (1991) of the teaching and learning curriculum is based on ‘separate realms of experience: a world of theory and a world of practice’, which whilst analytically different, present a mediated relation particularly relevant in the context of apprenticeship. Building on the work of Fuller and Unwin (1998) advocating learner-centred and teacher-centred activities as interdependent aspects of expansive learning processes, this research integrates principles of the formal and informal learning literature to develop a model of apprenticeship competence development.

Given the association between apprenticeship and the development of knowledge and skills required for effective performance (Vivian et al., 2012), the developmental quality of the apprenticeship is defined as the extent to which the apprenticeship, encompassing formal and informal learning activities, contributes to apprentices’ competence development. More

specifically, following the work of Dragoni and colleagues (2009) on managerial development, the developmental quality of apprenticeship encompasses features of the training intervention and the work environment that provide opportunities for learning new knowledge and skills. Whilst considerable research has explored apprentices' learning experiences in the workplace, a comprehensive model investigating the factors contributing to the developmental quality of the apprenticeship is needed. Accordingly, this research investigates formal and informal learning factors contributing to the development of critical competencies, providing insight into how best apprentices' professional development can be supported.

With a dual status of worker and learner (Fuller and Unwin, 2003b), apprentices engage in learning activities at the educational institution (college, University, training academy), and in the workplace. Whilst the former falls under the learning 'as acquisition' paradigm, entailing learning as a predominantly individualistic activity leading to the acquisition of knowledge, ideas, materials (Sfard, 1998), the latter is best described as learning 'as participation' (Sfard, 1998), resulting from practicing and interacting with people, tools and materials, placing emphasis on the context in which learning occurs (Felstead et al., 2005). Whilst postulating an integrated approach between formal and informal learning, the contribution of each learning mode to apprentices' development is reviewed respectively. The following section hence considers how formal and informal learning activities contribute to apprentices' development, unravelling the multidimensionality of competencies as the intended outcome of the apprenticeship.

2.3.1 Formal training

Formal training in apprenticeship is associated with the development of the technical and theoretical knowledge underpinning the job role and providing apprentices with the conceptual understanding required to progress in their occupation and in education (Fuller and Unwin, 1998; 2007). In the context of apprenticeship, formal training in the form of teacher-centred instruction and individual study away from the workplace contributes also to apprentices' personal development, representing an opportunity for reflection and for the development of the ability of critical thinking (Fuller and Unwin, 1998).

Recalling Engestrom (1994), Fuller and Unwin (1998), acknowledge the value of structured teaching and learning for the development of intellectual and critical abilities, central for generating innovative capabilities and for enhancing creativity and the ability to develop new ideas. Similarly, the development of a robust knowledge base has been associated with

‘particular ways of knowing, thinking and practicing’ when facing complex situations (Brown et al., 2012, pp. 757), reflecting the contribution of formal training to the development of more general and transferable skills. As argued by Cheng and Hampson (2008), in addition to delivering qualifications, formal off-the-job training contributes to developing generic skills that individuals can transfer to the workplace or between jobs throughout their career, supporting mobility and progression in the labour market.

Formal training is a statutory requirement of any apprenticeship (SASE, 2017) and is central to the development of apprentices’ theoretical knowledge and core skills, as already discussed by many commentators (Broackmann et al., 2010; Fuller and Unwin, 1998, 2003b). Whilst acknowledging the importance of training for the development of a substantial knowledge base, this research focuses on the factors that support the transfer and application of technical knowledge to the workplace underpinning apprentices’ performance. This is an imperative consideration given that for any training to be successful the knowledge and skills acquired in the training intervention need to be applied and translated into competent behaviours (Grossman and Salas, 2011). In doing so, this research builds on previous work on apprenticeship (i.e. the expansive-restrictive framework of Fuller and Unwin) and considers how facets of the work environment support the transfer and application of knowledge acquired through formal instruction to the job. On this basis, this research tests the association between formal training and the development and application of apprentices’ technical knowledge underpinning the occupation.

2.3.2 Informal learning

When considering apprentices’ learning activities in the workplace, Messmann and Mulder (2015) define them as learning activities carried out in relation to the accomplishment of work tasks. Apprentices’ learning in the workplace is therefore categorised as informal, hence taking place without being institutionally sponsored, arising mainly from experiences and interactions, and presenting various levels of intentionality.

Informal learning is usually presented in contrast with formal training, and basing the distinction on the locus of control, informal learning activities are depicted as learner-centred, whilst formal learning activities are presented as trainer-centred (Garavan et al., 2002). Marsick and Watkins (2001, pp. 25) follow this paradigm, describing formal learning as ‘institutionally sponsored, classroom-based, and highly structured’ and informal learning as ‘intentional but not highly structured’.

Marsick and Volpe (1999) describe informal learning as experiential and integral to working tasks and routines, arising as individuals face problems or challenges, whilst Boud and Middleton (2003, pp. 194) depict it as 'embedded in the practices and relationships of the workplace'. Similarly, Brown and Duguid (1991) portray informal learning as experiential, collaborative and highly contextual, stressing the integration of informal learning in the workplace, reflecting strong elements of interaction and engagement in practice.

Whilst informal learning activities have been presented as intentional, encompassing high levels of self-directedness, Marsick and Watkins (2001) present incidental learning as a subcategory of informal learning, and describe it as the learning arising as a by-product of other activities, such as experimenting and interacting, often resulting in unconscious tacit knowledge. In exploring the array of learning modes in non-formal learning, Eraut (2000) makes a distinction on the basis of intentionality, presenting implicit learning in contrast to deliberate learning. Whilst the former arises without a purposeful intention and without awareness at the time of learning, the latter is the result of planned learning efforts (Eraut, 2000). When an action is performed with reflection, informal learning is deliberately performed with the objective to learn; whilst incidental learning is the side-product of activities performed without an intended learning goal (Mulder, 2013).

Informal learning is often presented in terms of activities, defined by Marsick and Volpe (1999, pp. 4) as the 'action containers' of learning. In a longitudinal study on how early career professionals develop knowledge and skills, Eraut (2007) found informal learning to arise from consultations and collaborations within and outside the working group, and from the challenge of the work itself. In order to categorise the various informal learning activities identified, Eraut (2007) proposes a categorisation based on the principal object being either working or learning. Among activities classified as work processes with learning as a by-product, Eraut (2007) identifies participation in group processes, challenging tasks and roles, engaging in problem solving and trying things out, working alongside others, or with clients. Activities classified as learning processes encompass being supervised, coached and mentored, shadowing and independent study. Additionally, Eraut (2007) distinguishes a series of learning activities part of both the work and the learning processes, including asking questions, getting information, listening and observing, engaging in reflection, and giving and receiving feedback.

As reported by Messmann and Mulder (2015), learning activities are also classified in terms of being physical (i.e. researching the internet for new information, reading a book) or cognitive (i.e. the mental construction of ideas, concepts or strategies). In stressing the distinction between these types of activities, Mulder (2013) argues that physical learning activities can lead to cognitive learning activities, but this is not always the case. Cognitive activities correspond to the internal acquisition process where knowledge is actively constructed through processes of accumulation, assimilation, accommodation and transformation (Piaget, 1952; Poortman et al., 2011).

A further conceptualisation of informal learning considers it as an individual or a social activity. Whilst individual learning takes place without social interaction, arising from reflecting individually on work situations or interacting with media and cultural artefacts such as consulting manuals, social learning activities are classified as learning from others and learning together (Doornbos et al., 2004). The former involves a one-way developmental relation in which the individual learns from interacting with others, but the interaction does not necessarily contribute to the development of other part. Examples are receiving feedback and role modelling. The latter sees all parties learning from the interaction and being aware of the respective learning. Examples include group discussions reflecting on work situations, evaluating different perspectives and constructing shared meaning (Doornbos et al., 2004).

Ultimately, Messmann and Mulder (2015) argue that informal learning activities are domain-specific, in that the particular learning activity adopted is determined by the nature of the work tasks and the work environment. Accordingly, while in some situations engaging in discussions with colleagues would be the most suitable course of action for dealing with a work tasks, in other domains searching for information in relevant media would be the most suitable strategy.

Whilst different categorisations of informal learning exist, the significance of informal learning in developing the competencies required by individuals to effectively operate in complex and increasingly changing work environments has been widely recognised (Bednall et al., 2014; van Rijn et al., 2013). Additionally, informal learning is by nature highly contextual, occurring ‘just in time’ when individuals face challenging situations or unanticipated needs (Marsick and Volpe, 1999), with the inherent advantage of eluding the issue of transfer of learning intrinsic to formal training.

The theories of adult development such as andragogy (Knowles, 1980) and experiential learning (Kolb, 1984) can inform our understanding of informal learning through the constructs of self-directedness and reflection. The concept of self-directedness follows the humanist andragogical assumption that views individuals as autonomous and growth-oriented agents, with a mature orientation towards learning as a means for facing work and life-related challenges with a self-development approach (Knowles, 1980, 1990). A central assumption of andragogy is the learner as proactive agent, capable of identifying learning needs and implementing learning strategies in a learner-centred approach (Knowles, 1990). While the principle of self-directedness has been popularised by Knowles (1980) as part of the andragogical approach to adult development as opposed to the traditional pedagogical approach, it provides valuable insight into informal learning in considering the individual agency in taking advantage of learning opportunities, directing learning needs, and developing the ability to learn as sustainable competence.

Whilst Doornbos and colleagues (2004) argue that self-directed learning is an educational construct which assigns an explicit role to the learner in organising and planning the learning event, hence overlooking much of the learning occurring implicitly and unconsciously at work, the scholars acknowledge the relevance of the construct in the workplace in portraying the intention to take advantage of learning opportunities, involving a certain degree of control over one's development.

The experiential learning theory presents learning as a cyclical on-going process of experiences, reflection, conceptualisation and experimentation (Kolb, 1984), where the learner creates knowledge and adapts on the basis of concrete experiences. Such conceptualisation is strongly linked to the experiential dimension of informal learning, and is important in recognising the focal role of reflection in enabling the individual to move from the mere experiential stage to a conscious process of learning, engaging in generative, rather than adaptive learning (Senge, 1990), thus enhancing opportunities for competence development. As argued by Cheetham and Chivers (2001), theories of andragogy and experiential learning do overlap, however, the scholars acknowledge the possibility for individuals to engage in experiential learning without necessarily being self-directed and highly aware of one's learning needs, but to recognise these in retrospect following the reflection process in the learning cycle.

Given that informal learning can be either planned or unplanned, with incidental learning resulting in the development of tacit knowledge, the process of reflection plays a central role in enabling individuals to probe and explore the experiences in insight, as in learning from mistakes or unsystematic processes of trial and error (Marsick and Watkins, 2001). As argued by van Woerkom (2004, pp. 182), ‘reflection is important in examining one’s experience to assess its effectiveness and to improve performance’, recognising the contribution to the individual in developing further knowledge and competencies, and to the organisation fostering continual improvements (Argyris and Schon, 1978). In a research project on critical reflection at work, van Woerkom (2003) operationalised the construct of critical reflective behaviour in seven work activities carried out individually or in interaction with others, finding these to positively affect individual competence development. The activities encompass reflection, experimentation, learning from mistakes, career awareness, critical opinion sharing, asking for feedback and challenging groupthink, and are strongly aligned with the informal learning activities identified in research.

Informal learning is therefore defined as deliberate or reactive learning activities, taking place in the workplace, individually or in social interaction, and leading to competence development. With numerous studies providing empirical evidence of how individuals develop job competence in the workplace through processes of social interaction and engagement in practice (i.e. Lave and Wenger, 1991; Eraut, 2007; Felstead et al., 2005; Janssens et al., 2017), informal learning is deemed pivotal to apprentices’ competence development.

In line with situated learning theories, informal learning takes place in the workplace, as the social context presenting individuals with access to a wide range of resources encompassing social and physical circumstances, histories and social relations, allowing to experience learning in deep connection with the context in which it has meaning (Brown and Duguid, 1991). As a result of the highly situated nature of workplace learning, Brown and Duguid (1991) contend that individuals are better placed to learn how to function in the community, understanding how to make appropriate use of the community’s practices and shared repertoire. On a similar line, Brown and colleagues (2012) maintain that workplace learning presents complementarities in the learning of technical, social and networking skills, supporting the argument that informal learning contributes to functional, social and behavioural skills.

On this basis, this research tests the association between informal learning and the development and application of behaviour-based competencies reflecting apprentices' job competence and work and business skills.

As represented in Fig. 2.1, formal training in apprenticeship is associated with the development of technical knowledge. Conversely, informal learning in the workplace is associated with the development of job competence and work and business skills. Given the array of competencies developed through formal and informal learning activities, the following section introduces a categorisation of apprentices' competencies, evaluating their relevance for apprentices' performance.

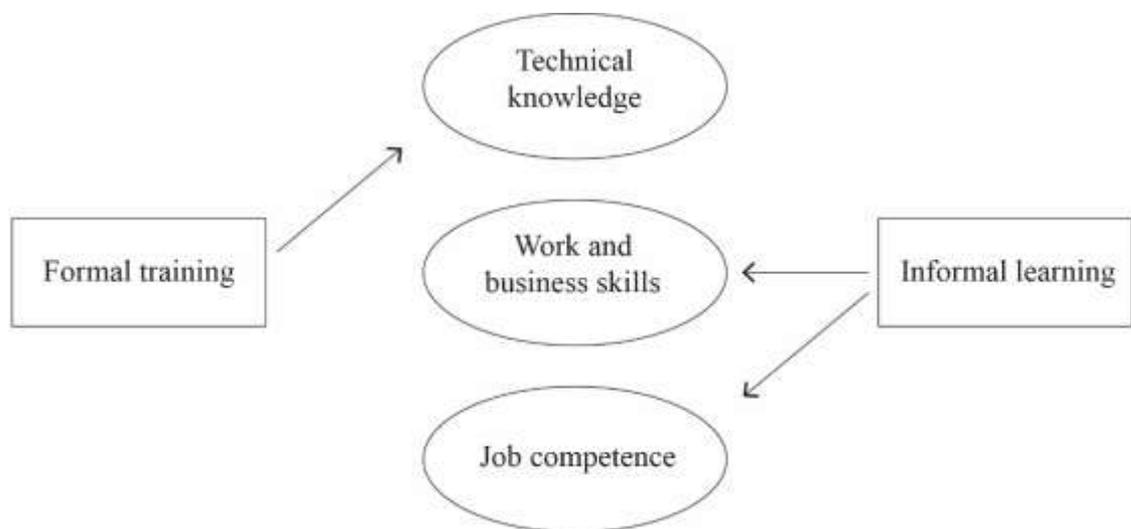


Fig. 2.1 The impact of formal and informal learning on apprentices' end-state competencies.

2.4 A typology of apprenticeship competencies

Having discussed the developmental quality of the apprenticeship in contributing to apprentices' competence development, a typology of apprenticeship competencies is advanced. A typology is required in order to categorise the competencies developed through the apprenticeship, and test the association of each category with particular facets of the training intervention and the work environment. This enables the research to provide greater insight and understanding into how the apprenticeship contributes to competence

development, by looking at specific performance behaviour-based competencies and exploring what factors are conducive to this end.

This is an important step in advancing research as to my knowledge no other studies have sought to empirically examine the impact of the apprenticeship on the observable development of particular end-state competencies critical for effective performance (see Vaughan (2017) as an exception in considering the role of apprenticeship in cultivating soft skills and dispositions). The research builds on studies conducted on leadership development (i.e. De Rue and Wellmann, 2009; Dragoni et al., 2009), and explores the impact of formal and informal learning on the development of important competencies. In doing so, it addresses the limitations of previous studies which have only considered learning (i.e. learning activities) as outcome of interest (i.e. Messmann and Mulder, 2015) and provides greater understanding on what factors in the training intervention and the work environment are related to the development of meaningful competencies. Before presenting such a typology, a discussion of the concept of competency is warranted.

2.4.1 Defining competencies

The literature presents several interpretations of the term competence and various scholars have stressed the importance of clarifying the terminology as competency frameworks have increasingly been used in human resource management and development interventions (Garavan and McGuire, 2001; Moore, Cheng and Dainly, 2002). As the term competence and competency have been used interchangeably, Rowe (1995) advances a clarification presenting ‘competence’ as the standard of performance reached, referring to what people can do, and ‘competency’ as the behaviours underlying such performance, referring to how the standard is achieved, presenting a clear interface between the two concepts, with suitable competence depending on appropriate competencies and vice versa.

Competencies are here defined at individual level, as knowledge, skills and abilities required for effective job performance. As such, competencies represent a dynamic construct, which individuals progressively develop by means of training and experience, and are inherently multidimensional. A multi-dimensional view of professional competence was firstly advanced by Cheetham and Chivers (1996; 1998), who proposed a model integrating cognitive (know-that and know-why) and functional competencies (know-how), with ethical, personal (know how to behave) and meta-competencies, as in the ability to learn and reflect. The scholars presented professional competence as the product of various

interrelated components, whose presence and integration stands at the basis of effective performance (Le Deist and Winterton, 2005).

A holistic model of competence was later advanced by Le Deist and Winterton (2005), arguing that a holistic typology better responds to the requirements of particular occupations, recognising that functional, cognitive, and behavioural competencies are core to any competence model. The scholars present a model featuring four main competencies and place meta-competence, intended as the ability to learn, at the centre of the model as the input required for acquiring further competencies.

The remaining three competencies represent the conceptual knowledge and understanding; the functional skills, and the social attitudes and behaviours, and are all required for effective performance. Such perspective presents implications for competence development, since they are developed integrating educational and workplace learning and exploiting the synergy between formal and informal learning (Le Deist and Winterton, 2005). This angle provides insight in guiding the analysis of apprenticeship as in recognising the multidimensional configuration of the apprenticeship end-state competencies and the integrated approach underpinning apprentices' development.

2.4.2 Apprenticeship end-state competencies

As a model of learning in employment, apprenticeships are designed to equip apprentices with job competence, technical knowledge and work and business skills (National Apprenticeship Service, 2014). This is reflected in the SASE (2017) setting out the minimum requirements to be included in any apprenticeship framework, comprising the *competencies qualification* required to demonstrate competence in performing the skill, trade or occupation; the *technical knowledge qualification*, required to demonstrate attainment of technical skills, knowledge and theoretical understanding underlying the occupation; functional skills in English, Mathematics, Information and Communications Technology (ICT), Employee Rights and Responsibilities (ERR) and Personal Learning and Thinking Skills (PLTS).

On this basis, apprentices' end-state competencies are classified into three main categories:

- **Job competence:** as in the functional and operational skills required for delivering the job role effectively. Skills refer to 'aspects of behaviour which are practiced in the work situation, and which individuals need to be able to perform at an acceptable level in order to do the job satisfactorily' (Marchington and Wilkinson, 2008, pp.

344). Job competence in apprenticeship is usually accredited by National Vocational Qualifications (NVQ) on the basis of occupational standards of competence, as apprentices are assessed in a range of job-specific tasks against performance criteria establishing behaviours and vocational skills required to meet the apprenticeship standard.

- **Technical knowledge:** refers to the theoretical knowledge underpinning the job role. Given the emphasis on advanced and high levels skills in today's economy, the theoretical knowledge base is a fundamental component in any apprenticeship (Lee, 2012), in providing individuals with the conceptual understanding for educational and occupational progression. It encompasses technical skills, knowledge and understanding of theoretical concepts and of the industry and markets relevant to the occupation (SASE, 2017).
- **Work and business skills:** a category encompassing a vast range of skills and competencies intended to be transferable to other occupations and sectors, and therefore regarded as generic and fundamental for effective performance. The UK Governments have placed emphasis on 'core skills' intended as essential skills that ought to be included in any competence-based development programme (Cheetham and Chivers, 1996). Such core skills are referred to as Functional/Key skills in the SASE (2017) and include English, Math, ICT, ERR and PLTS.

Whilst English, Math and ICT are not reviewed in this research, as they are under the remit of the educational system, PLTSs are considered as transferable work and business skills developed in the workplace. Among these feature skills of independent enquiry, creative thinking, reflective learning, team working, self-management and effective participation (SASE, 2017).

Whilst the new apprenticeship standards under development have adopted a slightly different terminology, referring to job competence as vocational skills, technical knowledge as academic knowledge, and work and business skills as occupational behaviours, this study maintains the terminology adopted by the National Apprenticeship Service in 2014 when the research project started to ensure clarity and consistency.

This multidimensional representation of the apprenticeship end-state competencies is aligned with the competence models presented in the literature, advancing professional competence as the product of various interrelated components whose integration is required for effective performance (Cheetham and Chivers, 1996, 1998; Le Deist and Winterton, 2005). Job competence, technical knowledge and work and business skills are the outcomes of interest in the model of apprenticeship development, which analytically distinguishes between core elements constituting the basis for occupational performance (Le Deist and Winterton, 2005).

2.5 Facilitative conditions for competence development

Having presented the developmental quality of the apprenticeship and the end-state competencies associated with it, the focus now turns to the work environment as an important determinant of apprentices' learning experiences. In introducing an organisational perspective to the study of apprenticeship, this research considers how facets of the work environment sustain apprentices' development intertwining educational experiences with developmental activities inside the workplace.

A focus on the work environment is justified by an epistemological consideration of the construct of competence, shedding light on the processes at the basis of competence development. The literature presents two main approaches to the notion of competence, with a rationalist positivistic approach presenting competence as an attribute-based phenomenon (i.e. Boyatzis, 1982), as in the knowledge and skills required for effective performance, viewing competence as context-independent; and an interpretivist approach, focusing on how people use competence at work, intended as the lived experience of work (Sandberg, 2000). Whilst as attribute-based concept, the notion of competence is approached prescriptively and out of context, the interpretivist approach acknowledges its situational and context-dependent dimension, with implications for its tacit component (Sandberg, 2000).

In recognising the tacit dimension of competence (Polany, 1967), the internal organisational context and employees' experiences of work take centre stage (Garavan and McGuire, 2001), contributing to identifying individual perceptions as antecedents of competence development and to recognise the importance of informal learning in addition to traditional training interventions. An interdisciplinary approach is therefore required to enhance the understanding of the processes at the basis of competence development, integrating the formal and informal learning literatures.

Given such interdisciplinary approach, the methodology of the traditional narrative review is adopted here, identifying key papers and relevant secondary studies in the two themes under consideration with the aim of evaluating relevant research findings and theoretical developments (MacPherson and Jones, 2010). The literature has traditionally presented two contrasting approaches to the study of employees' development, with the conventional approach examining formal training interventions as a source of knowledge and expertise (Arthur et al., 2003) and the informal learning approach investigating employees' development because of participation in work practices (Brown and Duguid, 1991; Marsick and Watkins, 2001). Considering the abundance of empirical studies, reviews and meta-analysis on formal and informal learning (i.e. Bell et al., 2017; Cerasoli et al., 2018; Cheetham and Chivers, 2001; Conlon, 2004; Grossman and Salas, 2011; Massenberg et al., 2017), this review is not intended to be comprehensive but rather aims to identify the most critical factors to inform the research hypotheses.

2.5.1 Formal training review and hypotheses development

Formal training refers to those activities initiated by the organisation in order to develop employees' critical competencies for job performance, encompassing cognitive, behavioural and affective learning outcomes (Grossman and Salas, 2011). Researchers have long conceded that although individuals may learn from participating in formal training, such training cannot be considered effective unless the acquired knowledge and skills are transferred to the workplace resulting in changes in performance (Blume et al., 2010).

Transfer of training is defined as generalisation and maintenance of acquired knowledge, skills and behaviours to the work context (Baldwin and Ford, 1988). As reported by Ford and Weissbein (1997), generalisation implies the ability of trainees to apply the trained behaviours in different settings, people and situations, whilst maintenance refers to the ability of maintaining the knowledge, skills and behaviours over time. In the context of apprenticeship, where formal training represents one of the processes leading to apprentices' competence development, transfer of training is pivotal in enabling apprentices to take action based on the knowledge and skills acquired through formal instruction.

Research on training transfer has been largely based on the Baldwin and Ford's model (1988), which categorises the transfer process into input factors (trainee characteristics, training design and work environment), outcomes of training (learning and retention) and transfer (generalisation and maintenance of learning on the job). Comprehensive reviews have examined the variables factoring in each category, presenting extensive knowledge on

the factors exhibiting strong relationships with transfer (i.e. Blume et al., 2010; Bell et al., 2017; Burke and Hutchins, 2007; Chen and Hampson, 2008; Grossman and Salas, 2011). Trainees' individual factors encompass ability, skills, motivation and personality; training intervention factors comprise training methods and objectives, learning principles and opportunities for practice; whilst the work environment consists of transfer climate, peer and supervisor support, and opportunities to apply the new knowledge and skills on the job (Blume et al., 2010).

Research into vocational education has recently drawn on this model to identify the factors facilitating or obstructing students' transfer of knowledge between school and work (Pineda-Herrero et al., 2015; Renta Davids et al., 2017), presenting it as a valid framework for examining the factors supporting learning transfer in the context of apprenticeships. As discussed by Renta Davids and her colleagues (2017), the framework advanced by Baldwin and Ford (1998) allows the simultaneous assessment of different factors within the transfer process, enabling the identification of critical factors facilitating or obstructing transfer of learning.

Accordingly, as presented in Fig. 2.2, in investigating the developmental quality of the apprenticeship, this research focuses on the training intervention and the work environment factors that have shown strong and consistent relationships with transfer on the assumption that such input variables would sustain apprentices' learning and contribute to the development of a robust knowledge base.

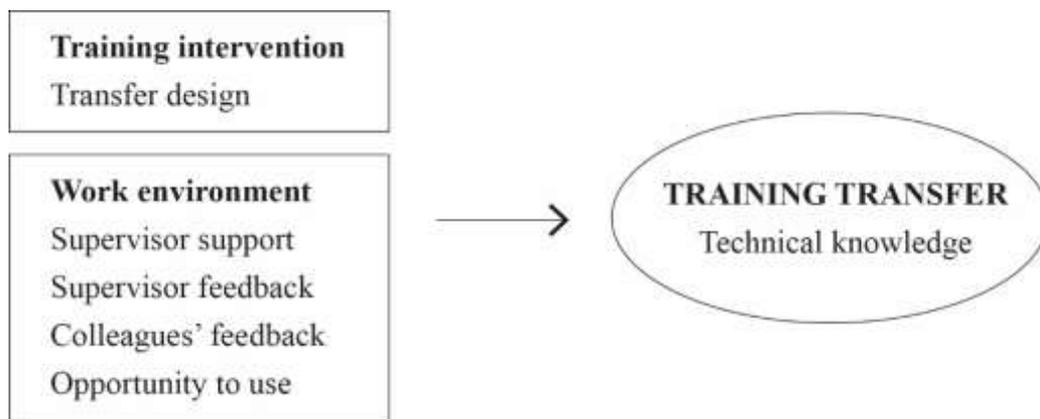


Fig. 2.2 The association between formal training and apprentices' technical knowledge

Training intervention: transfer design

Studies on training delivery have focused on trainees' need analysis (Arthur et al., 2003), instructional methods as behaviour modelling (Taylor et al., 2005) and goal setting techniques (Noe, 2008), to name only a few of the variables investigated as influencing learning transfer. As transfer of training is here discussed as contributing to apprentices' technical knowledge, its design is considered as a factor strongly related to the transfer and application of such knowledge in the workplace.

Transfer design refers to the 'degree to which 1) training has been designed and delivered to give trainees the ability to transfer learning to the job, and 2) training instructions match job requirements' (Holton et al., 2000, pp. 345). Accordingly, transfer design encompasses activities and exercises devised to help trainees to understand how to apply new knowledge and skills on-the-job, sustaining training transfer. As discussed by Diamantidis and Chatzoglou (2014), trainees need to be guided during the training intervention in how to apply new knowledge and skills to the job.

In terms of transfer generalisability, Laker (1990) presents two dimensions with implications for the design of the training intervention: near transfer refers to the extent to which trainees apply the acquired knowledge and skills to situations analogous to the training intervention; far transfer on the other hand, refers to the extent to which trainees apply the training content to novel and unrelated situations. Laker (1990) argues that the achievement of near or far transfer depends on the theoretical underpinnings of the training design. Specifically, Laker (1990) suggests that near transfer is influenced by the principles of identical-elements theory (Holding, 1965), in that learning transfer is maximised through a close physical and psychological representation of the work environment in the training settings; on the other hand, far transfer is underpinned by the Principles Theory (Goldstein, 1986), which stresses the understanding of underlying assumptions and their application to novel and abstract situations.

Empirical research presents strong evidence of a positive relation between transfer design and training transfer when the former matches job requirements and provides trainees with the understanding of how to apply training on-the-job (i.e. Bates et al., 2000; Diamantidis and Chatzoglou, 2014; Velada et al., 2007). Such evidence demonstrates that when training is delivered using techniques, activities, exercises and examples that reflect the applicability of the training content in the workplace, transfer of training is enhanced. Additionally, apprenticeship research has recently considered the alignment between the school and the

organisational environment. As discussed by Mulder, Messman and Konig (2015) alignment indicates that the learning processes at school and in the workplace are consistent and build upon each other. In a study on a sample of apprentices in Germany, Messmann and Mulder (2015) hypothesised that the integration of work tasks as examples in school learning processes along with discussions and elucidations into how school-based learning outcomes are applicable in the work context, would foster apprentices' learning in the workplace. In finding work-oriented learning at school in positive association with apprentices' enquiring in the workplace, their study presents preliminary evidence for the importance of school-work alignment in apprenticeships.

With research considering school-work alignment as determinant of apprentices' engagement in workplace learning, it is important to examine the association between transfer design, representing both the relevance of training content to the job and the way the training is structured and delivered, and learning transfer. The following hypothesis is therefore advanced:

H1a Transfer design is positively related to the transfer of technical knowledge

Work environment: support, feedback and opportunities

The training literature is in strong agreement on the fact that the work environment following the training intervention significantly influences learning transfer encouraging the application of new knowledge and skills on the job (Holton et al., 2000; Tracey et al., 1995). With apprentices acquiring technical and theoretical knowledge off-the-job whilst being an integral part of the workforce, the work environment necessitates great consideration in contributing to widen and reinforce the apprentices' knowledge base. Additionally, with apprentices developing generic work and business skills in formal training providing space for reflection (Fuller and Unwin, 1998), the work environment is important in facilitating the integration of such skills in apprentices' daily activities.

In 1988 Baldwin and Ford called for further conceptualisation and operationalisation of the work environment factors impacting on transfer. Over the years, advancements have been made in defining the work environment constructs of transfer climate, support and opportunity to use, and in demonstrating the influence of such factors over transfer (Ford and Weissbeim, 1997).

Transfer climate has been defined by Rouiller and Goldstein (1993) as the job situations that either inhibit or facilitate learning transfer, classifying the characteristics of transfer climate in situational cues and consequences. Whilst situational cues include manager goals, peer support and equipment availability, intended to remind trainees of their learning and providing them with opportunities to apply it, consequences entail punishment or positive or negative feedback following the application of learning on-the-job (Rouiller and Goldstein, 1993). The effects of transfer climate have been examined in various studies, with Tracey and colleagues (1995) finding a direct relationship between transfer climate and post-training behaviours, and Colquitt and colleagues (2000) reporting climate to be moderately related to both motivation to learn and learning transfer. Additionally, the impact of transfer climate has been confirmed in a meta-analysis by Blume and colleagues (2010), finding climate to have the highest relationship with transfer (.27) in comparison to other work environment factors.

Although support and opportunity to perform feature among the transfer climate situational cues, research has found these variables to uniquely impact training transfer (Burke and Hutchins, 2007). Supervisor's feedback is a constant factor in learning transfer research (Clarke, 2002), with studies reporting a positive relationship between supervisor's support and transfer (i.e. Blume et al., 2010; Lim and Johnson, 2002; Van den Bossche, Segers and Jansen, 2010; Xiao, 1996). As argued by Grossman and Salas (2011), supervisors provide support in multiple stages over the training process; prior to training, goal setting in the form of action plans or learning agreements between trainees and supervisors, can enhance commitment and motivation on both parts, resulting in greater transfer (Noe, 2008). Following training, supervisors need to provide employees with time, space and support required to transfer the newly acquired knowledge on the job (Diamantidis and Chatzoglou, 2014), recognising the multidimensional role of the supervisor in adopting a variety of attitudes and behaviours over various stages in the training transfer process (Govaerts and Dochy, 2014).

Despite the widespread agreement on the influence of supervisor support, some studies present non-significant relationships between supervisor support and transfer (i.e. Awoniyi et al., 2002; Chiaburu and Marinova, 2005; Velada et al., 2007) leading scholars to question the validity of the construct. A recent review on the role of supervisors in training transfer has revealed that a lack of conceptual clarity has led scholars to operationalise the construct of supervisor support differently, limiting opportunities for integration and generalisation of

previous findings (Govaerts and Dochy, 2014). Despite the contradictory evidence, this research maintains the dominant view in the transfer literature and following the approach taken by Chiaburu and Marinova (2005) conceptualises supervisor supports as encompassing a general view of employee development and more specific practical aspects as providing trainees with time for practicing new skills and offering reminders on the application of new knowledge and skills.

With research into vocational education increasingly considering the role of the workplace supervisor in supporting training transfer (Pineda-Herrero et al., 2015; Renta Davids et al., 2017), the following hypothesis is therefore advanced:

H1b Supervisor support is positively related to the transfer of technical knowledge

Peer support has also been consistently related with transfer (i.e. Cromwell and Kolb, 2004; Facticeau et al., 1995; Hawley and Barnard, 2005; Xiao, 1996). In a study combining individual and contextual dimensions such as goal orientation, training self-efficacy, peer and supervisor support, Chiaburu and Marinova (2005) identified peer support as the variable having the only direct relationship with transfer. The scholars stress the importance of encouraging peer support in organisations through knowledge management and performance management systems rewarding knowledge sharing and mutual support (Chiaburu and Marinova, 2005).

On the contrary, Blume and colleagues (2010) report peer support to have a weaker relationship (.14) than supervisor support (.31) with transfer, but acknowledge the findings to be based on small sample sizes. As ultimately argued by Grossman and Salas (2011), support from both peers and supervisors is important, and evidence is still limited on what factor exerts stronger influence. As reported by Van den Bossche, Segers and Jansen (2010), social support is a work environment factor strongly related with transfer, and referring to Russ-Eft (2002) the scholars maintain that whilst peers primarily support the use of learning on the job providing assistance and positive feedback, supervisors' support is mainly related to providing reinforcement for learning on-the-job.

Feedback from both peers and supervisors has been analysed as a support factor, with Velada and colleagues (2007) finding feedback on performance after training to significantly predict transfer. Feedback, positive and negative, features in transfer climate (Rouiller and

Goldstein, 1993), and feedback quality in terms of helpfulness as well as the number of feedback sources have been found in positive relation with transfer, proving that a diverse range of feedback sources benefits training transfer (Van den Bossche et al., 2010).

In light of the positive evidence that feedback contributes to learning and performance, Salas and colleagues (2006) note that in order to be effective, feedback ought to meet specific criteria. These include being related to the performance of the task and not to the specific individual; providing information on how to improve learning in order to meet performance requirements; being perceived as relevant at all applicable levels, such as the individual and the team.

In recognising the importance of feedback as support factor along with the importance of conceptualising support according to its source (i.e. peers and supervisor) (Chiaburu and Marinova, 2005), this research explores the association between apprentices' job environment feedback request and training transfer. Following Diamantidis and Chatzoglou (2014), feedback from colleagues and feedback from supervisors is investigated as a factor that in enabling the intersection of formal and informal learning, contributes to the application of newly acquired knowledge and skills to the job. In light of compelling evidence that feedback seeking facilitates transfer of training (Sparr, Knipfer and Willems, 2017), the following hypothesis are advanced:

H1c Colleagues' feedback is positively related to the transfer of technical knowledge

H1d Supervisor's feedback is positively related to the transfer of technical knowledge

Finally, trainees need resources and plentiful opportunities to apply the knowledge and skills acquired off-the-job to the workplace (Burke and Hutchins, 2007; Grossmann and Salas, 2011). A study of the factors influencing transfer within a human service agency identified limited opportunities to perform the newly acquired skills as the main barrier to transfer (Clarke, 2002), whilst interviews with trainees in a study conducted by Gilpin-Jackson and Bushe (2007) identified lack of time as the explanation for low transfer levels.

Opportunity to use was identified as the main reason for transfer in a study on Korean organisations (Lim and Johnson, 2002), and features as an individual-level perception in the Learning Transfer System Inventory (LTSI) measuring 'the extent to which trainees are provided with or obtain resources and tasks on the job enabling them to use training on the

job' (Holton et al., 2000, pp. 345). In a study on the role of interpersonal factors in the application of training, Bates and colleagues (2000) found opportunity to use to influence training transfer indirectly through its relationship with content validity, whilst Seyler and colleagues (1998) found opportunity to use to be a significant predictor of motivation to transfer.

On the basis of the empirical and conceptual evidence reviewed, the following hypothesis is formulated:

H1e Opportunity to use the knowledge and skills acquired in training is positively related to the transfer of technical knowledge

2.5.2 Informal learning review and hypotheses development

The situated nature of learning is the key theme running throughout the review of apprenticeship as model of learning, and of informal learning as source of competence development. However, despite the empirical and theoretical contributions of the situated perspective in recognising the social context as source of knowledge through interaction and participation in practice, the approach has been criticised for being restricted to a simple representation of how newcomers are socialised in the practices of the community (Cox, 2005), and for overlooking the individual agency in adopting different forms of participation (Handley et al., 2006).

The role of the individual in determining the engagement in workplace learning has been recognised by Billett (2001), who presents workplace learning as an inter-psychological process between workplace affordances and individual agencies, intended as how individuals select to engage in such affordances. In line with situated learning, Billett (2001) acknowledges the focal role played by the work environment as in providing opportunities to engage in practice and interactions, but stresses the mediating role of individual agency. Learning is therefore presented as the result of workplace experiences, mediated by both the contributions of the workplace and individual agency. The latter represents both how individuals decide to participate in learning opportunities, and what they construe from such experiences.

Given that engagement in workplace learning is relatively under individual control, understanding the factors encouraging participation in informal learning is pivotal (Bednall et al., 2014). Researchers have long examined the interplay between informal learning

activities, the work environment and individual characteristics of those engaging in such activities in order to further the understanding of how contextual and personal factors enhance or constrain informal learning (i.e. Boud and Middleton, 2003; Kwakman, 2003; Skule, 2004).

Studies addressing individual characteristics have found self-efficacy and learning orientation to be positively related to activities such as reflection and feedback asking (Runhaar, Sanders and Yang, 2010), while van Rijn, Yang and Sanders (2013) identified career motivation to positively affect individuals' engagement in activities as keeping up-to-date, knowledge sharing and asking for feedback from supervisors, finding the former to be positively strengthened by individual self-construal.

A conceptual model advanced by Doornbos, Bolhuis and Simons (2004) presents six work environment characteristics influencing work-related learning, encompassing managerial support, collegial support, opportunities to interact with different partners, task variation, work pressure and the level of individual autonomy. The scholars postulate that the level of attention, feedback, advice and support provided by managers and colleagues is expected to influence participation in workplace learning; additionally, the possibility to interact with a variety of partners and knowledgeable practitioners presents further opportunities to learn from and with others. Following Kwakman (2003), Doornbos and colleagues (2004) differentiate between work environment and task factors, identifying task variation and autonomy as conducive to intentional work-related learning.

Empirical support for some of these factors was found in a study conducted on apprentices in Germany. Messmann and Mulder (2015) found apprentices perceiving work as complex, providing autonomy and support to more strongly engage in reflection on work-related challenges. Additionally, perceptions of work as complex were associated with apprentices' engaging in reflective interactions with others, presenting evidence that work complexity, autonomy and social support facilitate informal learning in the workplace.

Among studies investigating the work environment factors inhibiting participation in informal learning, Lohman (2000) identifies lack of time, lack of proximity to resources, lack of meaningful rewards for learning, and limited decision-making power as the main factors preventing teacher's engagement in workplace learning. Similar findings were reported in a larger study conducted on public school teachers in the USA identifying lack of time, lack of proximity to colleagues' work areas, and insufficient funds as the main

environmental inhibitors to learning (Lohman, 2006). Such findings are aligned with the model presented by Doornbos and colleagues (2004) and with the empirical findings presented by Kwakman (2003) in that collegial availability and support from colleagues were found to influence engagement in interactive learning activities.

Furthermore, in a quantitative study surveying 1300 employees in the private sector and 200 employees in the public sector in Norway, Skule (2004) identified seven conditions conducive to informal learning. These include exposure to changes, as in changes in technology and working methods; exposure to demands from customers, colleagues or managers; managerial responsibilities, as in task decision making or group projects; extensive professional contacts, as in participation in forums, trade fairs and occupational networks; superior feedback, as in learning from the results of work; management support for learning, as in feelings of encouragement from management; rewards of proficiency, as in monetary rewards or career opportunities. The empirical results of the study are strongly aligned with the theoretical model advanced by Doornbos and colleagues (2004) and with the findings of Eraut (2007), and introduce human resource policies such as reward and career opportunities as an additional factor.

Factors affecting apprentices' learning in the workplace

The most salient factors influencing apprentices' participation in informal learning are still unclear. Additionally, whilst research on formal training is widely established with a plethora of studies exploring factors supporting training transfer, several reviews and meta-analysis (i.e. Artur et al., 2003; Bell et al., 2017; Burke and Hutchins, 2007; Grossman and Salas, 2011; Massenberg et al., 2017), and tested instruments for data collection (i.e. The Learning Transfer System Inventory by Holton and colleagues, 2000), research on informal learning is less consolidated.

As discussed by Skule (2004), informal learning research faces a lack of indicators for measuring and comparing the quality of the learning environment. The scholar argues that most research on informal learning has adopted qualitative methods, which although insightful in identifying factors conducive to informal learning, is limited in generalisation hindering comparative studies across the economy. Additionally, parameters conventionally used to measure formal learning (i.e. level of qualification, number of hours of training attended) are not transferable to the informal learning domain.

In light of these considerations, Skule (2004) overcomes the difficulties in measuring informal learning directly, by developing and empirically testing a framework of the learning environment. The seven conditions conducive to informal learning identified in his research, although not exhaustive, are associated with learning intensive jobs and present the basis for measuring, comparing and assessing the quality of the workplace across industries and job types (Skule, 2004). This view is supported by Felstead and his colleagues (2005) who argue in favour of further examining the connections between learning and work design, and call on researchers to build ‘on the lessons of case studies which focus on how learning takes place in the work context’ (Felstead et al., 2005, pp. 361).

When considering research on apprenticeship (i.e. Gijbels, Raemdonck and Vervecken, 2010; Messmann and Mulder, 2015), the quality of the work environment has been assessed following the principles of the social psychological theory of work stress, also known as the Job Demand-Control Model (Karasek, 1979) and the Job Demand-Control-Support model (DCSM) (Karasek and Theorell, 1990). According to the former, the interaction between job demand and job control can result in situations of strain (low strain or high-strain respectively). Alternatively, having decision latitude (i.e. job control) in situations of high psychological demand (i.e. mental workload, conflicting demands) can foster learning, motivation and the development of skills (Van der Doef and Maes, 1999). The DCSM introduces the dimension of social support and presents job characterised by high demand, low control and low support at risk of poor psychological well-being and poor health. Conversely, jobs providing an optimal balance of job demand, job control and social support are set to foster an active work orientation, enhancing opportunities for learning and development (Karasek and Theorell, 1990; Raemdonck, Gijbels and van Groen, 2014).

Studies on apprenticeship have examined the work environment dimensions of work complexity, work autonomy and needs support as proxies for the dimensions of the DCSM (i.e. Messmann and Mulder, 2015), presenting evidence of how dimensions of the work environment facilitate apprentices’ engagement in informal learning. However, whilst the social psychological theory of work stress is insightful in turning the focus on situations of ‘active learning’ and in addressing relevant facets of the work environment, such factors are inherently multidimensional and need to be operationalised carefully (Kwakman, 2003). Following Kwakman (2003) and Doornbos and colleagues (2004), this research differentiates between work environment and task factors and considers six constructs as contributing to apprentices’ competence development, as presented in figure 2.3:

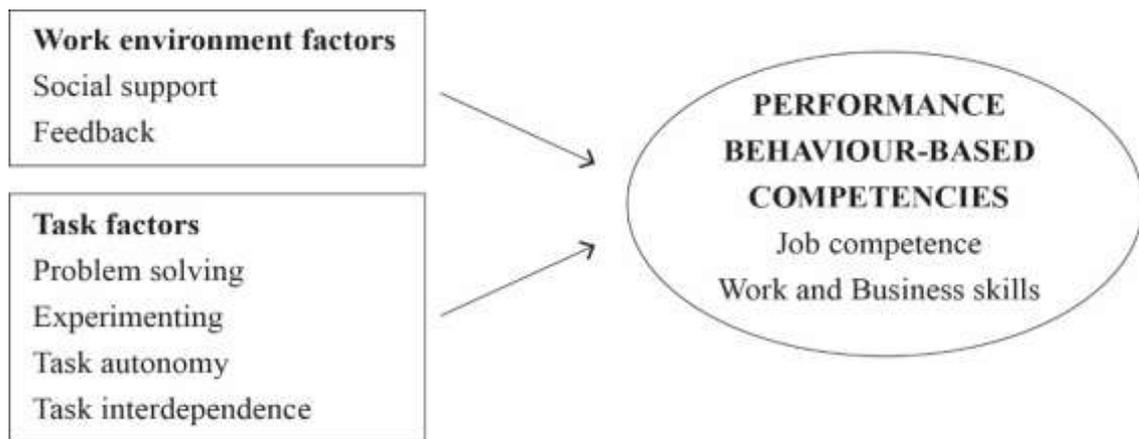


Fig. 2.3 The association between informal learning and apprentices' performance behaviour-based competencies

Social Support

As argued by Brown (2013), working and learning are social activities, and work relationships contribute to the development of knowledge and skills. Informal learning is indeed highly dependent on the quality of the human relationships in the workplace (Eraut, 2004) and social and pedagogical relationships have been identified as pivotal in apprenticeship (Fuller and Unwin, 2003c).

As postulated by Doornbos and colleagues (2004), the attention, feedback, advice and encouragement provided by colleagues and superiors, is likely to stimulate work-related learning. Social support, as in support from colleagues, has been found to influence participation in informal learning activities, although results presented by Kwakman (2003) indicate that the effects of support on participation in informal learning are relatively small. Evidence presented by Eraut and colleagues (2000) indicates that support from colleagues is important in building early career professionals' levels of confidence in taking on challenging tasks, presenting a triangular relationship between confidence, support and challenges.

When considering apprentices, as junior category of employees facing novel and challenging work situations, social support plays the role of psychological guidance in providing them with the resources required for remaining motivated (Messmann and Mulder, 2015). Evidence available on the role of social support in apprenticeship is however mixed. The study conducted by Gijbels and colleagues (2010) in Belgium did not find social support along with job control and job demand to predict work-related learning, although the

scholars ascribe the insignificant results to the structure of the data. On the other hand, Messman and Mulder (2015) researching apprentices in Germany found social support to significantly predict the informal learning activity of reflecting alone.

Despite the limited and contradictory evidence available, this research follows the theoretical assumptions discussed above and advances the following hypothesis:

H2a: Social support is positively related to a) job competence; b) work and business skills

Feedback

In addition to support, research demonstrates the value of feedback in sustaining engagement in workplace learning and in supporting competence development. Specifically, Eraut (2007) found feedback to influence early career professionals' levels of motivation and commitment, and recognised the importance of informal feedback, as in the feedback provided by the person on the spot rather than normative feedback from performance appraisal, over the first period of a new job.

Additionally, research conducted by Mulder (2013) on the effects of feedback on informal learning found that 367 reported feedback incidents led to 913 informal learning activities. Among these feature reflection, discussions with colleagues and supervisors, and approaching colleagues for advice, indicating the relevance of feedback in stimulating both individual and social learning activities.

Added to this, research on leadership development conducted by DeRue and Wellman (2009) found the availability of feedback to mitigate the diminishing returns of developmental challenges, enhancing individuals' self-awareness and reducing stress. The findings are particularly important in recognising the value of feedback in helping individuals cope with the uncertainty associated with novel and challenging tasks. The scholar present sound evidence of the role of feedback in supporting individuals in highly developmental job assignments, demonstrating that in counterbalancing the levels of uncertainty associated with challenges, feedback allowed individuals to remain focused.

On the basis of this evidence, and given the lack of research on feedback in the context of apprenticeship, the following hypothesis is advanced:

H2b: Feedback is positively related to a) job competence; b) work and business skills

Problem solving and experimenting

In the context of apprenticeship, a challenging work environment presents situations and tasks which require competence just over the level of existing apprentices' competencies, hence activating learning in order to master the challenge at hand (Messmann and Mulder, 2015). Evidence on the influence of challenging work in apprenticeship is contradictory, with Gijbels and colleagues (2010) finding no significant relation between job demand and workplace learning, and Messmann and Mulder (2015) finding work complexity to predict reflecting alone and reflecting with others.

Whilst previous research operationalised work complexity as in the scope in planning, preparing and carrying out work tasks (i.e. Messmann and Mulder, 2015), here challenging work is operationalised as source of skill development. The challenges of the job have indeed been identified as main source of skill development in entailing engagement in problem solving, in activities requiring creativity and the exercise of judgement (Brown, 2009).

Problem solving has been identified as learning opportunity in a study conducted by Brockman and Dirks (2006) on twenty manufacturing workers who associate problem solving with the construction of new knowledge contributing to enhanced performance and expertise. Problem solving is also classified as a working activity with learning as a by-product by Eraut (2007), reflecting the experiential dimension of informal learning. Accordingly, problem solving is here considered as important component of challenging work experiences that in presenting novel and complex situations activates a learning response (Doornbos, Bolhuis & Simons 2004).

Similarly, experimenting as in trying things out and engaging in trial and error has been identified as informal learning activity by Eraut (2007), Cheetham and Chivers (2001) and most recently Becker and Bish (2017). As argued by Van Woerkem and Croon (2008), experimenting reflects individual learning 'by trying out new ways of working' (pp. 320), and is associated with the last stage of the experiential learning cycle (Kolb, 1984) where individuals try out and test knowledge and skills acquired through reflecting on previous concrete experiences.

Based on this evidence, problem solving and experimenting represent challenging and novel situations requiring apprentices to stretch their abilities and engage in learning. The following hypotheses are therefore advanced:

H2c: Problem solving is positively related to a) job competence; b) work and business skills

H2d: Experimenting is positively related to a) job competence and b) work and business skills

Task autonomy

Theory suggests that task autonomy is an important factor in determining individual engagement in informal learning. Doornbos and colleagues (2004) postulate that when granted autonomy, individuals are given discretion in selecting the most appropriate method for completing the task, providing opportunities to include learning goals. Felstead and colleagues (2005) who found job design to facilitate learning at work have provided empirical support for this proposition. Specifically, individual influence in organising, planning and checking the quality of the work is positively associated with both learning by acquisition (i.e. training courses) and learning by participation (i.e. work experience). Additionally, a recent meta-analysis investigating the antecedents of informal learning has found task autonomy in positive association with informal learning behaviours (Cerasoli et al., 2018).

Added to this, Wood and de Menezes (2011) observed a strong relationship between enriched jobs, as in providing individuals responsibility in managing and executing the primary tasks, and well-being. Correspondingly, the scholars postulate that enriched jobs, in encompassing a certain degree of variety and autonomy, can increase opportunities for skills use and development. Conversely, other studies present contradictory evidence as Kwakman (2003) and Gijbels and colleagues (2010) did not find any association between work autonomy and workplace learning. These studies did not however dismiss the relevance of task factors in influencing participation in informal learning with Kwakman (2003) arguing that the effects of task and work environment factors may have been diminished because personal factors were simultaneously included in the analysis, suggesting a mediated effect.

In particular, Messmann and Mulder (2015) discuss the importance of work autonomy in apprenticeship in empowering apprentices to ‘actively respond to challenges at work with learning activities they consider appropriate for the situation and task at hand’ (pp. 583), and present preliminary evidence for the association between work autonomy and apprentices

engagement in reflecting alone. Accordingly, this research advances the following hypothesis:

H2e: Task autonomy is positively related to a) job competence; b) work and business skills

Task interdependence

In line with situated learning, another aspect conducive to professional development is that of task interdependence. As discussed by Doornbos and colleagues (2004), the possibility to interact with a variety of interaction partners comprising managers, peers, clients, interns, suppliers presents opportunities for learning in the workplace. Empirical evidence is presented by Eraut (2007) who, researching early-career professionals as nurses, engineers and accountants, identified participation in group processes such as team working and collaborations as main source of learning.

A comprehensive study on how professionals work in practice conducted by Cheetham and Chivers (2001) on 80 practitioners from 20 different professions presents similar evidence, identifying learning via interactions (i.e. observing others, shadowing, and working in teams, with clients) as important source of competence development. Learning from interactions within communities and networks has also been identified as pivotal in developing an understanding of the whole work process as well as developing expertise in a study on career adaptabilities conducted by Brown, Bimrose, Barnes and Hughes (2012).

Additionally, Fuller and Unwin (2003b) present evidence of the influence of the scope, length and aim of apprentices' participation in the workplace. The scholars argue that expansive apprenticeships entail a breadth of experience fostered by cross-company experiences built into the programme. Whilst the scholars refer to breadth of experience as in planned rotation (i.e. placements) within the company, interdependence is here considered as task factor, considering how the job is designed.

Given that task interdependence provides individuals with a collaborative learning environment (Runhaar et al., 2016), it is expected that the level of collaboration and interaction among individuals to achieve the intended goals would positively influence apprentices learning experiences. Additionally, interacting with members of the same or different unit would contribute to knowledge sharing and opportunities for feedback, contributing to apprentices' competence development.

With no research to my knowledge on the influence of task interdependence in apprenticeship, the following hypothesis is advanced:

H2f: Task interdependence is positively related to a) job competence and b) work and business skills

2.6 Chapter summary and conclusion

The chapter has developed a model of apprenticeship that specifies how formal and informal learning, conceptualised as facets of the training intervention and the work environment, contribute to the development of apprentices' end-state competencies.

Building on extant work on apprenticeships (i.e. expansive-restrictive framework), this research offers a holistic model that captures important factors critical for a positive and effective apprenticeship experience. In turning the spotlight onto the work environment, this research reconciles the polarised positions of learner-centred and teacher-centred approaches to pedagogy (see Fuller and Unwin, 1998) and recognises the apprentice as active recipient and constructor of knowledge.

Whilst the expansive-restrictive framework of apprenticeship (Fuller and Unwin, 2013) considers the quality of the learning environment in terms of the apprenticeship's institutional and contextual arrangements, this study specifically addresses the combined influence of formal and informal learning in contributing to apprentices' development. In doing so, this research draws on conceptual and empirical studies dominating the formal and informal learning literature to construct an apprenticeship development model.

The contributions of the chapter are three-fold. Firstly, considering the integrated approach to formal and informal learning advocated in apprenticeship research, this study consider the respective contribution of these learning modes to apprentices' development. In doing so, the research identifies specific categories of apprenticeship competencies (technical knowledge, job competence, work and business skills) as meaningful outcomes critical for individual performance.

Secondly, focusing on the work environment this research identifies factors that support the transfer of knowledge acquired in formal training to the workplace, along with factors that encourage and enable apprentices' engagement in informal learning. This has informed the design of a model of apprenticeship development that provides greater understanding on

which factors in the work environment are associated with meaningful competencies. By testing the model empirically, the research provides much needed insight for organisations and policy makers identifying key factors required for supporting apprentices' development.

Thirdly, whilst developing a model for apprenticeship development, the research contributes to inform workforce development more generally, showing that by intertwining educational experiences (i.e. formal training) with developmental activities *inside* the workplace (i.e. informal learning), organizations can achieve optimum value from key talent.

Chapter 3

The influence of HRM and learning goal orientation on apprentices' professional development

3.1 Introduction

Having introduced the apprenticeship development model in Chapter 2, pondering how formal and informal learning contribute to the development of apprentices' end-state competencies, the focus now turns to critical boundary conditions at contextual and individual level. This is an important consideration as research indicates that both individual and contextual factors influence professional development (i.e. Dragoni et al., 2009; Runhaar, Sanders and Yang, 2010; Velada, Caetano, Michel, Lyons and Kavanagh, 2007).

Turning the focus on higher-level organisational factors, this research addresses the limitations of the formal training literature, which in presenting a narrow focus on environmental factors as transfer climate and support (i.e. Govaerts and Dochy, 2014; Rouiller and Goldstein, 1993), overlooks the effects of non-training related factors at organisational level with potential implications for training transfer (Kontoghiorghes, 2004). As recently discussed by Sitzmann and Weinhardt (2018), in focusing on narrow components of the training domain, existing theories provide a limited understanding of the process. Similarly, informal learning research has at length considered situational factors enhancing participation in workplace learning with a limited focus on immediate environmental factors as the challenge of the job and opportunities for interactions (i.e. Doornbos et al., 2004; Eraut, 2007; Lave and Wenger, 1991).

In line with recent research developments, where scholars as Ballesteros-Rodriguez, De Saa-Perez and Dominguez-Falcon (2012) have investigated the influence of contextual factors as the organisational culture and HR practices on transfer of training, whilst Bednall, Sanders and Runhaar (2014) have examined the influence of the HRM system strength on participation in informal learning activities, this research adopts a macro-level of analysis. In doing so, this chapter introduces the principles of social exchange theory (Blau, 1964; Setton, Bennett and Liden, 1996) in combination with the communicative function of the HRM system (Guest, 2011) and investigates how the latter encourages apprentices' competence development by means of a quality employment relationship. Defining apprenticeships as investments in core talent, the high-commitment HR system is presented

as the strategy for managing a quality employment relationship with apprentices as high value employees (i.e. Lepak and Snell, 1999). Adopting the process approach to HRM (Bowen and Ostroff, 2004), the influence of the HRM system in apprenticeship is examined shifting the focus on the HRM system's signalling function (Ehnrrooth and Bjorkman, 2012). Added to this, PA as distinctive HR practice is examined as facilitator of informal learning in apprenticeship.

Additionally, in line with leadership development studies (i.e. Dragoni et al., 2009; DeRue and Wellmann, 2009), this research introduces a further consideration: the role played by the individual in the learning process. In doing so, the research presents a nuanced understanding of the apprenticeship in examining the interplay of formal and informal learning with a critical contingency, that of learning goal orientation, as discrete dimension that underlies apprentices' learning behaviours and consequent competence development.

As both formal and informal learning research indicates that learning goal orientation is a significant dimension in explaining both trainees' motivation to learn and resultant outcomes (i.e. Klein, Noe and Wang, 2006), and employees' engagement in informal learning activities (i.e. Runhaar, Sanders and Yang, 2010), it is here deemed an important determinant of apprentices' responses to developmental opportunities and resultant competencies. Accordingly, the research explores how apprentices' learning orientation influences the way apprentices respond to formal training at college or University, and approach informal learning in the workplace, expecting apprentices displaying high levels of learning orientation to benefit the most.

Introducing these crucial boundary conditions in apprenticeship the chapter is structured in three parts. The first part presents a classification of apprentices as core employees and, drawing on the HR architecture model advanced by Lepak and Snell (1999), identifies the appropriate HR configuration for sustaining a positive employment relationship in apprenticeship. Adopting the process approach to HRM, the chapter outlines the hypothesis regarding the apprenticeship training, encompassing formal and informal learning, and the HRM system strength in facilitating apprentices' competence development. Secondly, the chapter reviews PA as critical HR practice for developing and motivating apprentices and presents the hypothesis evaluating PA as facilitator of informal learning. The third part turns to the learning orientation literature and introduces the hypothesis evaluating the relevance

of the construct in apprenticeship as human capital development programme. Lastly, the empirical and theoretical contributions of the chapter are discussed.

3.2 Apprentices as high value employees

Drawing on the human resource architecture model of Lepak and Snell (1999, 2002), the apprenticeship is here conceptualised as internal development employment mode where human capital is developed in the organisation. With employers investing in apprenticeships to develop their talent pipeline, with a preference to train their own workforce and meet a close fit between skills and business needs (Hogarth et al., 2012a), apprentices are considered as core employees. Core employees are both strategically valuable and unique to the organisation, particularly in knowledge-intensive industries (Lepak and Snell, 2002). In being strategically valuable, core employees possess the skills required to contribute to the firm's strategic objectives and competitive advantage; in being unique, core employees possess skills that are firm specific (Lepak and Snell, 1999). Given that organisations invest in apprenticeships to internally develop core and firm specific talent (Winterbotham et al., 2012), apprentices are here presented as high value employees. As argued by Lepak and Snell (2002, pp. 520), the employment mode of core employees is 'structured around skills and competencies, rather than on the execution of programmed tasks and routines'. Such conceptualisation strongly reflects apprentices' dual status of worker and learner (Fuller and Unwin, 2003c) where the execution of daily tasks is learning-driven to develop the knowledge and skills required to become proficient. Accordingly, apprentices are here presented as high value employees that organisations have decided to internally develop in order to create core talent.

3.3 Apprenticeship HRM configuration

Having presented the apprenticeship as human capital development programme reflecting the philosophy of internally developing the organisation's talent as corporate resource allows to account for its embeddedness in an HRM system. HRM systems have been conceptualised at the highest level of abstraction as 'the pattern of planned human resource deployments and activities intended to enable an organisation to achieve its goals' (Wright and McMahan, 1992, pp. 298), encompassing both the contingency and the configurational perspective (Delery and Doty, 1996). Scholars have long acknowledged that researching systems of practices is more appropriate than focusing on single practices in isolation (Delery, 1998;

Lepak et al., 2006), however research presents various classifications of the practices that make up such systems (i.e. Delery and Doty, 1996; Huselid, 1995).

The configurational view of HRM is complicated in that lists of descriptors of HR practices tend to follow a universalistic approach and therefore lack to account for the contextual nature of the HRM system (Armstrong, 2008). Boxall and Mackey (2009) support this view, contending that constructing HRM systems on the basis of ‘best practices’ without accounting for the contextual settings is strongly debatable. Similarly, Lepak and colleagues (2006) argue that such lists of practices fail to justify the reasons why such practices have been included or excluded, neglecting to explain the relationship among practices and the mechanisms by which the HRM system functions and impacts on performance.

Accordingly, Kinnie and his colleagues (2005) argue that the assumption that HR policies and practices are applied uniformly to different groups of employees needs to be questioned. The scholars advance the proposition of focusing research on ‘narrowly defined occupational groupings’ (pp. 23) and so identifying bundles of policies and practices reflecting the character of the particular employment group. In more general terms, Boxall and Macky (2009) suggest that a more significant representation of an HRM system ought to be based on the themes and philosophies at the basis of the management approach to work and employment practices.

Following these propositions, the focus turns on identifying HRM systems associated with investments in human capital development, overcoming the limitations of the universalistic ‘best practice’ approach in treating different groups of employees uniformly. As argued by Liao, Toya, Lepak and Hong (2009), HRM systems are differentiated across employee groups reflecting the status of different employee groups in relation to the respective contribution to the organisation’s strategy. Such differentiation results in variability in the levels of implementation of specific HR practices for certain categories of employees, indicating that ‘the most appropriate mode of investment in human capital will vary for different types of human capital’ (Lepak and Snell, 1999, pp. 32).

Having established that organisations employ a heterogeneous workforce, an overview of what differentiates different approaches to HRM for various employment groups follows. As discussed by Lepak and Snell (1999), differences in employment are dependent on the strategic value and uniqueness of human capital, subsequently resulting in variations in the HR strategies used to manage specific employment groups. Accordingly, the HR architecture

model of Lepak and Snell (1999, 2002) identifies four HR configurations associated with four different employment modes. Firstly, when human capital is highly unique to the organisation but not strategically valuable to be internally employed, organisations are likely to rely on alliances and partnerships. Examples of alliances providing long-term customised services are legal consultants or research and development labs. A collaborative HR configuration is here adopted to foster trust, collaboration, cooperation and information sharing among the parts; practices as team building, job rotation, mentoring and group-based rewards are adopted. Secondly, when human capital is neither strategically valuable nor unique, organisations rely on contractual employment. Temporary employees performing low-level jobs as clerical and support are outsourced ensuring staff flexibility to the organisation. Given the short-term and transactional nature of the employment relationship, HRM systems fostering compliance are adopted. Rules, regulations and work protocols take centre stage.

Thirdly, when human capital is highly valuable in terms of contributing to the organisation strategy but not firm specific, organisations internalise employment acquiring employees with existing generic skills that are widely available in the labour market. Examples are accountants hired to perform determined tasks. This acquisition employment mode is associated with a market-based HR configuration whereby training and development practices are kept to a minimum and emphasis is placed on selective staffing and rewards. On the contrary, when human capital is both strategically valuable and unique, organisations internalise employment and internally develop talent with core skills. Examples are creative engineers constantly developing new technologies contributing to the organisation's strategy. Given that the internal development employment mode has a long-term focus and involves important investments in creating core and specific talent, Lepak and Snell (1999) argue that organisations adopt a commitment approach to HRM in order to sustain a relational employment relationship. Practices as training and development, empowerment and developmental PA are adopted to foster commitment and a long-term orientation.

In testing the HR architecture model empirically, Lepak and Snell (2002) present compelling evidence that different HR models tend to be used for different employment groups. In particular, the commitment-based HR configuration tends to be more commonly applied to core employees reflecting the knowledge-based employment mode, rather than to noncore employee groups. Among the jobs identified in the knowledge-based employment mode Lepak and Snell (2002) list engineers (design, mechanical), professional employees,

research and development employees and analysts. Similarly, commitment-based HR practices contribute to firm performance in manufacturing firms (Arthur, 1994), and are critical for key knowledge workers such as scientists and engineers operating in high technology firms (Collins and Smith, 2006). Accordingly, having presented apprentices as high value core employees who are internally developed by the organisation in order to create strategic talent, the high commitment HR configuration is reviewed as the HR model for managing the employment relationship in apprenticeship.

3.3.1 High-Commitment HRM

A commitment-based HR configuration is characterised by the underlying theme of enhancing employees commitment to the organisation, rather than adopting policies and practices directed towards control and compliance (Boxall, 2012). Stemming from different underlying management philosophies, a commitment-based approach stands in stark contrast with a transaction-based approach to HRM. Whilst the transaction-based approach has a short term focus relying on the external labour market (Collins and Smith, 2006), is control-oriented in order to minimise labour costs and increase efficiency, and uses narrow and well-defined jobs, requiring low skills and minimal training (Lepak et al., 2006), a commitment-based approach entails a long-term focus on developing the organisation's internal labour market, valuing employees' technical and social development and fostering motivation towards the organisation's goals (Tsui et al., 1997). The high commitment HR configuration is focused on nurturing employee involvement, maximising employees' contributions towards the organisation's objectives and gaining maximum returns from investments in human capital development (Lepak and Snell, 1999).

At the basis of the commitment approach to HRM is the alignment of the individual objectives with those of the organisation, and as reported by Arthur (1994:672), 'commitment human resource systems shape desired employee behaviours and attitudes by forging psychological links between organisational and employee goals', underlying a relationship of mutuality and trust among the parts. Research indicates that in order to shape such a strong psychological connection, high commitment systems adopt bundles of practices such as selective staffing, career opportunities, performance appraisal and participation in decision making (Sanders, Dorenbosch and de Reuver, 2008). Similarly, Lepak and colleagues (2006) report that high-commitment systems implement practices as intensive training and development, socialisation, internal promotion and high levels of compensation.

Such practices are intended to foster a relational employment relationship where the expectations and obligations between the employer and the employee involve open-ended exchanges and long-term mutual investments (Tsui et al., 1997). For example, practices of recruitment and selection are based on the philosophy of growing the organisation's talent, rather than acquiring sets of skills and expertise. Thus the recruitment and selection process are based on aptitudes and on the capacity to learn rather than achievement (Lepak and Snell, 2002), while staffing decisions are likely to reflect employees' potential in terms of cognitive abilities and attitudes, rather than technical knowledge (Lepak and Snell, 1999). Similarly, career development practices associated with an internal labour market and focused on continuous improvement are strongly related to employees' commitment towards the organisation (Delery and Doty, 1996; Lepak et al., 2006). As demonstrated by Meyer and Smith (2000), career development practices are the best predictor of affective and normative commitment in signalling the active role of the organisation in supporting employees and in preparing them for career progression.

Overall, such practices signal long-term investments in employees and support a relationship of mutuality between the employee and the organisation (Sun, Aryee and Law, 2007). According to the principles of social exchange (Blau, 1964), as organisations invest in employees' development, such organisation's inducements in turn foster employees' reciprocation with contributions towards the organisation's objectives and positive attitudes towards the employer. Research presents empirical evidence of the influence of social exchange principles in the employment relationship, indicating that when employees feel valued and supported by the organisation, their commitment and discretionary behaviours are enhanced (i.e. Chamber and Sobral, 2011; Settoon et al., 1996). Additionally, as discussed by Collins and Smith (2006), commitment-based practices are strongly associated with firm performance in creating an environment that, in line with the strategic view of HRM, fosters individuals' attitudes and behaviours that support the organisation's objectives (Bowen and Ostroff, 2004).

Furthermore, research indicates that employees' attributions that HR practices are motivated by the organisation's concern for their continuous development and wellbeing are reflected in high quality exchange relationships. The model advanced by Nishii, Lepak and Schneider (2008) follows the social exchange principles and presents HR attributions in relation to perceptions of the organisation's employee-oriented philosophy. The scholars demonstrate that in commitment-based HR systems (Arthur, 1994) employees are likely to feel valued

and reciprocate the organisation's favourable treatments with positive attitudes. Similarly, employees interpreting HR practices as part of a quality HR strategy regarding human capital as a core organisational asset and investing in employees' development and wellbeing, are likely to reciprocate with high levels of commitment (Nishii et al., 2008).

Moreover, when taking a micro contingency perspective, the quality of the employment relationship reflecting the principles of social exchange (Blau, 1964), is critical in explaining the effectiveness of developmental programmes. Research conducted by Kuvaas (2008) demonstrates that a high quality employment relationship is necessary in order for employees to positively respond to developmental opportunities in ways that benefit themselves and the organisation. In a study on 593 employees operating in 64 local savings bank in Norway, Kuvaas (2008) conceptualises the employee-organisational relationship (EOR) in terms of perceived organisational support (POS), affective commitment, procedural justice and interactional justice. Examining whether the quality of the EOR impacts on the relationship between perceived developmental HR practices (i.e. career development, training opportunities, and performance appraisal) and employee outcomes (i.e. work performance, turnover intentions), Kuvaas finds supporting evidence that the EOR positively moderates the relationship between perception of developmental practices and individual outcomes. The study presents important implications for organisations investing in human capital development, as employees' perceptions of and responses to such investments are strongly dependent on the quality of the EOR.

According to Kuvaas' findings (2008), employees' experiencing a quality employment relationship are more likely to make effective use of developmental HR practices developing their skills and improving their performance levels in reciprocation to the organisation's investments in their development. On the contrary, those experiencing low quality employment relationships are reluctant to engage in developmental opportunities or tend to respond to these opportunistically, focusing on their own individual gains enhancing their skills and abilities in the labour market, rather than applying these for the organisational benefit. Given that apprenticeships are investments in human capital, the high-commitment HR system is critical in shaping and supporting a quality employment relationship of mutuality, interdependency and reciprocity (Sun, Aryee and Law, 2007) fostering apprentices to reciprocate the organisation with positive behaviours and contributions aligned with the organisation's objectives.

The apprenticeship is thus characterised as a mutual investment employee-organisation relationship (Tsui et al., 1997) implying a social exchange between the parts rather a purely economic one (Blau, 1964). Social exchange relationships entail mutual investments with employers considering employees long-term well-being such as career opportunities within the firm, and with employees learning firm specific knowledge and skills and viewing the organisation's objectives as their own (Tsui et al., 1997). Such mechanisms are evident in apprenticeships with employers investing in the organisation future talent, presenting apprentices with opportunities for employment, training and qualification, and apprentices in turn developing general and firm specific knowledge and skills and contributing to the organisation objectives as part of their daily work.

Accordingly, the high-commitment HR strategy is expected to foster a positive employment relationship between the apprentice and the employing organisation, sustaining apprentices' competence development. However, given that research indicates that in order for HR practices to elicit the intended attitudes and responses, they first need to be interpreted as intended by the organisation (Bowen and Ostroff, 2004; Nishii et al., 2008), attention is here directed at the communicative function of the HR system (Guest, 2011; Pereira and Gomes, 2012) by means of the HR process approach.

3.4 HRM implementation

The HRM system has been described as set of communication processes between the organisation and its employees (Tsui et al., 1997). In early work on multi-level research in HRM, Ostroff and Bowen (2000, pp. 233) advance the proposition that HR practices 'communicate promises and future intents in the name of the organisation through types of hiring practices, reward practices, and developmental activities', sending messages to employees about valued behaviours and mutual expectations. In recognising HR practices as the primary means through which the employee-organisational relationship is established (Lepak and Snell, 1999), recent theoretical and research developments have shifted the focus to the HRM process approach (i.e. Bowen and Ostroff, 2004; Nishii et al., 2008). In doing so, researchers have started to consider key aspects of the implementation of HR practices at the basis of the HRM system signalling and communicative function (Ehrnrooth and Bjorkman, 2012).

Whilst previous research focused on the content of HRM considering the virtues or vices associated with particular practices, the process view of HRM addresses the psychological processes through which employees interpret and attribute certain meanings to HRM (Sanders, Shipton and Gomes, 2014). This approach stems from the consideration that employees' *perceptions* of HR practices determine their attitudes and behaviours (Kinnie et al., 2005; Wright and Nishii, 2007), drawing attention to the fact that in order for HR practices to elicit the desired attitudes and behaviours, they first need to be perceived and interpreted in ways that stimulate appropriate attitudinal and behavioural responses (Nishii et al., 2008).

Such conceptualisation recognises the possibility that HR practices can be interpreted idiosyncratically (Katou et al., 2014) leading individual responses to vary depending on the attributions inferred about the reasons why such practices were implemented (Nishii et al., 2008), or following the co-variation principle in attribution theory (Kelley, 1967), depending on causal attributions inferred from features of the contextual situation (Sanders and Yang, 2016). The study conducted by Nishii and colleagues (2008) presents compelling evidence that individual attributions for the same HR practice differ (i.e. commitment-focused versus control-focused employee-oriented philosophy), with consequences for related attitudes and behaviours. More recently, an experimental study and a field study conducted by Sanders and Yang (2016) found that when employees made sense of HRM as intended by management, in perceiving the HRM system with high levels of distinctiveness, consistency and consensus, the impact of high-commitment practices on affective organisational commitment was maximised.

Whilst the former study focuses on the locus of causality, intended as the reasons why management implements specific HR practices (Sanders, Shipton and Gomes, 2014), and the latter adopts attribution theory derived from social psychology to investigate how employees make sense of HRM, both studies turn the focus on the way HR practices are enacted in the organisation drawing attention to the way the HRM system communicates the content and purpose of specific HR practices (Guest, 2011). As reported by Pereira and Gomes (2012), communication is key in the HRM process, recognising that the way the HR message is transmitted through the practices' implementation, and how it is received by employees, affect the message interpretation and consequent response.

3.4.1 HRM process

Introducing the process approach to HRM, Bowen and Ostroff (2004; see also Ostroff and Bowen, 2000; 2016) advance a differentiation between the HRM system content, intended as the policies and practices that make up the system to achieve a specific set of objectives, and the HRM system process, referring to the design and administration of the system through defining meta-features which communicate and signal expected behaviours and performance expectation to employees. Since the introduction of the process approach to HRM, this has been presented as ‘the way HR policies and practices are communicated to employees’ (Li, Frenkel and Sanders, 2011, pp. 1826), and it has been more specifically defined as the ‘features of the HRM system, such as its perceived relevance and validity, which should strengthen and clarify the signals it sends to employees about performance expectations’ (Ehrnrooth and Bjormann, 2012, pp. 1110).

Recognising that appropriate employees’ reactions are dependent on employees perceiving and interpreting HR practices as intended by the organisation, Bowen and Ostroff (2004) use attribution theory (Kelley, 1967) to identify the features that would allow messages to be received and interpreted uniformly. The scholars theorise that individuals can make confident attributions about cause-effect relationships depending on situational aspects of distinctiveness, consistency and consensus (Sanders et al., 2008). Distinctiveness refers to features of the HRM system that attract employees’ attention and stimulate interest; consistency refers to features that present the cause-effect relationship as stable and constant over time, people and contexts; and consensus refers to shared agreement among employees, as well as shared agreement among policy makers, about the cause-effect relationship (Bowen and Ostroff, 2004).

As reported by Ehrnrooth and Bjorkman (2012), the features of distinctiveness, consistency and consensus enable employees’ attributions of cause-effect relationships in the HRM system and enhance employees’ understanding of the organisational expected behaviours, aligning individual and organisational goals. Central to the model advanced by Bowen and Ostroff (2004) is the role of climate and the notion of situational strength, intended as a strong HRM system contributing to consistency and uniformity in attitudes and behaviours within the group (Pereira and Gomes, 2012). As argued by Bowen and Ostroff (2004; see also Ostroff and Bowen, 2016), the HRM process construct is based on the assumption that as employees interpret HR practices idiosyncratically, these result in individual level psychological climate perceptions; however, shared higher-level perceptions arise when the

HRM system presents meta-features of distinctiveness, consistency and consensus, resulting in the emergence of a strong climate. The scholars maintain that in a strong situation ‘HRM practices, as a system, can contribute to firm performance by motivating employees to adopt desired attitudes and behaviours that, in the collective, help achieve the organisation’s strategic goals’ (Bowen and Ostroff, 2004, pp. 204).

Although the original conceptualisation of the HRM system strength maintains a group or organisational level of analysis, presenting employees’ shared perceptions as precursors of a strong organisational climate in turn leading to organisational performance (Sanders, Shipton and Gomes, 2014), researchers have explored the HRM process approach from different angles and at different levels. A review conducted by Wang (2015) identifies three approaches to the study of employees’ perceptions of HRM categorised in: rated HRM, examining employees’ perceptions of the ‘what’ of practices (i.e. Wright and Nishii, 2007); HRM strength, examining the features of HRM practices (i.e. Bowen and Ostroff, 2004); and attributed HRM, focusing on employees’ perceptions of the ‘why’ of HR practices (i.e. Nishii, Lepak and Schneider, 2008), often adopting an individual level of analysis (i.e. Bednall et al, 2014, Bednall and Sanders, 2016).

In reviewing the HRM process literature Wang (2015) maintains that whilst these approaches investigate different dimensions of employees’ perceptions of HRM practices, they should not be considered as distinct, but as ‘facets of the same phenomenon’ (Wang, 2015, pp. 16752). Acknowledging the complexity of the HRM construct, encompassing content, process and intent, this research adopts the *HRM system strength* approach focusing on the effects of perceived features of the entire HRM system in communicating messages to employees. This is an important consideration given the focus of the research on apprenticeship as human capital development strategy implementing the high-commitment HR system configuration, as features of a strong HRM system have been described as ‘the building blocks for linking the HRM activities together in a particular architecture’ (Ostroff and Bowen, 2016, pp. 15). As discussed by the original contributors to the HRM process approach, ‘the components of each HRM system that make up its architecture include philosophy (guiding principles and values about human resources), policies (guidelines about what is to be achieved with practices, e.g. skill development), practices (the practices needed to achieve the policy) and processes (how practices are implemented)’ (Ostroff and Bowen, 2016, pp. 15). The scholars maintain that processes, as in features of a strong HRM system, stand at the basis of the HR architecture in ensuring HR practices are appropriately

designed and implemented, resulting in shared consensus among employees on expected attitudes and behaviours.

However, departing from the original conceptualisation of the process approach, this research maintains an individual level of analysis. Whilst Bowen and Ostroff (2004) present the construct of HRM strength as higher-level contextual variable, subsequent work has adopted an individual level of analysis treating the HRM system strength as individual difference variable, directing attention to individual perceptions of the HR system features (i.e. Delmotte, De Winne and Sels, 2012). Such approach stems from the consideration that although the collective-level influence of the HRM process plays a crucial role in securing organisational performance, research ought to further investigate the individual-level influence effects standing at the basis of higher-level influence (i.e. Ehrnrooth and Bjorkman, 2012; Nishii et al., 2008). Additionally, the individual has been identified as the most appropriate level of analysis and unit of measurement of employees' perceptions and attributions (i.e. Bowen and Ostroff, 2004; Nishii et al., 2008). As discussed by Ostroff and Bowen (2016), the individual level of analysis follows the principles of social exchange theory (Blau, 1964) and presents the idiosyncratic processing of the social context at the basis of particular individual responses. Thus, adopting an individual level of analysis the next session discusses how the HRM system strength shapes employees understanding of the work situation with implications for competence development.

3.4.2 HRM system strength

In line with Bowen and Ostroff (2004), the HRM process has been presented as defining metafeatures of an HRM system that enable employees to appropriately interpret and respond to the messages conveyed by HR practices with desired attitudes and behaviours. HRM systems characterised by high levels of distinctiveness, consistency and consensus lead to strong situations, where messages are communicated unambiguously, allowing individuals to make confident attributions (Bowen and Ostroff, 2004). Ostroff and Bowen (2000, pp. 236) define *situational strength* as 'the degree of ambiguity presented in the context', associating the strength of the HRM system with how effectively HR practices convey the strategic focus of the organisation and communicate the behaviours that are valued.

Following Bowen and Ostroff (2000; 2004) this research conceptualises the HRM system strength as the effectiveness of the HRM system, when such system is characterised by high levels of distinctiveness, consistency and consensus, in communicating unambiguous

messages and in enabling the clear interpretation of such messages, as intended by the organisation. The effectiveness of the HRM system has however been presented as a function of the HR content and the HR process, with Bowen and Ostroff (2004, pp. 206) postulating that content and process are two interrelated features of an HRM system which ‘must be integrated effectively in order for prescriptive models of strategic HRM actually to link to firm performance’. Accordingly, Ehrnrooth and Bjorkman (2012) advance an integrative HRM process theorisation presenting the HRM process as having both signalling effects on employees’ understanding and functional qualities of the HR content. In testing the model empirically on a sample of IT and management consultants the scholars found the HRM strength construct in positive relation with employees’ creativity, job performance and the level of workload.

Similarly, Katou and her colleagues (2014) examined the effects of the HRM system, integrating content and process, on organisational performance. The study on 1250 employees operating in 133 organisations in the private and public sector in Greece is innovative in demonstrating that both the content and process of HR practices impact on organisational performance through the mediating effects on employees’ reactions. An important contribution of the study is evidence of the moderating role of features of the HRM system (distinctiveness, consistency, consensus) on the relationship between rated HR practices (i.e. resources, training, rewards, relations) and employee outcomes (i.e. motivation, commitment, engagement, OCB). The results are aligned with previous studies which found climate strength, as in shared perceptions of HRM, to moderate the relationship between perceptions of consistency in HRM and affective commitment (Sanders, Dorenbosch and de Reuver, 2008), and the association between perceptions of HRM system features and employee attitudes as work satisfaction, vigour and intention to quit (Li, Frenkel and Sanders, 2011).

More recently, Bednall and colleagues investigated the role of the HRM system strength in relation to employees’ participation in informal learning. In two studies the scholars present evidence that a strong HRM system strengthens the effects of performance appraisal (Bednall et al., 2014) and formal training (Bednall and Sanders, 2016) on participation in individual and collaborative informal learning activities over time. Overall, the literature presents compelling evidence of the role of the HRM system strength in moderating the relationship between HRM and employees’ reactions, indicating that strong situations characterised by little ambiguity strengthen the relationship between perceived HR practices

and employees' outcomes. In keeping with this line of research, following the covariation model of attribution (Kelley, 1967) a strong HRM system is defined by features of distinctiveness, consistency and consensus. As discussed by Sanders and Yang (2016) when applying the covariation principle to HRM, it is expected that in situations characterised by high levels of distinctiveness (HR practices are standing out), consistency (internal alignment of HR practices), and consensus (colleagues understand HR practices in the same way), employees are likely to attribute HRM to the management of the organisation, and so understand the organisation's values, expectations and desired behaviours (Bowen and Ostroff, 2004).

Having positioned the apprenticeship as internal development employment mode in a high-commitment HR system, it is expected that a strong system would send clear and unambiguous messages and enable apprentices to make accurate attributions. More specifically, given that the high-commitment HR system is the strategy implemented by the organisation to sustain a long-term, high-quality exchange relationship with the apprentice (Tsui et al., 1997), a strong HRM system is expected to facilitate the interpretation of the HR content as intended by the organisation and support a relational employment relationship. There are several ways in which the HRM system strength can reinforce a positive long-term relationship between the apprentice and the organisation. First, high levels of distinctiveness would allow apprentices to become aware of developmental opportunities (Bednall et al., 2014); as career development is a crucial practice for sustaining a high-quality exchange relationship with the organisation (Meyer and Smith, 2000), making apprentices aware of career opportunities and internal labour markets within the firm through the distinctive implementation of career development practices, positively supports the employee-organisational relationship.

Secondly, given that internal consistency affects the strength of the HRM system (Ostroff and Bowen, 2000), apprentices experiencing high levels of integration among HR practices and so receiving consistent messages and drawing consistent inferences, are expected to be more confident in their attributions. Internal consistency is advocated in the configurational approach to HRM (Delery and Doty, 1996) and has been found to be the principal feature of a strong HRM system in the study conducted by Katou and colleagues (2014), supporting the view that without consistent messages, the effects of distinctiveness and consensus may be less influential (Bowen and Ostroff, 2004). It is therefore expected that the more apprentices are exposed to HR practices signalling concern for their development and well-

being, the more they would construct positive attributions about the organisation (Nishii et al., 2008), sustaining a positive employment relationship. Thirdly, consensus among policy makers and line managers that continuous improvement is valued by the organisation has been positively related to engagement in informal learning (Bednall et al., 2014). In line with theories of POS (Eisenberger et al., 1990), consensus among key organisational figures about the value of apprentices and the importance of the apprentices' development with the firm is expected to result in high levels of POS, sustaining a positive employment relationship. Overall, it is reasonable to expect that the strength of the HRM system enables apprentices to interpret the HR practices as motivated by a commitment focus, sustaining a positive employment relationship.

Given that the employee-organisational relationship influences how employees respond to developmental opportunities such as training (Kuvaas, 2008), the HRM system strength plays a crucial role in ensuring that apprentices feel valued, supported and part of a mutual relationship (Tsui et al., 1997). It follows that when experiencing a positive employment relationship, apprentices are more likely to make effective use of the apprenticeship training, extensively engaging in formal and informal learning for the development of their competencies. On the basis of this evidence, it is expected that the apprenticeship will have the greatest impact on apprentices' end-state competencies when embedded in a strong HRM system.

Based on the proposition that apprentices' interpretation of the work situation through features of the HRM system will influence their engagement with formal and informal learning, this research hypothesises an interaction between HRM system strength and the apprenticeship training:

Hypothesis 3: *HRM system strength positively moderates the relationship between the apprenticeship training, encompassing formal and informal learning, and apprentices' end-state competencies.*

3.5 Performance appraisal

Having considered the influence of the high-commitment HR system by means of the HRM system strength on the effectiveness of apprenticeships, attention is here directed at PA. The HR practice of PA is central to the high-commitment HR configuration (Lepak and Snell,

1999; Lepak et al., 2006) and is a particularly valuable practice for professional employees. In aligning individual and organisational interests, PA fosters professionals' commitment to the organisation (Kinnie et al., 2005), emerging as critical HR practice for high value employees as apprentices. Additionally, quality PA has been found to promote participation in informal learning activities such as reflection, knowledge sharing and innovative behaviour over time (Bednall, Sanders & Runhaar, 2014), emerging as facilitator of informal learning. Accordingly, PA is deemed particularly important for apprentices as core employees who are developing professionally in the workplace.

While in testing the role of the HRM system this study assumes a broad perspective exploring how apprentices' perceptions of the HRM system strength influence the formal and informal learning processes inherent to apprenticeships, PA is investigated as facilitator of informal learning. In so doing, PA is presented as mechanism for developing and motivating employees that fosters apprentices' engagement with the informal learning factors of the work environment.

PA is here considered as formal event entailing the evaluation and communication of individual performance feedback in face-to-face meetings between the employee and the supervisor (Elicker, Levy & Hall 2006). As discussed by Bednall and colleagues (2014), PA allows supervisors to provide employees with valuable feedback, to support them in approaching mistakes as learning opportunities and more generally encouraging knowledge-sharing among team members. Whilst employees are expected to receive regular informal daily feedback on-the-job, PA is more formal in nature. Specifically, PA is more broadly focused on delivering normative feedback on performance and assessing whether organisational expectations have been met (DeNisi and Sonesh, 2010). Notably, both regular daily feedback and formal PA feedback have been found to benefit employees, with Kuvaas (2011) demonstrating that the effects of PA feedback on employees' performance are contingent on high levels of daily informal feedback.

Additionally, research demonstrates that reactions to PA influence employees' attitudes and behaviours with implications for resultant performance. A study investigating how perceptions of PA use relate to employee satisfaction with the appraisal and the appraiser, demonstrates that perceived developmental appraisals result in positive attitudes toward the appraisal and the appraiser (Boswell and Boudreau, 2000). The results reveal that when PA is focused on identifying individual training needs, strength and weaknesses, along with

providing performance feedback, its use is consistent with communicating to employees their value and future in the organisation (Boswell and Boudreau, 2000). Similarly, a study conducted on 593 employees from 64 organisations found PA satisfaction in direct association with affective commitment and turnover intentions (Kuvaas, 2006). Perceived helpfulness of PA was associated with affective commitment in a subsequent study on a sample of 803 employees in Norway (Kuvaas, 2011). Overall research indicates that PA focused on continuous development and performance improvements contributes to employees' perceptions of the organisation's investments in their development and enhances participation in informal learning.

Given that employees' perceptions of PA are indicative of their relationship with the organisation (Lepak and Snell, 1999), satisfaction with PA is expected to sustain a positive employment relationship in apprenticeship. In line with the principles of social exchange theory (Blau, 1964), perceptions that the organisation is 'taking care' of employees result in engendered beneficial consequences (Cropanzano and Mitchell, 2005), hence apprentices' satisfaction with PA reflecting a quality employment relationship, is set to positively impact on their learning behaviour. This can be explained given that apprentices' perceptions of developmental PA are likely to communicate the organisation's willingness to invest in their development and provide them with the knowledge and skills required for career progression (i.e. Kuvaas, 2006).

In investigating PA as facilitator of informal learning, this study draws on the Job Demand-Control-Support model (Karasek and Theorell, 1990; Messman and Mulder, 2015) and examines how PA influences apprentices' engagement with the informal learning factors of problem solving, task autonomy and feedback. The relevance of these factors in sustaining apprentices' competence development has been discussed in Chapter 2. Here, in line with the principles of social exchange (Blau, 1964), apprentices experiencing PA satisfaction are expected to engage in problem solving as a mean to develop professionally. Similarly, PA satisfaction is expected to strengthen the effects of task autonomy and informal daily feedback from colleagues and supervisors on apprentices' competencies, as these are viewed as learning opportunities.

Based on the proposition that apprentices' satisfaction with PA will positively influence their engagement with the informal learning factors of the work environment, this research hypothesises an interaction between PA and problem solving, task autonomy and feedback:

Hypothesis 4: *PA satisfaction positively moderates the relationship between a) problem solving, b) task autonomy, c) feedback and apprentices' end-state competencies*

3.6 Learning goal orientation

Having discussed the significance of the HRM system in apprenticeship, the chapter turns to the individual level construct of learning goal orientation as determinant of apprentices' competence development. According to the argument presented here, the individual difference of learning goal orientation is proposed to influence apprentices' responses to formal and informal learning activities with implications for their competence development.

Goal orientation, defined as the goals pursued by individuals in achievement situations, forms the basis for deeper motivational processes which determine how the individual approaches the learning event, influencing affective, behavioural and cognitive reactions (i.e. Kozlowski et al., 2001; Porath and Bateman, 2006). The construct has proven insightful in explaining individual differences in response to challenging and demanding tasks (VandeWalle, 1997) and presents potential to explain variation in learning behaviours and competence development in apprenticeship.

As argued by Gong and Fan (2006), goal orientation theory (Dweck, 1986; Dweck and Leggett, 1988), presents implications for the motivation underlying individual behaviours in achievement situations. Next, a review of goal orientation theory addresses how different goal orientations are associated with particular patterns of behaviours in achievement situations. Attention is directed at four aspects of these patterns as particularly relevant for discussing the role of goal orientation in developmental programmes as apprenticeships.

3.6.1 Goal orientation theory

Adaptive and Maladaptive motivational patterns

According to goal orientation theory, the goals pursued by individuals create a framework within which they interpret and react to events, determining different patterns of behaviours (Dweck and Leggett, 1988). Dweck (1986) presents goal orientation as an individual disposition towards developing or demonstrating ones abilities, identifying two major classes of goals: *performance goals* in which individuals strive to gain favourable judgement or to avoid negative judgement of their competence; and *learning goals* in which individuals

endeavour to increase their competence and master new knowledge and skills. Such dispositions result in maladaptive and adaptive patterns of behaviours in achievement situations, with performance oriented individuals assuming maladaptive responses with the tendency to adopt defensive strategies, avoiding challenges and withdrawing in face of difficulties; and learning oriented individuals assuming adaptive responses, purposely seeking challenges and persisting when encountering difficulties.

Implicit theories of ability

Individuals' predispositions toward learning or performance goals has been associated with individuals' self-conception of their intellectual abilities. Dweck and Leggett (1988) propose that individuals hold implicit theories about their ability, regarding their intelligence either as a fixed entity, or as a malleable attribute. Those regarding their intellectual ability as fixed, believe that such ability is difficult to develop and perceive performance as dependent on their innate ability; conversely, those regarding their ability as incremental, believe that such ability can be further developed through effort and experience (Dweck and Leggett, 1988). Accordingly, individual beliefs about ability are associated with either learning or performance orientation, influencing behavioural responses as performance oriented individuals seek to demonstrate their ability, and learning oriented individuals strive to develop their ability.

Views of effort expenditures

Accordingly, assumptions about one's ability and the related goal orientation present implications for how individuals interpret effort in achievement situations. As reported by Vandewalle (1997, 2003), learning oriented individuals view effort as an instrumental strategy for developing their abilities, while performance oriented individuals view effort as signalling the inadequacy of their ability, resulting in maladaptive responses to challenges and obstacles. Consequently, individuals' self-conceptions affect behavioural responses in face of challenging tasks or task failure, with learning oriented individuals being energised by challenges and exerting efforts to progress, and performance oriented individuals avoiding and withdrawing from challenges in order to avoid display of low ability (Dweck and Leggett, 1988; Vandewalle, 1997).

Dispositional, situational and dimensional traits

Research has debated the dimensionality of goal orientation, with scholars conceptualising it as a single bipolar trait with the two orientations (learning and performance) as ends of a

continuum (i.e. Dweck, 1986), and others presenting learning and performance orientation as two separate and uncorrelated dimensions (i.e. Button et al., 1996).

The construction of goal orientation as a single continuum (Dweck, 1986) implies that individuals display either a learning or a performance orientation, and precludes the possibility to hold neither or both dispositions simultaneously. However, studies conducted by Button and his colleagues (1996) present strong evidence of learning and performance orientation as two separate and uncorrelated constructs, validating the possibility that individuals hold high or low levels of learning and performance orientation at the same time. This line of research has subsequently been adopted in other studies (i.e. Ford et al., 1998, Kozwloeski et al., 2001; Pintrich, 2000; VandeWalle and Cummings, 1997), upholding the conceptualisation of learning and performance goal orientation as two separate constructs.

Additionally, while research has focused on goal orientation as dispositional trait, it has been established that situational factors can activate particular learning or performance responses. The study conducted by Button and colleagues (1996) found dispositional and situational goal orientation to be distinct, maintaining that while individuals are predisposed to a certain goal orientation from their general disposition (i.e. Dweck, 1986), situational cues may lead them to a different or less intense orientation response. Accordingly, when the situation does not provide cues about the preferred goals, the dispositional orientation will prevail; however, strong situational cues may offset dispositional orientations (VandeWalle, 2003).

The conceptualisation of goal orientation as dispositional and situational presents important implications for organisations investing in human capital development for several reasons. As discussed by VandeWalle (2003), a learning orientation may be a valid selection criterion for jobs that are complex, dynamic, learning-focused, requiring individuals to self-regulate to secure performance. Secondly, while individuals are expected to join any training programme with a learning orientation, perceived situational cues may affect their responses inducing a performance orientation (Button et al., 1996) and negatively affecting learning outcomes. Additionally, given the value of on-going learning for both individual and organisational performance (Bednall et al., 2014), organisations would benefit from encouraging employees to hold an incremental view of their ability supporting an orientation towards developing competence (Brett and VandeWalle, 1999; Vandewalle and Cummings, 1997; Vandewalle et al., 2001). More specifically, the promotion of a learning environment conducive to competence development may be sustained by practices as developmental

performance appraisals that foster learning rather than comparison with others (Vandewalle, 2003). In light of these considerations, a discussion on the influence of goal orientation on learning and development activities follows.

3.6.2 The influence of goal orientation on skill acquisition

Goal orientation is an important individual difference in training situations, with implications for the design of training interventions intended to develop complex knowledge structures. This is the case since goal orientation has an influence on individuals' motivation to learn, on the learning strategies adopted, as well as on training self-efficacy (i.e. Chiaburu and Marinova, 2005; Ford et al., 1998; Vandewalle et al., 2001).

Research presents compelling evidence of the influence of particular orientations on training outcomes. Kozlowski and colleagues (2001) predicted performance goal orientation to hinder the learning of complex skills, given that trainees striving to demonstrate their abilities and avoid negative judgement would tend to limit themselves to the basic and superficial aspects of the task, failing to address a deeper understanding of the concepts and underlying principles. Conversely, trainees holding a learning orientation would be more effective in learning complex skills, striving to investigate and understand the complexities of the task, approaching errors as opportunities to learn, and developing a broad understanding required for task proficiency. In testing the propositions empirically, Kozlowski and colleagues (2001) found dispositional learning goal orientation in combination with situational mastery training goals to support the development of complex knowledge structures, validating their model.

Additionally, a study conducted by Ford and colleagues (1998) found positive associations between learning goal orientation and metacognitive activities as in strategies requiring considerable cognitive effort, leading to deep understanding of the task. The results are insightful in presenting learning goal orientation as crucial in training interventions where individuals are allowed a certain degree of control over learning of complex tasks. Generally, both studies indicate that goal orientation is significant for the mastery of complex and substantial knowledge in encouraging individuals to approach the learning process with high motivation levels, in fostering curiosity and a tendency to explore the task and subject under investigation, and securing high levels of understanding. Given that mastery of complex knowledge structures requires high levels of motivation and resilience in face of difficulties encountered during the learning process, learning goal orientation is related to self-efficacy,

a critical factor in situations where the knowledge and skills acquired need to be transferred and adapted to different situational demands (Kozlowski et al., 2001).

Goal orientation and self-efficacy

Research has investigated the relationship between goal orientation and self-efficacy (i.e. Ford et al., 1998; Kozlowski et al., 2001; Runhaar et al., 2010; VandeWalle, Cron and Slocum, 2001) however with little consensus on the causal direction between the two constructs (Gong and Fan, 2006).

Self-efficacy is conceived as judgements and assumptions individuals hold about their ability to perform a given task, affecting individual reactions in face of challenges (Bandura, 1982). As argued by Bandura (1982), individuals with low levels of self-efficacy react negatively to challenges and obstacles, diverting their attention towards concerns about failure, rather than focusing on how to best tackle the task. Conversely, individuals with high levels of self-efficacy direct their energy and attention on the challenging event exerting efforts to meet the task requirements.

Studies conducted by Kozwloski and colleagues (2001) and Vandewalle and colleagues (2001) demonstrate that learning orientation leads to task performance as the adaptive patterns of behaviour contribute to developing and sustaining high levels of self-efficacy in the training situation. The assumption is that learning goal orientation is related to maintenance of self-efficacy during the learning process, as adaptive individuals approach setbacks and negative feedback as opportunities for improvement (Gong and Fang, 2006).

Other studies (i.e. Runhaar et al., 2010) assume a broad concept of self-efficacy as related to an individual conception of ability (i.e. Dweck and Leggett, 1988). The assumption is that individuals holding an incremental view of their abilities possess high levels of occupational self-efficacy, corresponding to the belief that with effort and application one can successfully approach situational demands. Accordingly, self-efficacy is viewed as antecedent to learning goal orientation, intended as the motivation to improve oneself (Runhaar et al., 2010).

As argued by Gong and Fan (2006), the causal link between learning goal orientation and self-efficacy is particularly evident when goal orientation is presented as trait-like variable and self-efficacy is intended as domain-specific variable. Following the industrial organisational psychology scholars (i.e. Kozlowski et al., 2001; VandeWalle et al., 2001), Gong and Fan (2006) find corroborating evidence of dispositional learning orientation as an exogenous variable influencing self-efficacy in the competence acquisition process.

Keeping with this line of research, as the apprenticeship is a developmental programme encompassing novel and challenging tasks, learning goal orientation presents the mental framing for sustaining individuals' beliefs in their abilities to develop their competencies (VandeWalle et al., 2001), in turn sustaining apprentices' self-efficacy during the learning process. Having established the assumed linkage between goal orientation and self-efficacy in this research, the focus turns to the impact of learning goal orientation in apprenticeship.

3.6.3 Learning goal orientation in apprenticeship

The literature indicates that learning goal orientation is an exceptional predictor of individual level outcomes. This is particularly so in situations where the training requires the mastery of substantial knowledge (i.e. Kozwloski et al., 2001), where the individual is granted control over the learning process (i.e. Ford et al., 1998), where development is strongly dependent on feedback-seeking behaviours (i.e. VadeWalle and Commings, 1997) and where knowledge and skills need to be transferred back to the workplace (Chiaburu and Marinova, 2005).

With the apprenticeship encompassing formal training activities to develop substantial knowledge, along with informal learning activities as engagement in challenging tasks and interactions with others, it is important to examine how apprentices' learning orientation impacts on competence development. As discussed in the introductory chapter (Chapter 1), failing to address such an important individual construct may lead to the assumption that developmental assignments promote the development of competent professionals under all individual conditions (Dragoni et al., 2009).

Apprentices' learning goal orientation

According to goal orientation theory (Dweck, 1986), learning oriented individuals strive towards continuous improvement and highly value experiences presenting opportunities for growth and development. As demonstrated by Lisa Dragoni and her colleagues (2009), managers with high levels of learning orientation tend to pursue highly developmental assignments validating this adaptive pattern of behaviour. Correspondingly, as apprentices have made an active choice to pursue qualifications and develop professionally with an apprenticeship, it is reasonable to expect that they would hold an incremental view of their ability, associated with a dispositional orientation towards learning (Dweck and Leggett, 1988). Additionally, as learning oriented individuals perceive success as dependent on interest and effort (Duda and Nicholls, 1992), it is sensible to predict that apprentices, who

have committed themselves to develop professionally by means of formal training and work experience, would hold a disposition towards learning.

Accordingly, the belief that competence can be developed by means of learning, application and effort provides the foundation for a dispositional orientation towards learning, supporting the prediction that apprentices hold high levels of learning orientation. Moreover, the high-commitment HR system embedding the apprenticeship is likely to convey the organisation's focus on growing talented individuals, hence signalling that learning is valued. In line with the argument advanced by Dragoni (2005), whereby situational cues signal the preferred achievement orientation and compel individuals to adopt an appropriate state goal orientation, the high-commitment HR system is expected to sustain apprentices' disposition towards learning.

Given that individuals can hold different orientations simultaneously (Button et al., 1996), as apprentices are expected to join the programme with a dispositional learning orientation, the high-commitment HR system is envisaged to sustain such disposition, preventing any individual motivation to demonstrate competence in highly competitive environments to divert attention from the learning process. This research therefore predicts apprentices to hold high levels of learning orientation, as an individual disposition sustained by situational cues, and in light of the focus on human capital development makes no prediction with regards to performance orientation.

As apprentices develop multidimensional competencies via means of formal and informal learning, a consideration of the influence of learning orientation on both processes is warranted.

Formal learning

The apprenticeship development model advanced in this research illustrates formal learning as contributing to apprentices' technical knowledge. Central to the model is the transfer of learning from instructional to work settings in order to secure performance through the application and maintenance of a newly acquired knowledge-base (Grossman and Salas, 2011).

Research presents evidence of a positive association between learning goal orientation and pre-training motivation, with implications for training transfer. A study conducted by Chiaburu and Marinova (2005) found mastery approach oriented individuals to display high levels of pre-training motivation and consequent training transfer, indicating that learning

oriented individuals approach the training event positively and transfer the acquired knowledge and skills to the workplace. Additionally, research has demonstrated that learning goal orientation contributes to the development and maintenance of self-efficacy in the competence acquisition process (i.e. Gong and Fang, 2006; Ford et al., 1998), in turn predicting transfer of learning (i.e. Ford et al., 1998; Velada et al., 2007). Adopting Holton and colleagues (2000) conceptualisation of performance self-efficacy as in the individual belief that one is able to change his or her own performance when desired, Velada, Caetano, Michel and others (2007) found performance self-efficacy to strongly predict transfer of learning to the work context. Accordingly, given the high levels of pre-training motivation and self-efficacy displayed by learning oriented individuals, it is expected that apprentices' learning goal orientation would support the transfer of knowledge and skills acquired at college or University to the workplace.

Additionally, as formal training encompasses also self-directed study, as apprentices engage in activities such as working on case studies, reading additional material and writing reports, learning goal orientation is set to play an important role in self-regulatory behaviours. Research in academic settings presents evidence of the relation between goal orientation and students' motivational beliefs and self-regulated learning, finding learning oriented students to focus on mastering the study material and to display adaptive motivational beliefs such as self-efficacy and extensive cognitive engagement (Wolters, Yu and Pintrich, 1996). Similarly, learning goal orientation has been presented as yielding beneficial results when trainees approach the learning of complex tasks (Kozlowski et al., 2001), and when engaged in self-directed activities aimed at developing skills and mastering the discipline (Ford et al., 1998). It is therefore reasonable to predict that learning oriented apprentices would actively engage in self-directed study, exerting discipline and self-direction for mastering an extensive knowledge base.

Informal learning

The apprenticeship development model portrays informal learning as contributing to apprentices' job competence and work and business skills. Apprentices develop these critical competencies on-the-job through processes of social interaction, such as team working and shadowing, and when undertaking novel and challenging tasks (Eraut, 2007). As learning orientation is an important factor in situations where the individual is in control of the learning activity (Ford et al., 1998), it is deemed critical for informal learning in the workplace. This is so given the unstructured nature of informal learning and the discretionary

position of the individual who can decide either to actively engage or not to engage in activities such as reflection, knowledge sharing and innovative behaviours (Bednall et al., 2014).

As learning oriented individuals value competence development and are oriented towards self-improvement (Kozlowski et al., 2001), they are expected to actively pursue informal learning activities as in strategies for expanding their knowledge and skills. An incremental assumption of ones' intelligence and ability, associated with the belief that effort and application lead to competence development, has indeed been positively associated with selection and engagement in challenging tasks (Dweck and Leggett, 1998; Dragoni et al., 2009) and with developmental experiences as performance feedback (VadeWalle and Cummings, 1997).

With apprentices developing critical competencies on-the-job when trying things out, engaging in problem solving and undertaking novel tasks, an adaptive response to achievement situations where mistakes and setbacks are viewed as learning opportunities and where effort is conceived as strategy to grow and develop (Dweck, 1986), is expected to positively sustain apprentices' development. Additionally, given that engagement in activities involving decision-making, problem solving, team-working and communication has been associated with the development of higher levels of skills (Brown, 2009), a focus on mastering challenging situations and persevering in face of obstacles (Dweck and Leggett, 1988) is predicted to enhance the skills acquired as a result of participation in practice.

Additionally, as apprentices learn by engaging in practice, feedback from the outcomes and feedback from colleagues and superiors on their level of performance is a valuable resource for improving on errors and weaknesses (VandeWalle et al., 2001). Research indicates that learning orientation is an important construct for explaining individuals' decisions to seek feedback based on perceived costs and value of feedback seeking. Specifically, Vandewalle and Cummings (1997) present compelling evidence that learning oriented individuals, perceiving feedback as valuable diagnostic information, engage in feedback seeking behaviours as in strategic efforts towards task mastery.

Given the situated nature of the apprenticeship where individuals learn by participating in practice and interacting with knowledgeable practitioners (Lave and Wenger, 1991), high levels of learning goal orientation are expected to foster apprentices' participation in social

exchanges as in activities of feedback seeking (i.e. VandeWalle and Cummings, 1997), enabling apprentices to extract valuable lessons from such engagements. Additionally, as learning goal orientation promotes resilience in face of negative feedback, apprentices are envisaged to respond to difficulties and challenges positively, exerting further effort to improve their abilities and develop the competencies required to perform effectively in their role.

Overall, learning oriented apprentices are expected to make an effective use of formal and informal learning activities with a positive impact on their end-state competencies. The adaptive patterns of behaviours associated with learning goal orientation, entailing effort and application as instrumental strategies for personal development and valuing feedback as diagnostic information to improve performance (VadeWalle and Cummings, 1997; Vandewalle et al., 2001), foster apprentices' engagement in learning and sustain the development of resultant competencies.

Based on the proposition that learning oriented apprentices display adaptive patterns of behaviours influencing their engagement in formal and informal learning activities, this research hypothesises an interaction between learning goal orientation and the apprenticeship training:

Hypothesis 5: *The positive relationship between the apprenticeship and resultant competencies is stronger when apprentices have high levels of learning goal orientation.*

3.7 Chapter summary and conclusions

This chapter has introduced important boundary conditions in the apprenticeship development model accounting for the influence of contextual and individual factors on apprentices' competence development.

At contextual level, the influence of the HRM system embedding the apprenticeship has been identified as pivotal for developing and maintaining a quality employment relationship. As indicated in the literature (i.e. Kuvaas, 2008), the latter is critical is ensuring that apprentices positively respond to development opportunities and reciprocate the organisation with effective performance behaviours.

Similarly, the individual construct of goal orientation plays an important role in influencing apprentices' dispositions towards formal and informal learning activities. As learning oriented individuals are adept at self-improvement and self-regulation, apprentices displaying high levels of learning orientation are expected to effectively engage in formal and informal learning, considerably improving their end-state competencies.

The contributions of the chapter are threefold; linking the HRM system and PA as distinctive HR practice with formal and informal learning, the study introduces a macro-level approach to learning and development research. In doing so, the study addresses extant research limitations whose underlying epistemological assumption treats learning as non-systemic phenomenon (Kontoghiorghes, 2004) and introduces employees' perceptions of HRM as key environmental consideration with implications for the effectiveness of formal and informal learning.

Secondly, whereas research has demonstrated the impact of employees' perceptions of HR practices on their attitudes and behaviours (Katou et al., 2014; Sanders et al., 2008; Sun, Aryee and Law, 2007), limited studies have addressed the influence of HRM on individual learning. Building on the work of Bednall and colleagues (2014; 2016), the first to examine the effect of HRM perceptions on participation in informal learning, this study adds knowledge on the influence of HR perceptions on employees' competence development. Addressing this issue, the study contributes to the HRM-performance link debate (Guest, 2011), shedding light on how participation in formal and informal learning enhances performance.

Thirdly, this study adds knowledge on the influence of learning goal orientation on performance in workplace settings. It does so extending the understanding on the interplay of learning goal orientation and formal and informal learning, providing further evidence of the value of the goal orientation construct in organisational research. Introducing the individual difference of learning goal orientation in the apprenticeship development model, the study presents a nuanced understanding of the types of apprentices who learn the most from formal and informal learning.

Finally, in testing the model in the field the research provides empirical evidence that apprentices' ability to learn and develop varies depending on their understanding of HR practices and on their individual characteristics.

Chapter 4: Research design and method

4.1 Introduction

To test the hypotheses proposed in Chapters 2 and 3, an empirical study was conducted with a sample of 233 apprentices employed in two organisations in England. Before reporting the results, this chapter presents how the study was designed and conducted.

The chapter is structured into two sections. The first section discusses the research paradigm positioning the study within the apprenticeship research context, whilst the second section provides a detailed account of the design of the field study, the procedure for data collection, the characteristics of the sample, the ethical considerations and the measures adopted in the study. Additionally, the chapter discusses the procedures adopted for the quantitative and qualitative data analysis and presents an overview of the emergent themes.

4.2 Research methodology

The purpose of this study is to understand how apprentices' competence development can be supported turning the focus to the work environment. To this end, given that the choice of research design and method is determined by the research question investigated (Bryman and Bell, 2011), this study adopts a positivist paradigm and advances and empirically tests a theoretically derived apprenticeship development model.

In so doing, following the work of Felstead and colleagues (2004) on workplace learning, this study aims to develop a survey that captures the sources of learning associated with apprenticeship, so identifying the conditions conducive to apprentices' development. It does so building on previous case studies on apprenticeship and informal learning (i.e. Eraut, 2007; Fuller and Unwin, 2003b; Gijbels et al., 2010) in operationalising and testing the factors contributing to learning in the workplace. Given that distinctive epistemological and ontological positions typify the methodological approach adopted in survey and case study research, a deliberation of the positivist and interpretivist paradigms is here called for.

Research methodology refers to 'the procedural framework within which the research is conducted' (Remenyi, Williams, Money and Swarts, 1998, pp. 28), underpinned by theoretical and philosophical assumptions informing the research design. Distinctive epistemological and ontological positions stand at the basis of particular research paradigms

as positivism and interpretivism. With epistemology relating to what should be considered acceptable knowledge in a particular discipline, the positivist paradigm posits that only observable phenomena constitute credible data. This view is linked with objectivism as an ontological position viewing reality as external and independent of social actors (Saunders, Lewis and Thornhill, 2009). Accordingly, positivist researchers observe social phenomena that are independent of those who observe, and posit that methods of the natural sciences are applicable to the study of the social sciences. Therefore, organisations are viewed as concrete entities beyond the researcher's influence and about which data can be collected on the basis of observations (Bryman and Bell, 2011). Within an objectivist conception, social reality is measured quantitatively through the operationalisation of concepts employed in hypotheses testing. In following the principle of deductivism, positivists develop and empirically test hypotheses on the basis of a particular domain of knowledge related to the research question under investigation. Accordingly, experimental and survey research strategies are employed to test theory and confirm or refute hypotheses (Bryman and Bell, 2011).

Conversely, the interpretivist paradigm rests on the assumption that there is no objective social reality but reality is socially constructed. A subjectivist view of the nature of reality considers social phenomena as resulting from perceptions of social actors and being in a continuous state of revision (Brymann and Bell, 2011). Recognising reality as subjective, the interpretivist paradigm does not seek to explain reality but to rather understand it considering humans as social actors embedded in specific and unique situational contexts. It follows that research adopts an empathetic approach in exploring subjective meanings therefore recognising different interpretations and multiple perspectives of reality (Saunders, Lewis, Thornill, 2009).

Unlike the positivist paradigm that views reality as independent of the observer, interpretivism assumes that the researcher is an intrinsic part of the researched phenomenon (Remenyi et al., 1998), and in entering the social world seeks to gain a rich understanding of the research context and of the meanings social actors attach to it. Accordingly, in-depth investigations based on small samples and qualitative methods for data collections are generally employed. Thus, case studies represent real-life events set in particular contexts and are particularly useful when the research seeks to understand the 'how' and 'why' of a particular phenomenon over which there is limited control (Yin, 1994). Within this research strategy, interviews allow to explore the social reality through people's knowledge, opinions, interpretations and personal experiences, whilst observations enable the collection of

multidimensional data on the physical, spatial and temporal dimensions of the context and on the social interactions, norms and behaviours that take place within it (Mason, 2002). Such rich data are ultimately used in an inductive approach for the development of theories and concepts (Brymann and Bell, 2011). With most apprenticeships studies adopting the interpretivist paradigm, a brief discussion on how these have provided valuable insights and have informed the current study follows.

4.2.1 Research methods in apprenticeship research

Apprenticeship research has been dominated by the interpretivist paradigm. A review of apprenticeship studies published in the *Journal of Vocational Education and Training* reveals a clear division among those discussing the apprenticeship's institutional arrangements on the basis of national statistics and policy reviews (i.e. Abdel-Wahab, 2012; Chankseliani and Relly, 2012; Hogarth, Gambin and Hasluck, 2012b) and those presenting empirical investigations into apprenticeships as model of learning (i.e. Chan, 2015; Dismore, 2014). Whilst the former focus on topics as participation rates, costs, benefits and reforms considering apprenticeships as an instrument of government policy, the latter examine a multitude of topics ranging from learning methods to educational progression.

Empirical studies following an interpretivist paradigm have made significant contributions to apprenticeship research providing insight into real life contexts and giving voice to apprentices as central social actors. Whilst based on limited samples, these studies present rich accounts of apprentices' learning experiences and quality theoretical inferences about factors critical to apprentices' development. As such, ethnographical studies investigated the socio-cultural aspects of learning in apprenticeship (i.e. Lave and Wenger, 1991) shedding light on the relationships and processes contributing to competence development. Within these, Chan (2015) adopted a phenomenological approach to investigate the role of observation in contributing to learning a trade. Rich data collected via interviews allowed to understand apprentices' learning experiences through their perspective, evaluating observation as an essential process in trades learning. Similarly, an ethnographic case-study encompassing interviews with apprentices and participant observation in college and at the workplace was conducted by Brockmann (2010) to explore the role of the apprenticeship in shaping young people learner identity.

Additionally, in examining how novice apprentices are guided and supported by experienced colleagues in the workplace and how guidance and support are distributed within teams, Filliettaz (2011) employed an ethnographic and discursive methodology where interactions

between apprentices and their colleagues were videotaped. Analysis of interactions provided insight into the pedagogical qualities of the workplace suggesting how a positive learning environment is dependent on experienced workers' pedagogical skills and awareness. Also, in a comprehensive study on workplace learning in initial VET, Poortman, Illeris and Nieuwenhuis (2011) investigated how different factors related to the cognitive, social and emotional dimensions of learning influence the learning process and the related outcomes. Rich data collected via interviews, observation and document analysis allowed to assess the influence of learner characteristics and the learning environment on apprentices' competence development.

Within the English apprenticeship system, in-depth case studies in the steel industry present insight into different company approaches to apprenticeships related to expansive and restrictive characteristics (Fuller and Unwin, 2003b); using a range of methods for data collection including interviews, observation and weekly learning logs, Fuller and Unwin (2003b) investigated opportunities for and barriers to learning in different learning environments. Additionally, whilst exploring the social and pedagogical relationships in the workplace, the information collected in weekly learning logs contributed to revisiting the pedagogical relationships between apprentices and older employees (Fuller and Unwin, 2003c). A subsequent study on organisations operating within the public and private sector furthered the understanding of best practices in apprenticeships interviewing training personnel within organisations on the rationale for providing apprenticeships, the costs and benefits involved, the structure of the training provided and the links with career progression (Fuller and Unwin, 2007).

Overall, in-depth case studies are influential in identifying factors contributing to successful apprenticeships and in explaining how and why apprentices engage in workplace learning. As discussed by Felstead and colleagues (2004) case-study research contributes to identifying the sources of learning related to daily experiences in the workplace however, although extensive research on apprenticeships has been carried out, most studies have tended to focus on limited aspects in specific organisational and occupational contexts. It follows that the generalisability of much research is problematic. Additionally, few studies have investigated apprenticeships in a systematic way, hence a comprehensive understanding of how the apprenticeship contributes to resultant competencies is still lacking. A generalised conceptualisation of the contextual factors that enhance apprentices' competence development is therefore called for.

An attempt in this direction was made by Messman and Mulder (2015) who investigating apprenticeships in Germany quantified the association between work characteristics and school-work alignment on one side and apprentices' engagement in workplace learning on the other. The study is however based on a small sample, and fails to consider individual factors as important determinants of professional development. Building on this line of work, this research adopts a positivist paradigm to examine the relationship between the apprenticeship, the HR system embedding the programme, apprentices' learning goal orientation and apprentices' resultant competencies. In examining causal relationships between independent and dependent variables with a focus on the social embeddedness of the phenomenon a quantitative approach is adopted.

With a positivist epistemology the research follows the principle of deductivism investigating the extant literature to generate hypotheses to be tested gathering empirical data (Bryman and Bell, 2011). The review of the literature has informed the development of a comprehensive framework that conceptualises the quality of the learning environment in apprenticeship and in testing it empirically allows to: 1) identify the relevant importance of different sources of learning and 2) establish the association between these and apprentices' resultant competencies. A survey was therefore developed to collect quantitative data and test the apprenticeship development model advanced from the literature. Additionally, an open question positioned at the end of the survey allowed the collection of qualitative data in form of statements allowing cross-checking of findings. Quantitative and qualitative data were collected simultaneously, and whilst analysed separately they form an integrated data corpus providing a strong basis for data triangulation. As discussed by Johnson, Onwuegbuzie and Turner (2007), a dominant quantitative mixed method research relies on a positivist view of the research process while at the same time recognising the benefits of additional qualitative data. Accordingly, this study adopts a multi-method design in the data collection and data analysis, however under the same paradigm, that of positivism.

Details of the research design are discussed in the following section, followed by a description of the quantitative and qualitative data analysis.

4.3 Research design

Important methodological considerations have informed the design of the field study. Firstly, since the early 2000s, HR research has recognised the importance of investigating multi-

level phenomena, taking into account the fact that HR practices designed at the organisational level influence employees' attitudes and behaviours at the individual level, which in turn influence performance at the organisational level (i.e. Bowen and Ostroff, 2004). As discussed by Sanders, Cugin and Bainbridge (2013) this presents implications for designing research models based on strong theoretical assumptions, implementing valid and reliable measures and adopting sound analytical techniques.

Thus, following the argument advanced by Wright and Nishii (2007), as this study considers apprentices as particular category of employees, the analysis focuses on HR practices at the level of the job group. The HR architecture model advanced by Lepak and Snell (1999) has led to the identification of the high-commitment HR system as embedding the apprenticeship as model of learning in employment, on the assumption that such practices are uniformly applied to the apprentices' job group. However, considering the multi-level dimension of organisations, it is acknowledged that HR practices at the job group are experienced and perceived subjectively at the individual level, with potential for variance (Wright and Nishii, 2007).

As ignoring the multi-level dimension in HRM research may lead to the problem of misspecification of the measured level in comparison to the theoretical level, negatively impacting construct validity (Sanders et al., 2013), the issue has been addressed studying the phenomenon at the individual level and identifying the individual apprentice as the focal unit of analysis. Collecting data from apprentices rather than HR staff or line managers enables capturing individual-based perceptions of the quality of the apprenticeship, the HR system and learning goal orientation, as strong determinants of apprentices' competence development. In so doing, this research captures apprentices' perceptions and experiences of HR practices, rather than the intended and espoused HR policies and practices as portrayed by managers (Kinnie et al., 2005). As argued by Arthur and Boyles (2007), the level-based assumptions behind the constructs under investigation ought to guide the choices about whom to survey and the types of questions to ask, hence surveying apprentices as respondents allows insight into the learning experiences and the factors potentially hindering or enabling apprentices' competence development.

Additionally, as single-informant designs are prone to issues of common method variance scholars recommend to collect data on the dependent and independent variables from different sources (Chang et al., 2010). Accordingly, the original set up of the study intended

to collect data on the independent variables from apprentices and data on the dependent variables from line managers. However, given that the apprenticeship is structured in placements with apprentices rotating regularly among departments, the tracking of line managers to match respective apprentices in Company B was impractical. While Company A agreed to line managers taking part in the study, the low number of responses from this category (N= 18 out of 30) precluded any analysis of the data. Accordingly, given that a multi-actor design for the field study was impractical, self-report measurements were deemed appropriate and steps were taken in the survey design to minimise the issue of common method bias.

Specifically, issues that relationships between self-reported variables are routinely upwardly biased have been challenged as misconceptions (i.e. Conway and Lance 2010; Fuller et al., 2015) upholding the view that multi-actor research is not necessarily superior to single-actor reports. Empirical studies suggest that self-reports are accurate performance measurements. In particular, Shalley, Gilson and Blum (2009, p. 495) have adopted self-reports for assessing creative performance in that employees are best placed to report on creativity for being 'aware of the subtle things they do in their jobs that make them creative'. Similarly, research on training transfer has extensively relied on self-reports (i.e. Chiaburu and Marinova, 2005; Fecteau et al., 1995, Tesluk et al., 1995) as no evidence suggests that trainees cannot accurately report on this outcome. As discussed by Velada and colleagues (2007), given that the results of studies on training transfer adopting self-reports are consistent with those of studies which implement both self-reports and supervisor performance rating, self-reports are deemed adequate and accurate performance measures. Additionally, measures employed to minimise the issue of common method bias in designing the questionnaire included reverse coding some of the items and adopting different anchors to measure different constructs. As discussed by Aulack and Gencturk (2000) such *ex ante* steps can minimise the effects of common method bias. Similarly, guaranteeing anonymity and confidentiality in the data collection process is expected to contribute to the accuracy of the data (Chang et al., 2010).

Another important consideration in HRM research is that of internal validity, here questioning how confident can we be that the apprenticeship development model is partly responsible for variation in apprentices' competencies. Scholars have long discussed the insufficient methodological rigour of cross-sectional studies in providing a foundation for inferring causality calling for advanced methodologies as longitudinal and experimental

designs (Sanders et al., 2013). In testing a theoretically derived framework that conceptualises the quality of the learning environment in apprenticeship, this research adopts a cross-sectional and a longitudinal design.

Whilst originally set up as a longitudinal study based on panel data collected over two waves, issues of sample attrition reduced the sample size to 90 observations, limiting the power for statistical inference tests (Hair et al., 2014). Although an exclusive longitudinal design would have allowed insight into the time order of variables and so enabled strong inferences about causality (Bryman and Bell, 2015), the restricted sample size precludes this methodology. Accordingly, this research is centred on a cross-sectional study based on the observations collected over the first wave (N= 233) and is complemented by a longitudinal study based on the observations collected over the second wave (N= 90). Whilst the former seeks to explain patterns of associations between factors conducive to apprentices' development and resultant competencies, the latter seeks to determine social change over time providing a preliminary basis for inferring causality (Brymann and Bell, 2011). In light of an emerging consensus in the informal learning (Cerasoli et al., 2018) and the apprenticeship literature (Fuller and Unwin, 2003b; Messman and Mulder, 2015) over the factors conducive to workplace learning, the cross-sectional study allows to test whether an association exists among such factors and apprentices' resultant competencies. Added to this, the longitudinal study allows identifying changes in perceptions of the apprenticeship development model and apprentices' performance over time, along with providing preliminary insights for inferring causality.

As discussed by Bednall (2013), longitudinal research presents methodological and logistical challenges in comparison to cross-sectional studies which should inform the research design. Following his guidelines, the time frame of the study was established considering the nature of the research question along with practical considerations such as funding and the timeframe available. Accordingly, data was collected on two assessments spaced about 10 months apart; the spacing of assessment was defined on the account that apprenticeships are learning intensive programmes involving accelerating development and expected to result in changes in competences in a relatively short-time space. Although Bednall (2013) discusses the limitations of two spaced assessments as in failing to differentiate true change from measurement error and to identify nonlinear change, in the context of this research it was deemed appropriate. Here the collection of panel data allowed the investigation of both stability and change in considering whether factors related to the

apprenticeship development model remained stable over time, and whether apprentices' competencies varied. Additionally, the availability of data collected at different points in time allowed to tentatively explore relationships of causality on the assumption that earlier events influenced subsequent events and not vice-versa (Keeves, 1997).

4.3.1 Research context

Two main issues were considered in selecting the organisations participating in the study. Firstly, they would be operating in the engineering sector, as this presents a long standing tradition of offering high quality apprenticeships and it is leading the way in England in the delivery of Higher Apprenticeships (Lee, 2012). Secondly, they would extensively provide Advanced (Level 3) and Higher (Level 4 and above) Apprenticeships, rather than Intermediate (Level 2) qualifications.

In order to identify companies meeting such requirements, the researcher consulted news (i.e. BBC news), social media (i.e. LinkedIn and Twitter), academic publications (i.e. Lee, 2012; Ryan et al., 2007) and Government reports listing the top 100 Apprenticeship employers. In order to promote the research project, a brief cover letter describing the research objectives and the beneficial insights offered by the study was circulated via email among fifteen large organisations. Given the popularity of apprenticeships as research topic, access for data collection proved problematic. Although interested in the project, most high profile organisations had already agreed to other apprenticeship studies and were reluctant to engage in an additional research project on the subject. Ultimately, two large engineering organisations agreed to participate in the study, here presented as Company A and Company B. Whilst the researcher negotiated access to Company A independently, access to Company B was facilitated by the existing contacts of the Nottingham Business School. Altogether the companies employed nearly 500 apprentices studying towards Level 3, 4 and 5 thus presenting an illustrative profile of the apprenticeships qualifications.

Company A

Company A is one of the world largest independent manufacturers of generators. The company has been a key figure within Electrical Engineering for over 130 years producing a wide range of electrical machines including turbo generators, power transformers and power management systems. The company trades worldwide within utility, oil, petrochemical, coal, steel and rail industries. Originally established in the UK in 1876, over the years the company experienced a series of integrations growing globally. Since the early 2000s the company acquired subsidiaries in the Netherlands, Czech Republic and the USA.

The integrated companies now operate as one group employing around 5000 employees globally. Company A strives towards ongoing investments on the implementation of modern technology through research and product development.

Data collection at Company A was conducted in its UK site employing around 500 staff of which 30 apprentices. Apprentices employed at company A attend a four-year programme within the manufacturing department. The apprenticeship is offered in cooperation with a local college where apprentices attend formal training courses leading to nationally recognised technical qualifications. Whilst the first 16 weeks of the apprenticeships are spent full-time at college to gain initial engineering technical knowledge, the remaining period is spent on-the-job with one day a week spent at college. Once in the workplace apprentices spend the first 12 months rotating among key manufacturing and support business areas to gain foundational knowledge covering manufacturing and production awareness along with product knowledge. Over the course of the second year apprentices are assigned to a specific department where in-depth technical skills training takes place. A comprehensive personal development programme complements the academic and vocational aspects of the apprenticeships and enables apprentices to gain key personal skills such as effective communication, leadership behaviours, presentation skills and career management.

Company B

Company B is a world leading industrial technology company creating power and propulsion systems for use on land, at sea and in the air. The company strives to globally lead the move to a low carbon economy. Pioneering cutting-edge technologies the company operates in five business units: civil aerospace, defence aerospace, power systems, marine and nuclear. Operating in 50 countries, Company B employs around 50,000 employees worldwide, of which 22,500 are based in the UK. 6,200 employees are based in the USA, 1000 in Canada, 10,600 in Germany, 3,000 in Nordic countries and 6,700 in the rest of the world. 18,245 of the global employees are engineers specialised in electrical, manufacturing, design and service engineering. Company B is continually developing its employee base to ensure core skills and capabilities are developed to support its strategy. In 2017, 31.2 million were invested in training and development in subjects ranging from health and safety, quality, product safety, export control and ethics.

Company B has more than a century engagement with apprenticeships and regularly employs around 500 apprentices in the UK. Data collection at Company B was conducted in

the UK surveying over 450 apprentices based in seven sites around the country. Level 3 Apprenticeships range from practical roles as mechanical fitters, welders and machinists to more technical engineering roles. Although geared towards different careers, all programmes follow the same format: the first year is spent off-the-job gaining broad understanding of engineering principles and technologies at college or in the company's training academy. The second year is based in the workplace and entails numerous placements within the business areas to gain real depth of knowledge, whilst in the third year apprentices are assigned to a specific role and further refine their knowledge and skills.

Level 4 and above Apprenticeships last around 4 years and lead to Degree qualifications and relevant professional qualifications in areas ranging from Business, Digital Technologies, Engineering, Management, Supply Chain and Accounting and Manufacturing. These involve placements within relevant business areas complemented by block releases at University to complete the relevant technical qualification. As in Company A, apprentices employed in Company B develop personal skills as team working, self-confidence and communication as part of an apprenticeship bespoke personnel development programme.

Although the apprenticeships investigated in Company A and B take place in various sites and are geared towards different curriculums and careers, they follow a standardised format. In all cases, apprentices are expected to work towards attainment of the technical certificate, relevant NVQ diploma and key skills. Accordingly, apprentices need to successfully complete academic assignments and examinations, workplace tests and other assessment specified by the Apprenticeship framework. Additionally, both companies provide comprehensive professional development programmes, competitive salaries, rewards and benefits. Given that both companies operate in the engineering sector, focus on innovation and present apprentices with equally structured programmes, for the purpose of this study respondents from company A and company B are treated as one sample.

4.3.2 Data collection

Before conducting the field study I consulted with the HR manager (Company A) and the Apprenticeship manager (Company B) in either company to present the scope of the research and the benefits involved. Both expressed interest in learning what factors contribute to apprentices' development and were supportive of the research in presenting them with different insights from their internal evaluations. Before agreeing to the study, both managers reviewed the survey to ensure the questions were relevant and of no sensitive nature.

A pilot study was then conducted with a focus-group of 8 apprentices in order to test the validity of the questionnaire. In the focus-group, apprentices were asked to look at the survey in pairs, with the opportunity to discuss it among each other before reporting their comments to the researcher. As part of the pilot, the researcher invited apprentices to comment on clarity of instruction and layout, any questions which appeared unclear or ambiguous, any topics which could make them uneasy, any repetitions and major topic omissions (Saunders et al., 2009).

The pilot allowed the identification of few items containing unclear terminology, providing the researcher the opportunity to discuss alternative wording with the group before finalising the final version of the survey. Overall the feedback from respondents was very positive, confirming the relevance of the constructs of interest in the context of the apprenticeship and validating the instrument. Additionally, two line managers read the scales adopted to measure apprentices' performance and confirmed their validity.

Next, an internal communication was distributed by the HR and Apprenticeship manager in either organisation to inform apprentices of the study and to invite them to promptly respond to the survey once received. The survey was then distributed via email to each individual apprentice. The email informed participants of anonymity of their responses and provided them with a unique identifier which they could use if they wished to withdraw their responses within two weeks of completing the survey. The email included a link to an online survey and provided the researcher's contact details for those participants who wished to enquire about the survey or discuss it further.

The online survey included an information sheet and a consent form (Appendix 1). The former explained the purpose of the study, the topics investigated and the time required to complete the questionnaire (about 20 minutes). It also assured participants of confidentiality of their responses, explaining that these would not be disclosed to anyone within and outside the organisation. The voluntary nature of the survey was also emphasised, informing participants of their right to withdraw at any time when completing the questionnaire. The researcher contact details along with those of the Director of Study and those of the School Director of Research at Nottingham Trent University were also included.

The online survey was adopted as the apprentices' population was geographically distributed (N= 495) as well as for the inherent advantages of the online tool in allowing apprentices to complete the survey in their own time and without social pressures. Email reminders with

voucher incentives were further distributed to boost the response rate. It has indeed become common practice to offer participants rewards for taking part to the project and increase participants' recruitment and retention (Bednall, 2013). Inducements were offered in the form of shopping vouchers (£10 - £25) allocated via a lottery system and distributed via email once the data collection was completed.

The first wave of data collection took place between March and June 2016, whilst the second wave of data collection took place in March and April 2017. As advised by Bednall (2013), a relationship management system was designed to manage the administration of the survey and record contacts with participants. A database with participants' contact details and unique identifiers allowed to record the dates of the survey distribution, details of those who responded, and track reminders to non-respondents. Such system enabled the administration of the survey in the second wave of data collection, targeting only those apprentices who completed the survey the first time, and enabled the distribution of the lottery vouchers.

4.3.3 Ethical issues

The research has been conducted in accordance with the ethical framework endorsed by Nottingham Trent University. As the project involved the collection and analysis of data related to living human beings, ethical approval from the University's College Research Ethic Committee was required.

Among the ethical principles promulgated by the University, the research ensured to protect confidentiality and anonymity of participants and security of the research data during and after the project. These principles were integrated in the research procedure by storing all data in anonymised form and linking participants to their data only through unique identifiers. Data were saved on digital files, stored with password protection and accessible only by the researcher. Additionally, no individual or organisation has been and will be named in any publication discussing the empirical findings unless consent is given by the party concerned.

According to the principle of informed consent all relevant information related to the research project and the data collection procedure should be communicated to the research participants. This should include any risks and benefits associated with their involvement and should stress the voluntary nature of their participation. In so doing, detailed and clear information should be presented so that participants are fully informed of the nature and objectives of the research. Correspondingly, apprentices were informed of the research

project by the HR manager and the Apprenticeship manager in either organisation; subsequently, an information sheet and a consent form were read and agreed upon by all respondents before completing the questionnaire.

As particular attention should be given to the capacity to give valid consent, the researcher acknowledged the possibility that with Apprenticeships being available to anyone aged 16 and above, a proportion of respondents may have been aged under 18. However, being classed as full-time employees these were deemed capable of deciding whether to participate. Additionally, the representatives of the organisation (i.e. the HR manager and the Apprenticeship manager) introduced apprentices to the project, drawing attention to the voluntary nature of the study, further stressed in the information sheet introducing the questionnaire.

Ultimately, payments to participants in the form of shopping vouchers distributed with a lottery system were also subjected to approval of the University's Research Committee. This ensured that participants were rewarded for their participation to the project and not for a particular outcome. It also ensured that the value of the rewards was not at a level at which participants would take part to the study against their interest, and did not present the risk of skewing the data.

4.3.4 Sample

On the first wave of data collection completed and usable questionnaires from 233 apprentices were received. The data collection targeted all apprentices employed in Company A (N= 33) and all apprentices employed in Company B (N= 465). 30 responses came from Company A (response rate= 90%) and 203 responses came from Company B (response rate= 44%). Overall, this represented a response rate of 47%. The second wave of data collection targeted only apprentices based in Company B who had responded to the survey the first time, resulting in 90 responses (response rate 44%).

Among respondents, 69% are male and 18% are female. Whilst national statistics present an even split with 54% of women and 46% of man starting an apprenticeship in 2016 when considering the overall apprenticeship population (House of Commons Library, 2018), the gender distribution in this sample is typical of the engineering sector that has traditionally attracted predominantly male apprentices (Fuller and Unwin, 2003b).

A vast proportion of respondents is aged between 20 and 24 (49%), whilst 27% are aged between 16 and 19, and only around 10% are over 25. The demographic distribution of the

sample is particular to the Engineering sector, whilst the overall apprenticeship population presents 46% of apprentices aged 25 and over (House of Commons Library, 2018).

When considering the apprenticeship level, nearly half of respondents (47%) are studying towards a Level 3 qualification, whilst 25% are studying towards a Level 4 qualification and 15% towards a Level 5 qualification. The sample is representative of the apprenticeship levels with half of respondents undertaking an Advanced Apprenticeship and half undertaking a Higher Apprenticeship. The majority of respondents are studying towards an Engineering qualification, with others taking a Manufacturing, Supply Chain and Project Management qualification. It is important to note that the advance and higher levels are typical of the engineering sector, whilst 53% of the overall Apprenticeship population studies towards an Intermediate (Level 2) qualification.

When considering the organisation's tenure, only 15% of respondents have been employed for less than 1 year; 60% have been employed between 1 and 3 years and only 10% have over 3 years work experience with the company. 55% of respondents reported to be employed on a permanent contract, 30% on a temporary contract, whilst 15% did not provide this information. The overwhelmingly majority of the sample (90%) reported that the apprenticeship was voluntary, in that it was their decision to apply for the programme; whilst only 10% indicated that the apprenticeship was mandatory, as in required by the organisation.

4.3.5 Measures

Existing scales with proven reliability were selected for measuring the constructs of interest. The items were identical across the two waves of the study.

The following section presents the scales adopted to measure factors related to formal and informal learning, the HR system strength, performance appraisal, learning goal orientation and apprentices' competencies.

Formal learning

Transfer design

I used a 4-item scale developed by Diamantidis and Chatzoglou (2014) to measure transfer design intended as 'the degree to which a training programme (1) has been designed and delivered in such a way that provides trainees the ability to transfer learning back to the job and (2) match job requirements (tasks and activities)' (ibidem, pp. 158).

Whilst the original items were written in the past tense in order to measure training programmes attended over the previous years, the items were here presented in the present tense given that training in apprenticeship is ongoing. Additionally, some information was added to reflect the particular nature of the apprenticeship training as in encompassing courses at either college, university, the local training academy, and in including individual study.

Sample items are ‘During the training process (attending formal courses at college, university, local training academy) several examples are given about the ways to use learning on my daily job activities’ and ‘During the training process the activities and exercises I undertake (in class or as part of my individual study) help me understand how to apply learning on the job’. Response options ranged from (1) ‘strongly disagree’ to (5) ‘strongly agree’.

Supervisor support

I used a 7-item scale employed by Chiaburu and Marinova (2005) in a study on the antecedents of pre-training motivation and skill transfer to measure supervisor support. The scholars adopt a 5-item scale from Yarnall (1998) measuring supervisor support for career development and developed two additional items specifically related to learning transfer. The scale measures the extent to which the supervisor 1) encourages the application of newly acquired knowledge and skills and 2) assists employees with improving performance and with career development.

Sample items are ‘My supervisor provides me with the time I need to practice the skills learned in training’, ‘My supervisor provides me with constant reminders on how to apply the acquired skills’ and ‘My supervisor utilises a variety of methods to assist me with my development’. Response options ranged from (1) ‘strongly disagree’ to (5) ‘strongly agree’.

Supervisor’s feedback

I used a 3-item scale developed by Diamantidis and Chatzoglou (2014) to measure supervisor feedback. The scale measures the degree to which employees ask their supervisors about the extent to which they support and reinforce the use of newly learned knowledge and skills on the job. Sample items read ‘After completion of the training programme I often discuss with my supervisor the possible ways to apply training on the job’ and ‘After completion of the training programme I often discuss with my supervisor the

problems in using training on the job'. Response options ranged from (1) 'strongly disagree' to (5) 'strongly agree'.

Colleagues' feedback

I used a 3-item scale developed by Diamantidis and Chatzoglou (2014) to measure colleagues' feedback. The scale measures the degree to which employees ask their colleagues about how well they perform their job after participation in a training programme.

Sample items include 'After completion of the training programme I have post-training conversations with my colleagues about how to improve job performance' and 'After completion of the training programme I ask my colleagues how well I apply the training content on my job'. Response options ranged from (1) 'strongly disagree' to (5) 'strongly agree'.

Opportunity to use the knowledge and skills acquired in formal training

Opportunity to use the knowledge and skills acquired in training was measured with two items adopted from the scale developed by Ballesteros-Rodriguez and colleagues (2012). The items were originally developed to measure the application of training content on the job as part of a multidimensional scale measuring training success. The items read 'I have incorporated much of the skills learned in the training course to my daily work activities' and 'I have often used at work, knowledge and skills learned'. In the apprenticeship survey the items were phrased in the present tense to reflect the ongoing nature of formal training; additionally following the pilot study the second item included an example of formal training to clarify terminology. The items in the survey read: 'I can incorporate much of the skills learned in the training course in my daily work activities' and 'I can use at work, the knowledge and skills learned off-the-job (at college)'. Response options ranged from (1) 'strongly disagree' to (5) 'strongly agree'.

Informal learning

Social Support

In order to measure social support I used a 6-item scale developed by Morgeson and Humphrey (2006) as part of the Work Design Questionnaire, reflecting the extent to which the job presents good relationships among colleagues and provides the opportunity to obtain information from others and seek help when required. Sample items read 'I have the opportunity to meet with others in my work' and 'People I work with take a personal interest in me'. Response options ranged from (1) 'strongly disagree' to (5) 'strongly agree'.

Feedback

I used a 3-item scale developed by Morgeson and Humphrey (2006) as part of the Work Design Questionnaire to measure the availability of feedback in the workplace. The scale measures the extent to which others, as in colleagues and supervisors, provide ongoing feedback on performance. Sample items are 'I receive a great deal of information from my manager and colleagues about my job performance' and 'I receive feedback on my performance from other people in my organisation (such as my manager and colleagues)'. Response options ranged from (1) 'strongly disagree' to (5) 'strongly agree'.

Problem solving

I used a 4-item scale developed by Morgeson and Humphrey (2006) as part of the Work Design Questionnaire to measure problem solving as this exhibits the knowledge, skills and ability demands placed on individuals as a function of the job requirements. Sample items include 'The job often involves dealing with problems that I have not met before' and 'The job requires unique ideas or solutions to problems, Response options ranged from (1) 'strongly disagree' to (5) 'strongly agree'.

Experimenting

I used a 3-item scale developed by Van Woerkom and Croon (2008) to measure experimenting as in the extent to which the job allows to engage with experimenting with methods, techniques and tools. The scale items read 'I like to try things out, even if it sometimes leads nowhere', 'I experiment with other working methods' and 'I try out new working methods'. These were adapted to measure apprentices' perceptions of the extent their job allows them to engage in experimenting and following the pilot test the first item was rephrased to enhance respondents' understanding of terminology. The 3-items in the survey read: 'In my job I have the opportunity to try things out, even if it does not directly support the progress of the job', 'In my job I have the opportunity to experiment with different working methods' and 'In my job I have the opportunity to try out new techniques or tools'. The last item referred to 'new techniques and tools' rather than 'working methods' to cover a greater variety of activities contributing to informal learning (i.e. Lohman, 2006). Response options ranged from (1) 'strongly disagree' to (5) 'strongly agree'.

Task autonomy

Following Wood and de Menezes (2011) task autonomy is measured as in the extent to which the job presents employees with responsibility and discretion in managing and executing the

primary tasks using a 5-item scale adopted from the WERS2004 (Britain's Workplace Employment Relations Survey). Apprentices rated their influence on their jobs on a four-point scale (none; a little; some; a lot). Sample items include 'the tasks you do in your job', 'the pace at which you work' and 'how you do your work'.

Task interdependence

I measure task interdependence with a 7-item scale developed by Dean and Snell (1991) measuring to the extent to which the job requires interaction and collaboration with others to achieve the intended goals. The scholars measured task interdependence along with task variety and task complexity as job characteristics dependent on integrated manufacturing. Whilst the original items referred to work carried out in units (i.e. 'How much do people in this unit rely on people in other units' and 'How much do people in this unit have to coordinate work with others'), here the items were phrased to refer to the individual level. Sample items are 'How much does your work require you to coordinate with others', 'To what extent is dealing with other people part of your job' and 'How much does your success depend on cooperating with others'. Response options ranged from (1) 'not much' to (5) 'a great deal'.

HRM system strength

Following Bednall, Sanders and Runhaar (2014), the HRM system strength was measured as a composite of three subscales measuring the constructs of distinctiveness, consistency and consensus (Bowen and Ostroff, 2004). I adopted the same 16 items from the Delmotte, De Winne and Sels's measurement (2012) to capture the dimensions of each subscale and created a composite measure of the HRM system strength. Sample items for *distinctiveness* are 'When one ask the HR department for help, they provide clear answers' and 'The HR department undertakes exactly those actions that meet our needs'. Sample items for *consistency* are 'HR practices in this organisation achieve their intended goal' and 'The HR instruments for staff appraisal succeed in reinforcing the desired behaviours'. Sample items for *consensus* are 'Employees consider promotions as fair in this organisation' and 'If employees perform well, they get the necessary recognition and rewards'. Response options ranged from (1) 'strongly disagree' to (5) 'strongly agree'.

Performance appraisal satisfaction

I used a 6-item scale developed by Kuvaas (2006) to measure the construct of performance appraisal satisfaction. The scale was designed to measure employees' perceptions of the organisation's commitment to conduct developmental performance appraisal. Sample items

are ‘My organisation is good at providing recognition for good performance’ and ‘The feedback I receive on how I do my job is highly relevant’. Response options ranged from (1) ‘strongly disagree’ to (5) ‘strongly agree’.

Learning goal orientation

I used a 5-item scale developed by VandeWalle (1997) to measure the construct of learning goal orientation. The scale was specifically designed for the work domain and has been largely adopted in management research (i.e. Dragoni et al., 2009; Runhaar, Sanders and Yang, 2010). Sample items are ‘I am willing to select a challenging work assignment that I can learn a lot from’, ‘I enjoy challenging and difficult tasks at work where I will learn new skill’, and ‘For me, development of my work ability is important enough to take risks’. Response options ranged from (1) ‘strongly disagree’ to (5) ‘strongly agree’.

Apprentices’ end-state competencies

As discussed in Chapter 2, apprentices’ end-state competencies have been classified into three categories (technical knowledge; job competence; work and business skills) according to the statutory requirements indicated in the SASE (2017). In order to evaluate the application of these competencies, I measure the following constructs:

Training transfer as proxy for technical knowledge

I used a 6-item scale developed by Xiao (1996) to measure training transfer as proxy for technical knowledge. This scale has been widely adopted in studies on transfer of training with high reliability (i.e. Awoniyi, Griego, Morgan, 2002; Chiaburu and Marinova, 2005; Scaduto et al., 2008; Zumrah and Boyle, 2015) and operationalises transfer as in output of transfer behaviour (i.e. increased performance). Sample items are ‘Using the new technical/theoretical knowledge has helped me improve my work’ and ‘I have accomplished my job tasks faster than before attending the training’ and ‘The quality of my work has improved after using the new technical/theoretical knowledge’. Whilst the original scale referred to KSA (knowledge, skills, abilities) here the phrase ‘technical/theoretical knowledge’ was adapted to strongly reflect the expected outcome of formal training in apprenticeship. Response options ranged from (1) ‘strongly disagree’ to (5) ‘strongly agree’.

Formalised and emergent work role behaviours as proxies for job competence and work and business skills

Apprentices’ job competence and work and business skills are measured in terms of work role behaviours conceptualised as proficiency, adaptivity and proactivity, at the individual, team and organisational level.

I used a 27 item-scale developed by Griffin, Neal and Parker (2007) which differentiates among particular work role behaviours and the level of contribution. Accounting for contextual features of uncertainty and interdependence, Griffin and his colleagues developed a model of work role performance which considers formalised and emergent work role behaviours contributing to the effectiveness of the individual, the team and the organisation. Specifically, interdependence determines the extent to which work roles are embedded in social systems and defines whether individuals need to support the broader social context of the organisation (Griffin et al., 2007). In light of increasingly interrelated work environments both task and contextual performance (Borman and Motowidlo, 1993) are organisationally valuable. Whilst the former refers to behaviours prescribed by role requirements and contributing to individual effectiveness, the latter refers to behaviours contributing to the psychological, social and organisational context of work, and so facilitating the effectiveness of the team and the organisation as a whole (Motowidlo and Kell, 2003). Building on this distinction, Griffin, Neal and Parker (2007) categorise work role behaviours according to the level of contribution in: individual task-, team member-, and organisation member-behaviours.

Additionally, in light of increasingly dynamic work contexts the scholars postulate that work role behaviours require certain levels of flexibility. In distinguishing between formalised and emergent behaviours Griffin and colleagues (2007) present proficiency, adaptivity and proactivity as sub-dimensions of work role performance. Whilst proficiency describes the role requirements that can be formalised in stable and predictable circumstances, adaptivity and proactivity refer to behaviours that are emergent in dynamic situations. Specifically, adaptivity refers to behaviours responsive to externally initiated changes in task requirements and the work environment, and proactivity refers to self-initiated behaviours directed at changing task requirements or the work environment.

When considering apprentices' end-state competencies, the cross-classification of work role behaviours presented by Griffin, Neal and Parker (2007) is reflective of apprentices' job competence and important work and business skills. Job competence in referring to the skills required to deliver the job role reflects the behaviours underlying individual task proficiency. In measuring *individual task proficiency*, resembling the degree to which an individual meets the formalised behaviours specified in job descriptions, apprentices' underlying job competence is assessed. As discussed by Brockman and colleagues (2009), the notion of job competence within the English vocational system is conceptually related to the performance

of tasks. Accordingly, measuring individual task proficiency allows the assessment of apprentices' job competence.

Team member proficiency considers the behaviours required when working in a group context, encompassing helping colleagues and cooperating with others, and reflects team working skills. The latter feature as critical work and business skill that apprentices need to demonstrate as part of the PLTS. *Organisation member proficiency* refers to behaviours contributing to the organisational effectiveness including supporting and defending the organisational objectives and promoting the organisational image. Such construct resembles skills of effective participation, indicated in the SASE (2017) as the ability to actively engage with issues affecting oneself and those around, playing a full part in the life of the organisation by taking responsible actions to bring improvements to others and oneself.

Individual task, team member and organisation member adaptivity represent how individuals cope with, respond to and support change affecting their work role, their role as team members, and as members of the organisation. The constructs is closely related to the core skill of *self-management*, as in the ability to take responsibility, embrace change, cope with challenges and positively respond to demanding situations and new requirements (SASE, 2017).

Individual task, team member and organisation member proactivity refer to self-starting, future-oriented behaviours directed at changing the individual work role, the way the team operates, and the way the organisation works respectively. Proactivity emphasises self-directed behaviours and thus reflects skills of *creative thinking* in generating and exploring ideas and making original contributions (SASE, 2017).

Table 4.1 reports the constructs with the operational definition and the related underlying competencies. All items were measured using a 5-point Likert scale, asking respondents to rate the frequency of the behaviour over the last 12 months (1= not much; 2= little; 3= somewhat; 4= much; 5= a great deal). An overview of the constructs adopted to measure apprentices' end-state competencies is presented in Table 4.2.

Table 4.1: Formalised and emergent work role behaviours

Construct and operational definition	Items	Underlying competencies
Individual task proficiency: the extent to which an individual meets the expected role requirements.	<ol style="list-style-type: none"> 1. I carried out the core parts of my job well. 2. I completed my core tasks well using the standard procedures. 3. I ensured my tasks were completed properly 	Job competence
Individual task adaptivity: the extent to which an individual copes with, responds to and supports changes affecting their role.	<ol style="list-style-type: none"> 1. I adapted well to changes in core tasks 2. I coped with changes to the way I have to do my core tasks 3. I learned new skills to help me adapt to changes in my core tasks 	Self-management (embracing change, positively respond to new priorities)
Individual task proactivity: the extent to which an individual engages in self-directed behaviours aimed to change their individual work role or situation.	<ol style="list-style-type: none"> 1. I initiated better ways of doing my core tasks. 2. I came up with ideas to improve the way in which my core tasks are done 3. I made changes to the way my core tasks are done 	Creative thinking (generating and exploring ideas, trying different ways to tackle problems)
Team member proficiency: the extent to which an individual meets the requirements of his role as a member of a team.	<ol style="list-style-type: none"> 1. I coordinated my work with colleagues 2. I communicated effectively with colleagues 3. I provided help to colleagues when asked, or needed 	Team working skills (Collaborative work, facilitating social relations, engaging in and promoting mutual learning, joint planning)
Team member adaptivity: the extent to which an individual copes with, responds to and support changes affecting their role as members of a team.	<ol style="list-style-type: none"> 1. I dealt effectively with changes affecting my work unit (e.g. new members) 2. I learnt new skills or took on new roles to cope with changes in the way my unit works 3. I responded constructively to changes in the way my team works. 	Self-management (Embracing change, positively respond to new priorities)
Team member proactivity: the extent to which an individual engages in self-directed behaviours aimed to change a team situation or the way the team works.	<ol style="list-style-type: none"> 1. I suggested ways to make my work unit more effective 2. I developed new and improved methods to help my work unit perform better 3. I improved the way my work unit does things 	Creative thinking (generating and exploring ideas, trying different ways to tackle problems)

Table 1 continued.		
<p>Organisation member proficiency: the extent to which an individual meets the requirements of his role as a member of the organisation.</p>	<ol style="list-style-type: none"> 1. I presented a positive image of the organisation to other people (e.g. clients) 2. I defended the organisation if others criticised it 3. I talked about the organisation in positive ways 	<p>Effective participation (actively engage in the organisation)</p>
<p>Organisation member adaptivity: the extent to which an individual copes with, responds to and support changes affecting their role as members of an organisation.</p>	<ol style="list-style-type: none"> 1. I responded flexibly to overall changes in the organisation (e.g. changes in management) 2. I coped with changes in the way the organisation operates 3. I learnt skills or acquired information that helped me adjust to overall changes in the organisation. 	<p>Self-management (embracing change, positively respond to new priorities)</p>
<p>Organisation member proactivity: the extent to which an individual engages in self-directed behaviours aimed to change the organisation or the way the organisation works.</p>	<ol style="list-style-type: none"> 1. I made suggestions to improve the overall effectiveness of the organisation (e.g. by suggesting changes to administrative procedures) 2. I involved myself in changes that are helping to improve the overall effectiveness of the organisation 3. I came up with ways of increasing efficiency within the organisation 	<p>Creative thinking (generating and exploring ideas, trying different ways to tackle problems)</p>

Table 4.2: Apprenticeship end-state competencies and corresponding measured performance behaviour

Apprenticeship end-state competencies	Measured performance behaviours
Technical knowledge	Training transfer
Job competence	Individual task proficiency
Work & business skills (team working)	Team member proficiency
Work & business skills (effective participation)	Organisation member proficiency
Work & business skills (self-management)	Individual, team, organisation member adaptivity
Work & business skills (creative thinking)	Individual, team, organisation member proactivity

Open question

The survey ended with an open question stating: ‘The following question will give you an opportunity to tell us more about your experience as an apprentice. Please respond openly and truthfully’.

Control variables

As discussed by Dysvik and Kuvaas (2008), predicting the outcome of training and development is complicated in that several variables can influence the relationship between training and performance. A number of demographic and control variables were therefore included in the analysis.

I controlled for *age*, as commonly done in studies investigating employee development (i.e. Runhaar, Sanders and Yang, 2010; van Rijn, Yang and Sanders, 2012). I computed dichotomous variables such that 0 represented ‘younger than 20’ and 1 represented ‘older than 20’. The decision of coding age around the value of 20 was based on the fact that this presented an approximately even split of the sample.

Following Ehrnrooth and Bjorknan (2012) I controlled for *tenure* as this may influence both work performance and individuals’ perceptions of the HR process. Additionally, Dragoni and colleagues (2009) controlled for job assignment tenure and organisation tenure in order to isolate the effects of the developmental quality of managerial assignments. Similarly, DeRue and Wellman (2009) differentiated between organisational tenure and job tenure whilst Dysvik and Kuvaas (2008) differentiated between overall work experience and

specific job tenure. As apprenticeships may be undertaken by existing employees I collected data on both organisational tenure and apprenticeship tenure. However, given that for the overwhelmingly majority of respondents organisational and apprenticeship tenure coincided, I controlled for organisation tenure. This was coded as dichotomous variable so that 0 represented 'less than 1 year' and 1 represented 'more than 1 year'.

As staff position and formal education level have been identified as control variables (i.e. Dysvik and Kuvaas, 2008; Kuvaas, 2008; Sanders et al., 2008) I controlled for *level* of apprenticeship. A dichotomous variable was created so that 0 represented 'level 3' and 1 represented 'level 4 and above'. Ultimately, as done in other studies I controlled for type of contract (i.e. Sanders et al., 2008). This was identified as relevant within the context of apprenticeship given that research conducted by Vivian and colleagues (2012) for the Department of Business, Innovation and Skills found that apprentices employed on a fixed-term contract were less satisfied with the programme than those employed on a permanent contract. *Contract* was presented as dichotomous variable so that 0 represented 'temporary contract' and 1 represented 'permanent contract'.

4.4 Quantitative data analysis

A number of statistical data analysis techniques were employed to analyse the data.

Exploratory factor analysis

Before considering the proposed hypotheses, the accuracy of the measurement model was examined. Although existing validated scales were employed to measure relevant constructs, minor adaptations were required to better capture the constructs under investigation in the context of apprenticeships. Exploratory factor analysis (EFA) was therefore conducted to assess the dimensionality of the survey for the dataset and assess the extent to which each variable represented a separate construct.

As argued by Holton and colleagues (2000), by definition EFA generally does not make assumptions about the number of factors investigated, although these are normally derived from a conceptual framework; in practice however, EFA performs a confirmatory function when employed to confirm loosely constructed models underlying data. Here, EFA is utilised as an analytical technique to explore and confirm clumps of theoretically derived related variables, prior conducting regression analysis.

As the purpose of EFA is to ascertain the suitability of the survey for apprentices, principal component analysis (PCA) was chosen as appropriate factor extraction technique for uncovering the probable number and nature of factors (Tabachnick and Fidell, 1989). To aid factors interpretability, varimax rotation was adopted as the most suitable and widely applied

method of orthogonal rotation, which in constraining factors to be uncorrelated presents a solution with the best simple structure (Fabrigar, Wegener, MacCallum and Strahan, 1999).

Cross-sectional regression analysis

Hierarchical regression was used to test the relationships between constructs. Such technique allows to examine how variance in performance (DV) is partitioned among predictors, assessing the ability of the IVs to explain variance in the DV. Such application is consistent with the use of regression for explanatory purposes, where the researcher examines the regression coefficients of the IVs, considering their magnitude, sign and significance, endeavouring to advance functional or theoretical reasons for the effects of the IVs on the DV (Hair et al., 2014).

In testing the hypotheses related to formal training (Hypotheses H1a, H1b, H1c, H1d, H1e), the order of entrance of variables was determined by their logical and temporal sequence in the actual training intervention (Bates et al., 2000). After controlling for apprenticeship level, age, tenure and contract; transfer design was entered first, as this is the first factor encountered by apprentices when undergoing training. Supervisor support was entered second, as this reflected the relationship with the supervisor in sustaining apprentices' development; supervisor feedback was entered third to determine how much variance this variable accounts for over and above that explained by supervisor support; colleagues feedback was entered fourth, and lastly opportunity to use was entered. This allowed to partition the variance in transfer of training that was accounted for by each successive set of variables over and above the influence of the preceding sets. Accordingly, examination of the R^2 series estimated the proportion of variance accounted for by each set of variables, and examination of the ΔR^2 assessed the unique contribution of each variable.

Whilst in testing formal training the order of entrance of variables was based on a logical temporal sequence with variables pertaining to the training event entered before variables related to the work environment, when considering informal learning the sequence of entrance is less clear. In testing the hypotheses related to informal learning (Hypotheses H2a, H2b, H2c, H2d, H2e, H2f), decision on the order of entrance of variables in hierarchical regression was based on the correlations identified between the predictors and the criterions. The variables with stronger correlations with the criterion were entered first, followed by those presenting weaker correlations with performance behaviours. After controlling for level, age, tenure and contract, social support was entered at step 1, followed by feedback at step 2. Problem solving and experimenting were then entered at step 3 and step 4 respectively, followed by task autonomy at step 5 and task interdependence at step 6. Although task interdependence presented stronger correlations with the criterions compared

to task autonomy, it was entered last as studies suggest that autonomy is an important determinant of informal learning (Felstead et al., 2005; Messmann and Mulder, 2015). Regression analysis was also run with task interdependence entered at step 5 and task autonomy entered at step 6, but as the results did not differ the proposed order of entrance was retained.

Preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, multicollinearity and homoscedasticity. The sample size for the analysis ranged from $N= 175$ to $N= 198$; on the basis of the formula advanced by Tabachnick and Fidell: $N > 50 + 8 \times m$ ($m =$ number of independent variables) (2007, pp. 123) the sample size requirements for conducting regression analysis with 9 (formal training) and 10 (informal learning) predictors were met. In order to examine the influence of control variables, dummy variables were created for the categorical variables of age, level, tenure and contract.

Longitudinal regression analysis

Hierarchical regression analysis was used to test the hypotheses using Time 1 and Time 2 data following the principles of change score models (Bednall, 2013). Such model is useful for investigating the determinants of change in the criterion allowing to assess whether non-experimental factors are associated with change over time (Bednall, 2013). This procedure is consistent with studies conducted by Bednall, Sanders and Runhaar (2014) and Coyle-Shapiro, Morrow, Richardson and colleagues (2002). The former study, as an example, accounted for initial levels of participation in informal learning to assess change in participation over a year. Accordingly, the autoregressive relationship was performed, regressing the criterion at Time 2 on its baseline assessment at Time 1, allowing to test the other predictors as determinants of change (Bednall, 2013).

Testing for moderation

Moderated regression was used to test the moderating role of the HR system strength (Hypothesis 3), PA (Hypothesis 4) and learning goal orientation (Hypothesis 5) respectively on the relationship between the apprenticeship training and resultant competencies.

As discussed by Baron and Kenny (1986, pp. 1174), a moderator is a variable that ‘affects the direction and/or strength of the relation between an independent or predictor variable and a dependent or criterion variable’. Investigating moderation hypotheses extends research on associations to a deeper understanding of the boundaries conditions under which such associations occur (Hayes, 2014).

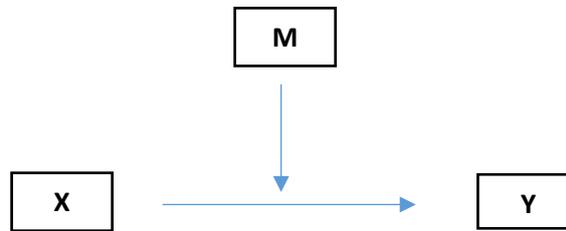


Fig. 4.1 Simple moderation model

As depicted in figure 4.1, the effect of a moderator is generally represented as a conceptual diagram where the effect of the predictor (X) on the outcome variable (Y) is influenced by or dependent on the moderator (M). A simple linear moderation model is expressed in an equation as:

$$\hat{Y} = i_1 + b_1 X + b_2 M + b_3 XM$$

where the effects of the independent variable (X) on the dependent variable (Y) are dependent, or conditional, on the moderator (M) (Hayes, 2014).

As discussed by Baron and Kenny (1986) statistically when the interaction between the predictor and the moderator is significant (a significant b_3 in the equation above), a moderation effect is said to occur; whilst the predictor and the moderator may be respectively significant, the test of moderation depends on the significance of the interaction between X and M. In that when an interaction effect is present, the effect of the independent variable X on the dependent variable Y will differ depending on values of the moderator M (Jaccard and Turrisi, 2003). Alternatively, when the interaction coefficient is non-significant, a more parsimonious model would present the effects of X on Y to be unconditional on M (Hayes, 2014).

Accordingly, in investigating the influence of boundary conditions in apprenticeships, three models were tested whereby in the first step the control variables were entered (Model 1); in the second step the main predictor (X) and the moderator (M) were entered (Model 2); in the third step the interaction term between the predictor and the moderator (XM) was entered (Model 3). To aid interpretation, the independent variables, the moderator and the interaction term were mean centred (i.e. put in deviation scores so that their means are zero) so that all outputs are based on mean-centred metrics of the predictor and the moderator (Hayes, 2014).

Additionally, the pick-a-point or simple slope approach was adopted to probe the interaction (Aiken and West, 1991), and ascertain where in the distribution of the moderator (M) the independent variable X has a significant effect on the dependent variable Y. Following the

pick-a-point approach implemented by regression centering, the effects of X on Y were probed at moderate (mean levels), relatively low (a standard deviation below the mean) and relatively high (a standard deviation above the mean) levels of the moderator (Hayes, 2014).

In order to test for moderation, composite measures for formal learning and informal learning were created aggregating the individual variables pertaining to each construct (i.e. Formal learning: transfer design, supervisor support, supervisor feedback, colleagues' feedback, opportunity to use; Informal learning: social support, feedback, problem solving, experimenting, task autonomy, task interdependence). Composite measures were also created for performance behaviours aggregating items measuring proficiency, adaptivity and proactivity at relevant levels: individual performance behaviours; team performance behaviours; organisation performance behaviours. Composite measures, where items tapping multiple dimensions are averaged, have been largely used to capture constructs such as performance and satisfaction where multiple dimensions make up the construct under investigation. As an example, Behrman and Perrault (1984) designed a composite measure of performance of sales representatives based on the average of 31 items measuring: success in achieving sales objectives; development and use of technical knowledge; providing information; controlling expenses; making effective sales presentations. Similarly Churchill and colleagues (1974) created a composite measure of sales representatives' job satisfaction as an average score of 95 items measuring satisfaction with: the job itself; fellow workers; supervision; company policies and support; pay; opportunities for advancement; customers.

4.5 Thematic data analysis

Qualitative data was collected via an open question in the survey. The question gave respondents the opportunity to talk openly about their experience as apprentices giving them freedom to discuss any topic they felt relevant. Out of 323 questionnaires collected over two waves, 140 included responses to the open question. Responses varied in length, with some giving brief statements and others elaborating on their experience. As the open question was positioned at the end of the survey, many respondents commented on topics they had been asked about such as formal training, the role of the supervisor, the challenges experienced at work and their knowledge of the HR system.

Before analysing the data, I engaged in repeated readings of the quotes collected in wave 1 (N= 90) and those collected in wave 2 (N= 50) to investigate whether there were significant differences which would require a separate analysis for each data set. However, as the quotes collected over time were consistent with each other, I decided to treat them as a single data set.

With data consisting of statements, thematic analysis was chosen as appropriate analytic method. As reported by Braun and Clarke (2006, pp. 79), ‘thematic analysis is a method for identifying, analysing and reporting patterns (themes) within data.’, and in being applicable to a range of theoretical and epistemological approaches, is congruent with the positivist paradigm adopted in this research. Accordingly, qualitative data analysis followed an objectivist orientation. In this respect, thematic analysis was adopted as ‘essentialist or realist method, which reports experiences, meanings and the reality of participants’ (Braun and Clarke, 2006, pp. 81), assuming a straightforward link between language and experience. The process was driven by the research question guiding the study and focused on the semantic or explicit level of the data.

In so doing, I followed the step-by-step guide advanced by Braun and Clarke (2006) and analysed the data with the following procedure:

- I familiarised myself with the data, reading the scripts several times and generating an initial list of ideas of interesting themes.
- Secondly, I coded segments of the data on the basis of semantic content and guided by the theoretical framework of the study. In so doing, I coded for features of the data related to the apprenticeship training, the work environment and the HR system. Once all data extracts were coded, I collated them together under specific codes.
- Thirdly, I collated codes along with the relevant data extract into themes. This process was theoretically-driven and resulted in the identification of several themes.
- Fourthly, following a revision process in which some themes were merged and others deleted, I identified six main themes with related subthemes (Table 4.3).
- Guided by the theoretical framework, themes were defined and named. Some of the themes contained sub-themes, which were particularly useful for clearly presenting and analysing themes encompassing various dimensions such as informal learning.
- Whilst the analysis of the entire data set identified six main themes, the findings reported and discussed relate only to five of these: formal learning; informal learning; feeling valued; end-state competencies; HRM. In so doing, a detailed account of themes strongly linked to the research question was adopted instead of a broad representation of the overall data set.

Table 4.3: Themes and subthemes

Formal learning
<ul style="list-style-type: none">• Quality and relevance
Informal learning
<ul style="list-style-type: none">• Learning environment• Development Opportunities• Level of responsibility
Feeling valued
End-state competencies
HRM
<ul style="list-style-type: none">• Career development• Performance management• Knowledge of HR
Apprenticeship scheme
<ul style="list-style-type: none">• Organisation of the scheme• Placements

Extracts of sample quotes related to each theme are presented in Appendix 2.

4.6 Summary

This chapter has discussed the choice of research paradigm and has presented the context of the study. Additionally, a detailed description of the research design, the data collection procedure, the sample and the measures employed in the study were provided.

Added to this, the chapter reviewed the procedure adopted for quantitative and qualitative data analysis and presented an overview of the emergent themes. These are consistent with the theoretical framework of the study and provide a strong basis for data triangulation. Results are presented in the forthcoming chapters, supplemented by the qualitative findings.

Chapter 5

Testing the apprenticeship development model: how formal and informal learning contribute to competence development

5.1 Introduction

This chapter reports the results of two studies testing the validity of the apprenticeship development model. A number of statistical data analysis techniques supplemented by qualitative data was used to test the study's hypotheses. The first section of the chapter reports the results of Study 1 cross-sectional analysis complemented by qualitative findings. The second section reports the results of Study 2 longitudinal analysis based on panel data.

5.2 Study 1: cross-sectional data analysis

The first study aims to investigate the association between the apprenticeship development model and apprentices' end-state competencies. Specifically, the study seeks to empirically test the apprenticeship development model advanced in Chapter 2 demonstrating the association between formal and informal learning factors and apprentices' competencies categorised as technical knowledge, job competence and work and business skills.

To this end, data was collected from a sample of 233 apprentices providing rich information on apprentices' perceptions on the quality of the programme and self-performance ratings. In line with the hypotheses advanced in Chapter 2, this study tests the association of formal training factors with apprentices' technical knowledge and the association of informal learning factors with apprentices' job competence and work and business skills.

5.2.1 The association between formal training and apprentices' competencies

Exploratory Factor Analysis

Before considering the proposed relationships (Hypotheses H1a, H1b, H1c, H1d, H1e), the accuracy of the measurement model was examined. PCA followed by varimax rotation was performed on 25 survey items relating to the formal training constructs and to the training transfer construct. Kaiser measure of sample adequacy (KMO) for the data set was .872, exceeding the recommended value of .6 (Kaiser, 1970, 1974) and Bartlett's Test of Sphericity (Bartlett, 1954) was significant, indicating that the data set was appropriate for factor analysis.

Initial examination of eigenvalues greater than one suggested the presence of five factors, accounting for 62.6% of the total variance. As reported in Table 5.1, varimax rotation revealed a clear structure with each rotated component loading above, or very close to, the

critical value .45 (Hair et al., 2014). Inspection of the rotated component matrix revealed that loadings on major factors ranged from .83 to .44, with few items loading weakly and loading on more than one factor. Item 1 and item 2 measuring *opportunity to use* were found to cross-load weakly (less than .5) on factors of transfer design and supervisor feedback respectively, hindering the model interpretability.

Whilst the theoretical model anticipated the presence of six factors, statistical analysis did not identify a sixth factor with the 2 items measuring *opportunity to use*. When considering the failure of the *opportunity to use* construct to emerge from PCA, Raubenheimer (2004) suggests that the number of items per factor is pivotal, with at least four items required for the identification of a one-factor scale. The scholar argues that in multidimensional scales a minimum of three items ought to load significantly on each factor in order for all the subscales to be successfully identified, reporting that only exceptionally scales with more than one factor may be identified with only two items per factor.

However, maintaining that theory should guide the decision related to the number of underlying factors (Hair et al., 2014), and given that the content of the two items making up the *opportunity to use* scale is commensurate with the theoretical construct represented (i.e. Holton et al., 2000; Seyler et al., 1998), the two items have not been discarded for further analysis.

Constructs validity

Overall the results of PCA are consistent with the extant literature and allow a parsimonious representation of the factors under investigation. The final instrument retains 25 items assessing six constructs closely aligned with the theoretical model anticipated. As reported in Table 5.1, factor 1 loads items related to training transfer; factor 2 loads items related to supervisor support; factor 3 loads items related to transfer design; factor 4 loads items related to supervisor feedback; factor 5 loads items related to colleagues feedback. As previously discussed, a sixth factor did not emerge however *opportunity to use* was retained as sixth factor given that it is a theoretically valid construct.

Reliability coefficients for the constructs are reported in the diagonal of Table 5.2. As argued by Churchill et al. (1974), alpha coefficients are useful in providing a summary measure of the homogeneity of a set of variables, with high alpha coefficient indicating that the variables included relate to a single underlying construct, validating internal reliability. Cronbach alpha reliability is satisfactory for most constructs, with only the scales measuring *colleagues' feedback* ($\alpha = .51$) and *opportunity to use* ($\alpha = .50$) below .70.

Table 5.1: Varimax rotated factor loadings: formal training

	Item	Component				
		1	2	3	4	5
Training transfer	Accomplished job tasks faster	.835				
	Improved quality of work	.834				
	Making fewer mistakes in production	.780				
	Being able to accomplish job tasks better	.775				
	Being able to accomplish job tasks faster	.771				
	Improved work using new knowledge	.755				
Supervisor support	Supervisor assisting with employee development		.803			
	Supervisor having the skills required to coach		.789			
	Supervisor valuing employee development		.777			
	Supervisor showing how to improve performance		.767			
	Supervisor providing feedback on performance		.748			
	Supervisor providing time to practice new skills		.495	.307		.388
	Supervisor providing reminders on new skills application		.440		.378	.429
Transfer design	Teaching focused on learning application on the job			.769		
	Examples provided about using learning on the job			.732		
	Activities and exercises facilitating understanding of learning application			.716		
	Training method supportive of learning application			.714		
Opportunity	New knowledge and skills applied at work	.375		.480		
Supervisor feedback	Discussions with supervisor on training application				.813	
	Discussions with supervisor on problems in training application				.785	
	Asking supervisor for feedback on post-training performance				.575	.398
Opportunity	Incorporation of new skills in daily work activities			.411	.460	
Colleagues feedback	Conversations with colleagues on ways to improve performance				.346	.678
	Asking colleagues for feedback on training application					.654
	Opinions by colleagues on improving job performance		.352			.459

Notes: Higher item loadings on each factor are presented in bold. Cross-loadings less than .30 have been deleted to aid the table interpretation. N= 189

When considering the internal reliability of these measures, it is apparent that as Cronbach's alpha is in positive relationship with the number of items in the scale (Hair et al., 2014), scales containing few items commonly yield low reliability values. As reported by Pallant (2010) scales with less than ten items normally report reliability in the range of .50. In addition, the low reliability of the constructs may be ascribed to the fact that the scales were originally developed for different contexts and different populations. The study conducted by Diamantidis and Chatzoglou (2014) researched professionals with over ten years of experience, employed full time in a variety of organisations, whilst the population of this study is made of apprentices with less than 3 years of experience who are emergent professionals.

Although low reliability can potentially impact a measure's relationship with other constructs, the constructs of *colleagues' feedback* and *opportunity to use*, being theoretically grounded, have been retained for completeness' purposes, as previously done in other studies (i.e. Behrman and Perreault, 1984).

Checks for common method variance

Given that data were collected at the same point in time and from a single data source, some measures were taken to minimise the possible effects of common-method variance. Firstly, as done in other studies some items in the survey were reversed coded and different anchors were adopted to measure different constructs (Aulakh and Gencturk, 2000). Secondly, Harman's one-factor test using varimax rotation was performed on the variables of interest (Podsakoff and Organ, 1986). The results showed 5 factors with eigenvalues greater than one accounting for 62.6% of variance. With the first factor accounting for 31.9% of total variance (less than 50%), common method variance was not identified as problematic.

Added to this, Fuller, Simmering, Atinc and colleagues (2015) presented evidence through a data simulation study that common method bias occurs only at relatively high levels of common method variance, whilst low and moderate levels of common method variance do not inflate correlations. The scholars maintain that although certain levels of common method variance are typical in survey research this is generally low, not invalidating the findings. Accordingly, common method bias was not deemed problematic.

Hypothesis testing: the relationship between formal training and technical knowledge

Means, standard deviations and correlations are presented in Table 5.2. Descriptive statistics indicate that apprentices have an adequate perception of transfer design (Mean= 3.53), opportunity to use (Mean= 3.57) and supervisor support (Mean= 3.68). Respondents report a moderate perception of supervisor feedback (Mean= 3.22) and colleagues feedback (Mean= 3.37). Apprentices self-assess their technical knowledge (training transfer) as a result of formal training as acceptable (Mean= 3.60).

When exploring the correlations between predictors and the dependent variable a large positive correlation is observed between transfer design and training transfer ($r = .50, p < .01$), and between opportunity to use and training transfer ($r = .51, p < .01$); A medium positive correlation is observed between supervisor support and training transfer ($r = .39, p < .01$), whilst supervisor feedback and colleagues feedback present small positive correlations with transfer ($r = .25, p < .01$; $r = .22, p < .01$ respectively). When considering the control variables, tenure presents a small negative correlation with transfer ($r = -.14, p < .05$), indicating that the longer apprentices are employed in the organisation, the less relevant the formal training becomes for their performance. In general, results indicate that all independent variables are positively and significantly related with training transfer, providing preliminary support for the relationship suggested.

Additionally, the independent variables present positive correlations, with transfer design having a large correlation with opportunity to use ($r = .54, p < .01$), and medium correlations with colleagues' feedback ($r = .32, p < .01$) and supervisor support ($r = .35, p < .01$). Colleagues' feedback presents medium correlations with supervisor feedback ($r = .44, p < .01$), supervisor support ($r = .44, p < .01$) and opportunity to use ($r = .30, p < .01$). Supervisor support presents medium correlations with opportunity to use ($r = .38, p < .01$) and supervisor feedback ($r = .37, p < .01$). Small negative correlations are present between transfer design and tenure ($r = -.16, p < .05$) and between supervisor support and tenure ($r = -.27, p < .01$). Contract is significantly and positively correlated with opportunity to use ($r = .15, p < .05$).

Results

Hierarchical regression was used to test the proposed hypotheses. As reported in Table 5.3, the control variables do not significantly predict transfer of training. The results of step 1 show that transfer design significantly predicts transfer of training ($\beta = .48, p < .01$). The results of step 2 show that supervisor support significantly predicts transfer of training ($\beta = .24, p < .01$), however supervisor feedback and colleagues feedback entered at step 3 and step 4 respectively, do not account for a significant proportion of variance in training transfer. Ultimately, results of step 5 show that opportunity to use significantly predicts transfer of training ($\beta = .28, p < .01$). Overall, these variables explain 36.7% of the total variance in transfer of training.

Summary of results

On the basis of the results obtained from the analysis conducted above the following can be concluded.

Hypothesis 1a is confirmed: transfer design is associated with technical knowledge

Hypothesis 1b is confirmed: supervisor support is associated with technical knowledge

Hypothesis 1c is not confirmed: supervisor's feedback is not significantly associated with technical knowledge

Hypothesis 1d is not confirmed: colleagues' feedback is not significantly associated with technical knowledge

Hypothesis 1e is confirmed: the opportunity to use the knowledge and skills acquired in formal training is associated with technical knowledge

Table 5.2: Means, standard deviations and correlations of formal training factors and training transfer

	M	SD	1	2	3	4	5	6	7	8	9	10
1 Age	-	-	1									
2 Level	-	-	.200**	1								
3 Tenure	-	-	.482**	-.081	1							
4 Contract	-	-	.020	-.018	-.096	1						
5 Training Transfer	3.60	.78	-.097	-.015	-.147*	.134	(.91)					
6 Transfer design	3.53	.79	-.112	-.064	-.164*	.054	.503**	(.80)				
7 Supervisor support	3.68	.74	-.079	.123	-.272**	.130	.397**	.357**	(.87)			
8 Supervisor feedback	3.22	.86	-.036	.009	-.095	.129	.257**	.239**	.465**	(.72)		
9 Colleagues' feedback	3.37	.71	.095	-.070	.010	.036	.227**	.321**	.422**	.446**	(.51)	
10 Opportunity to use	3.57	.80	-.071	-.011	-.107	.152*	.513**	.546**	.384**	.374**	.300**	(.50)

* p< .05; ** p< .01

Dummy variables; Age: 0= < 20 years; 1= > 20 years

Level: 0= level 3; 1= Level 4 and above

Tenure: 0= < 1 year; 1= > 1 year

Contract: 0= temporary; 1= permanent

Cronbach's alpha (when applicable) is reported on the diagonal.

Table 5.3: Results of hierarchical regression analysis showing the effects of formal training factors on training transfer

Independent Variables	Step 1	Step 2	Step 3	Step 4	Step 5
	β	β	β	β	β
Transfer design	.48**	.41**	.40**	.41**	.28**
Supervisor support		.24**	.22**	.22**	.19*
Supervisor feedback			.04	.05	.00
Colleagues feedback				-.02	-.03
Opportunity to use					.28**
R²	.26	.31	.31	.31	.36
ΔR^2	.23**	.04**	.00	.00	.05**

Note: Dependent variable: **training transfer**

All equations control for contract, level, tenure and age entered as dummy variables

* p< .05 ** p< .01

5.2.2 The association between informal learning and apprentices' competencies

Before considering the proposed relationships (Hypotheses H2a, H2b, H2c, H2d, H2e, H2f), the accuracy of the measurement model has been examined. Exploratory factor analysis (EFA) was conducted on 28 survey items measuring the constructs of social support, feedback, problem solving, experimenting, task autonomy and task interdependence.

Exploratory Factor Analysis

The 28 items were subjected to principal component analysis. The Kaiser-Meyer-Olkin value was .807, exceeding the recommended value of .6 (Kaiser, 1970, 1974) and Bartlett's Test of Sphericity (Bartlett, 1954) reached statistical significance, supporting the factorability of the correlation matrix. PCA revealed the presence of eight components with eigenvalues exceeding 1, explaining 23%, 12%, 8.5%, 6.4%, 5.2%, 4.5%, 4%, 3.6% of the variance respectively. As this solution was far from the hypothesised factors, the data was further reviewed. An inspection of the rotated solution revealed that some of the items of the scales representing *task autonomy* and *task interdependence* loaded on two factors respectively, resulting in an uninterpretable solution.

Guided by the conceptual framework underlying the set of variables, a six-factor solution was forced, explaining 59.6% of variance. Inspection of the rotated solution revealed several cross-loadings, with item 5 measuring *task autonomy* and item 4 measuring *social support*, loading weakly (less than .50) on two factors. Deletion of these items resulted in an improved 6-factor solution, which however presented item 7 measuring *task interdependence* to cross-load weakly on three factors. This item was therefore removed and a 6-factor solution was reconsidered.

This resulted in a model explaining 64.3% of variance, presenting a satisfactory criterion for the number of factors extracted (Hair et al., 2014). The six factor solution reflected the theoretical model anticipated and was therefore retained. As reported in Table 5.4, varimax rotation revealed a clear structure with each rotated component loading above the critical value of .50; the only exception is item 1 measuring *experimenting*, loading on three factors. As the item loaded at .486 on the construct representing *experimenting*, it was retained as the loading was considered close enough to the cut-off of .50.

Table 5.4: Varimax rotated factor loadings: informal learning

	Item	Component					
		1	2	3	4	5	6
Social support	Opportunity to meet with others	.842					
	Chances to get to know others	.842					
	Opportunity to develop friendships	.791					
	People at work taking interest in me	.572			.415		
	People at work being friendly	.506			.384		
Task Interdependence	Relying on people in other units		.779				
	Finishing work started by others		.773				
	Starting work finished by others		.752				
	Success depending on cooperating with others		.656				
	Dealing with others as part of job		.592			.391	
Problem solving	Work requiring coordination with others		.562			.409	
	Job presenting ambiguous problems			.806			
	Job requiring unique ideas and solutions to problems			.800			
	Job requiring creativity			.738			
	Job presenting novel problems			.716			
Experimenting	Job providing opportunities to try things out			.495	.316		.486
	Colleagues and supervisors providing feedback on effectiveness of job performance				.851		
	Receiving feedback on performance from colleagues and supervisors				.842		
	Receiving much information from supervisors and colleagues on job performance				.678		
	Influence on how you do your work					.740	
Task autonomy	Influence on tasks in your job					.740	
	Influence on pace of work					.649	
	Influence on order of tasks execution					.621	
	Opportunity to try out new techniques/tools						.805
	Opportunity to experiment with working methods			.301			.701

Notes: Higher item loadings on each factor are presented in bold. Cross-loadings less than .30 have been deleted to aid the table interpretation. N= 202

Constructs validity

Overall the results of PCA are consistent with the extant literature and allow a parsimonious representation of the factors under investigation. The final instrument retains 25 items assessing six constructs closely aligned with the theoretical model anticipated. As reported in Table 7, factor 1 loads items related to social support; factor 2 loads items related to task interdependence; factor 3 loads items related to problem solving; factor 4 loads items related to feedback; factor 5 loads items related to task autonomy, and factor 6 loads items related to experimenting.

When considering the items deleted, it is apparent that these did not seem relevant for the sample under investigation. Item 5 measuring *task autonomy* asked to rate the level of influence on the time apprentices started or finished their working day. Item 7 measuring *task interdependence* asked how often apprentices worked by themselves, whilst item 4 measuring *social support* rated how apprentices felt that their supervisors were concerned about the welfare of other people working for them. The irrelevance of these items for the apprentices' sample suggests that as a junior category of employees, apprentices do not have discretion on their working hours, and tend not to work in isolation. Additionally, the supervisor's concern for the welfare of others does not appear as germane with regards to how apprentices' feel supported.

Given the exploratory approach taken in the data collection instrument, which relied on work design and learning measurements as indicators of the quality of the learning environment, EFA has confirmed the suitability of these constructs in the context of the apprenticeship. Cronbach alpha reliability is satisfactory for all constructs, above the 0.6 threshold (Hair et al., 2014; Malhotra, 1999) for all factors, and is reported in the diagonal of Table 5.5.

Checks for common method variance

In order to address the issue of common method variance, Harman's one-factor test (Podsakoff and Organ, 1986) was performed using varimax rotation. The result identified 14 factors with eigenvalues greater than 1 accounting for 70.7% of variance and the first factor accounting for 21.4% of total variance. As reported by van Rijn, Yang and Sanders (2013), researchers have suggested that if the first factor accounts for 20 to 25% of total variance, common method variance should not be a concern (i.e. Aulakh and Gencturk, 2003; Tansky and Cohen, 2001). Accordingly, common method variance was not deemed problematic.

Hypothesis testing: the relationship between informal learning and job competence and work and business skills

Means, standard deviations and correlations are presented in Table 5.5. Descriptive statistics indicate that apprentices have a positively high perception of social support (Mean= 4.29), problem solving (Mean= 4.00), experimenting (Mean= 3.86) and task autonomy (Mean= 3.06). Apprentices report a moderate perception of feedback (Mean= 3.62) and task interdependence (Mean= 3.58).

When considering apprentices' performance, respondents report high levels of proficiency in conducting their job (individual task proficiency: Mean= 4.26), and in operating as part of a team (team member proficiency: Mean= 4.25). Apprentices indicate good levels of adaptivity at individual, team and organisational level (individual task adaptivity: Mean= 4.06; team member adaptivity: Mean= 4.02; organisation member adaptivity: Mean= 3.95), whilst the lowest scores were reported for proactivity (individual task proactivity: Mean= 3.53; team member proactivity: Mean= 3.05; organisation member proactivity: Mean= 2.76).

The results suggest that apprentices are equipped with the functional skills required to deliver the job and are well engaged in team working. Their adaptivity, as in the ability to cope with change and deal with challenges is adequate, whilst their proactivity, reflecting creative thinking skills is less developed.

When exploring the relationship between predictors and the criteria, the overall correlations pattern suggests that the informal learning factors are important for all the proposed performance outcomes. In particular, social support and feedback present the strongest associations with proficiency performance measures (social support and individual task proficiency: $r = .36$, $p < .01$; social support and team member proficiency: $r = .30$, $p < .01$; social support and organisation member proficiency: $r = .41$, $p < .01$; feedback and organisation member proficiency: $r = .40$, $p < .01$).

When considering the associations between the informal learning factors, problem solving and experimenting present medium positive correlations with social support and feedback (problem solving and feedback: $r = .31$, $p < .01$; experimenting and social support: $r = .39$, $p < .01$; experimenting and feedback: $r = .46$, $p < .01$). Additionally, task autonomy, presents small positive correlations with problem solving ($r = .24$, $p < .01$) and experimenting ($r = .21$, $p < .01$). Ultimately, task interdependence presents small positive correlations with social support ($r = .17$, $p < .05$) and problem solving ($r = .24$, $p < .01$).

Negative correlations are present among tenure and social support ($r = -.19, p < .01$), feedback ($r = -.24, p < .01$), and experimenting ($r = -.22, p < .01$). On the other hand, task interdependence and task autonomy are positively correlated with tenure ($r = .38, p < .01$; $r = .19, p < .01$ respectively). Apprenticeship level is also positively associated with social support ($r = .22, p < .01$), whilst age is correlated with task interdependence ($r = .36, p < .01$) and task autonomy ($r = .19, p < .01$).

Results

Hierarchical regression was used to test the proposed hypotheses. Results of the final step of each regression analysis along with the R^2 are presented in Table 5.6. The results indicate that social support is significantly and positively associated with a range of performance behaviours, including apprentices' proficiency at conducting their job (individual task proficiency: $\beta = .37, p < .01$), proficiency in operating as part of a team (team member proficiency: $\beta = .20, p < .05$) and proficiency in operating as valid members of the organisation (organisation member proficiency: $\beta = .31, p < .01$). Additionally, social support is significantly and positively associated with adaptivity in relation to changes affecting ones job (individual task adaptivity: $\beta = .24, p < .05$) and with adaptivity in relation to changes to the way the organisation operates (organisation member adaptivity: $\beta = .28, p < .01$).

Similarly, feedback is positively associated with proficiency at conducting ones job (individual task proficiency: $\beta = .19, p < .05$) and proficiency as members of the organisation (organisation member proficiency: $\beta = .28, p < .01$). Feedback is significantly and positively associated with adaptivity in relation to changes at the team level (team member adaptivity: $\beta = .18, p < .05$). Moreover, feedback is significantly correlated with apprentices displaying proactivity in relation to one's job (individual task proactivity: $\beta = .25, p < .01$) and in contributing to the team effectiveness (team member proactivity: $\beta = .24, p < .01$).

Problem solving and experimenting do not present any significant association with the criterions. Task autonomy is positively and significantly associated with apprentices displaying adaptivity to changes at organisational level (organisation member adaptivity: $\beta = .16, p < .05$) and with apprentices displaying proactivity in conducting ones job (individual task proactivity: $\beta = .19, p < .01$) and in contributing to the organisation effectiveness (organisation member proactivity: $\beta = .24, p < .01$).

Table 5.5: Means, standard deviations and correlations of informal learning factors and individual, team, organisation performance behaviours

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1 Social Support	4.29	0.54	(.81)																	
2 Feedback Availability	3.62	0.80	.46**	(.83)																
3 Problem Solving	4.00	0.75	.28**	.31**	(.81)															
4 Experimenting	3.86	0.87	.39**	.46**	.48**	(.80)														
5 Task Interdependence	3.58	0.70	.17*	.05	.24**	-.00	(.79)													
6 Task autonomy	3.06	0.61	.18*	.10	.24**	.21**	.27**	(.69)												
7 Individual Task Proficiency	4.26	0.57	.36**	.27**	.06	.08	.21**	.10	(.82)											
8 Individual Task Adaptivity	4.06	0.59	.28**	.25**	.14*	.20**	.13	.18*	.64**	(.72)										
9 Individual Task Proactivity	3.53	0.96	.21**	.30**	.20**	.26**	.17*	.28**	.27**	.32**	(.89)									
10 Team Member Proficiency	4.25	0.61	.30**	.23**	.22**	.15*	.30**	.13	.49**	.41**	.29**	(.77)								
11 Team Member Adaptivity	4.02	0.62	.25**	.28**	.26**	.22**	.26**	.16*	.47**	.51**	.42**	.55**	(.75)							
12 Team Member Proactivity	3.05	1.11	.16*	.28**	.23**	.23**	.13	.12	.21**	.25**	.66**	.33**	.42**	(.92)						
13 Organisation Member Proficiency	3.84	0.84	.41**	.40**	.25**	.18*	.13	.19*	.32**	.29**	.34**	.36**	.35**	.31**	(.86)					
14 Organisation Member Adaptivity	3.95	0.67	.27**	.20**	.15*	.11	.10	.14*	.43**	.44**	.15*	.43**	.45**	.21**	.46**	(.78)				
15 Organisation Member Proactivity	2.76	1.13	.02	.13	.14*	.07	.13	.26**	.11	.15*	.53**	.25**	.23**	.60**	.32**	.33**	(.89)			
16 Tenure			-.19**	-.24**	-.03	-.22**	.38**	.19**	.02	.05	.04	.03	.00	-.03	-.09	-.07	.06	1		
17 Level			.22**	.10	.09	.03	.12	.10	-.05	.00	.10	.05	-.04	-.02	.04	-.06	-.05	-.08	1	
18 Age			.00	-.03	.04	-.09	.36**	.19**	.01	.02	.01	-.06	.01	-.05	-.07	-.12	-.02	.48**	.20**	1
19 Contract			.13	.07	.10	.09	.09	.02	.04	-.00	.12	.00	.06	.14	.07	-.04	.03	-.09	-.01	.020

*p<.05; **p<.01; A 5-point Likert scale was used for all variables, excepted Task Autonomy measured on a 4-point Likert scale. Cronbach's alpha is reported on the diagonal.

Ultimately, task interdependence is positively and significantly associated with proficiency in conducting ones job (individual task proficiency: $\beta = .17$, $p < .05$) and proficiency in operating as part of a team (team member proficiency: $\beta = .25$, $p < .01$). Additionally, task interdependence is positively and significantly associated with adaptivity in relation to changes at team level (team member adaptivity: $\beta = .26$, $p < .01$).

When considering the control variables, level is significantly and negatively correlated with individual task proficiency ($\beta = -.16$, $p < .05$) suggesting that apprentices studying towards higher qualifications (level 4 and above) report lower levels of proficiency in conducting their job. Similarly, age is significantly and negatively correlated with team member proficiency ($\beta = -.21$, $p < .01$) and with organisation member adaptivity ($\beta = -.20$, $p < .05$) suggesting that older apprentices report lower levels of proficiency in operating as part of a team, and lower levels of adaptivity in relation to changes affecting the organisation.

Summary of results

On the basis of the results obtained from the analysis conducted above the following can be concluded.

Hypothesis 2a is confirmed: social support is associated with a) job competence; b) work and business skills such as team working, effective participation and self-management.

Hypothesis 2b is confirmed: feedback is associated with a) job competence; b) work and business skills such as effective participation, creative thinking and self-management.

Hypothesis 2c is not confirmed: problem solving is not significantly associated with a) job competence; b) work and business skills.

Hypothesis 2d is not confirmed: experimenting is not significantly associated with a) job competence; b) work and business skills.

Hypothesis 2e is partially confirmed: task autonomy is associated with b) work and business skills such as self-management and creative thinking.

Hypothesis 2f is confirmed: task interdependence is associated with a) job competence; b) work and business skills such as team working and self-management.

Table 5.6: Summary of hierarchical regression analyses showing the effects of informal learning factors on individual, team and organisation performance behaviours

	Individual Task Behaviours			Team Member Behaviours			Organisation Member Behaviours		
	Proficiency	Adaptivity	Proactivity	Proficiency	Adaptivity	Proactivity	Proficiency	Adaptivity	Proactivity
Level	-.16*								
Age				-.21**				-.20*	
Social support	.37**	.24**		.20*			.31**	.28**	
Feedback	.19*		.25**		.18*	.24**	.28**		
Problem solving									
Experimenting									
Task autonomy			.19*					.16*	.24**
Task interdependence	.17*			.25**	.26**				
R²	.22	.14	.20	.19	.19	.14	.28	.23	.12

All equations control for contract, level, tenure and age entered as dummy variables

* p< .05 ** p< .01

5.3 Qualitative data analysis

Qualitative data was collected via an open question positioned at the end of the survey. This gave respondents the opportunity to comment on any topic they felt relevant. By not presenting apprentices with a specific question, but by inviting them to discuss what they felt relevant, rich data was collected on the apprenticeship experience. The quotations provide further insight into factors enhancing competence development and complement Study 1 cross-sectional analysis supporting the apprenticeship development model.

Formal learning

Among the themes identified in the apprentices' quotes, the quality and relevance of formal training is dominant. The majority of respondents comment on the training received at college, at the company's training academy and at university presenting various levels of satisfaction with training ranging from poor, unorganised, to excellent and outstanding. Despite variability in satisfaction, examination of the quotes clearly suggest that apprentices value both the quality and relevance of training, with most remarks considering whether the training is *applicable, relevant, current, and valuable*.

This finding validates the results of the quantitative analysis which has identified transfer design in positive association with apprentices' technical knowledge, and substantiates the validity of transfer design in apprenticeships indicating that formal training needs to match job requirements (i.e. being relevant, current, valuable), and provide apprentices with the ability to transfer it to the job (i.e. applicable).

When considering the work environment factors supporting training transfer only three respondents comment directly on factors facilitating the application of knowledge and skills acquired off-the-job:

‘Although I enjoy what we learn at university generally (Materials engineering), very little can be applied back to my work directly and there is not that much emphasis on applying it back at work.’

‘Most courses are relevant and can have an impact on the way I work but little is done in the actual workplace to encourage sharing of the new skills/knowledge from a course and how it can be implemented’.

‘Sometimes it can be difficult with the amount of work you and your supervisor have, to properly reflect on training and skills identified at university and apply these in the workplace. Although most people I have worked with are advocates of new ideas and are generally up for trying new methods.’

Whilst not a prevalent theme, these quotes substantiate the importance of workplace support factors such as the opportunity to reflect with supervisors and share knowledge and skills with colleagues in sustaining training transfer. As discussed in the following section, the

quality of the learning environment in supporting apprentices' development dominates apprentices' statements and emerges as critical for emergent professionals.

Informal learning

Among the other themes identified: developmental opportunities, a supportive learning environment and level of responsibility are highly relevant. With regards to the former, examination of the quotes indicates that apprentices see challenges and novel tasks as positive developmental experiences. As exemplified in the following quote there is a distinct link between challenges and learning:

'My day job has given me far more responsibility than I thought an apprentice would get and has been very challenging at times. This has triggered a response towards learning for me so I feel I have good experience and skills possibly better than I expected.'

Challenges are reported to 'push oneself' to develop personally, technically and academically, and are associated with improved knowledge and performance, indicating that apprentices identify novel and challenging tasks as contributing to their skillset. Other factors associated with learning are 'opportunities to do new things', 'taking on developmental roles', 'experiencing new things' and 'opportunities to improve'. When considering apprentices' viewpoint, the quotes depict positive experiences indicating that apprentices enjoy and welcome challenges as developmental opportunities. Additionally, as exemplified by the following quotes, the level of challenge is counterbalanced by appropriate support and autonomy facilitating constructive learning experiences:

'It is great to be fully involved into a project. You are given your own part of that project and are expected to finish it on time, with the help of peers and other resources.'

'The responsibility given during work placements was at a level at which you can learn but are not left to just fend for yourself.'

The level of responsibility is reflective of apprentices' autonomy in carrying out their tasks and emerges as critical factor for sustaining apprentices' engagement in informal learning. Correspondingly, support from both colleagues and supervisors is crucial for ensuring a positive learning experience. Specifically, when considering apprentices' illustration of the learning environment, support from supervisors is presented as 'support for development' as in enabling apprentices to engage with developmental opportunities as challenging and novel tasks, as clearly exemplified in the following quotes:

'Overall I am an advocate of the scheme but feel apprentices could be better supported when in placements with more focus on their development, sometimes it feels like we are perceived as an opportunity to fill gaps in the workforce.'

‘There are some placements which do not encourage apprentices to learn in ways such as challenging assignments or interesting engagements and where apprentices are used more as an extra resource over someone who is exposed to critical projects/areas. However, there are placements where this is not the case.’

Whilst support from supervisors is crucial in providing apprentices with developmental opportunities, support from colleagues emerges as critical for assisting apprentices with their development. Apprentices describe how they feel ‘welcomed’, ‘well looked after’ and ‘comfortable to ask for advice and feedback’. Additionally, support from colleagues emerges as paramount in ‘providing insight into their role’, ‘lending you their knowledge’ and ‘showing you how to do the job and being patient with you during training’. The role of colleagues is thus presented as allowing apprentices to become legitimate peripheral participants having access to the practices of the community (Lave and Wenger, 1991), and assisting apprentices as new learners in developing knowledge and skills.

Overall, the findings support the Demand-Control-Support-Model (Karasek and Theorell, 1990) revealing that when apprentices are exposed to developmental opportunities (Demand) and are granted responsibility (Control) in a supportive learning environment (Support), they are able to learn and develop a wide range of skills. Notably, apprentices report gaining ‘breadth of knowledge’ and ‘invaluable skills’, ‘building up character, confidence and experience’ in turn contributing to their performance.

Ultimately, whilst learning is pervasive throughout the quotes generally supporting the apprenticeship development model advanced in this research, Karasek and Theorell (1990) argue that an optimal balance between factors of demand, control and support is required for activating and sustaining learning. This is exemplified in the following quote, drawing attention to the pivotal role of supervisors in presenting apprentices with the right level of challenge and responsibility:

‘My experience as an apprentice has been quite varied. Most managers have taken the time to plan my workload to meet my development needs. Some have seen me as extra ‘expert’ resource and expected me to be at a level way higher than my ability and become frustrated when I have failed to meet their standards. The opposite has been true with others who have not trusted me to perform anything other than basic tasks. My experience could have been improved if more people across the business knew what a higher apprenticeship was, what it entailed and the entry requirements.’

Whilst practical and theoretical implications will be discussed in the forthcoming chapter, analysis of qualitative data has validated and enriched the apprenticeship development model in several ways. Firstly, the quality and relevance of formal training has been confirmed as pivotal for apprentices’ development. Secondly, a focus on the work environment has been

justified by apprentices extensively discussing how supportive, challenging and empowering work situations contribute to the development of a wide range of skills. Thirdly, close inspection of apprentices' comments has revealed how support from supervisors and support from colleagues distinctively contributes to their development. Lastly, apprentices' reports of a wide range of knowledge and skills acquired through formal and informal learning has endorsed the apprenticeship as valid tool for human capital development, shedding light on focal aspects sustaining competence development.

5.4 Study 2: Longitudinal data analysis

This study seeks to more explicitly determine the causal link between formal and informal learning in apprenticeship and the development of apprentices' competencies. A particular strength of this study is the availability of data collected over time, providing insight into how individuals change over time. Panel data (N=90) collected in two assessment spaced eight to ten months apart allow to determine the extent of change from an initial baseline assessment. In addition, panel data allow to draw preliminary inferences about causality investigating the determinants of change.

Paired-sample T-test

In order to explore the rate of change over time, a T-test was performed. Paired-sample T-test are used to compare means scores for the same group of people on two different occasions. As reported in Table 5.7, inspection of the data reveals that the mean scores of the variables under consideration did not change substantially over time, but remained stable. However, when considering the formal learning factors there was a statistically significant decrease in supervisor support scores from Time 1 (Mean = 3.79, SD = .65) to Time 2 (Mean = 3.54, SD = .86), suggesting that with time apprentices experience less support from supervisors in transferring the knowledge and skills acquired off-the-job to the workplace. Similarly, there was a statistically significant decrease in training transfer scores from Time 1 (Mean = 3.64, SD = .75) to Time 2 (Mean = 3.22, SD = 1.19), indicating that with time apprentices tend to make less use of the knowledge and skills acquired off-the-job in the workplace. Conversely, data revealed a statistically significant increase in apprentices displaying proactivity at team level, with team member proactivity scores significantly increasing from Time 1 (Mean = 2.95, SD = 1.03) to Time 2 (Mean = 3.29, SD = 1.19).

Table 5.7: Means, Standard Deviations and T-test for T1 and T2

	Mean		SD		t	df	Sig. 2-tailed
	T1	T2	T1	T2			
Formal training							
Transfer design	3.61	3.42	.78	.91	1.63	88	.10
Supervisor support	3.79	3.54	.65	.86	2.46	85	.01
Supervisors' feedback	3.30	3.40	.83	.91	-0.79	83	.42
Colleagues' feedback	3.17	3.36	.87	.75	-1.73	88	.08
Opportunity to use	3.61	3.48	.78	.96	0.94	89	.34
Training transfer	3.64	3.22	.75	1.19	2.71	74	.00
Informal learning							
Social Support	4.39	4.30	.52	.54	1.21	80	.22
Feedback Availability	3.79	3.91	.77	.81	-1.22	85	.22
Problem Solving	4.01	4.10	.72	.69	-0.94	84	.34
Experimenting	3.83	3.87	.93	.79	-0.39	86	.69
Task Autonomy	3.05	3.18	.58	.64	-1.52	80	.13
Task interdependence	3.61	3.75	.69	.64	-1.42	77	.15
Individual Task Proficiency	4.25	4.28	.53	.55	-0.33	74	.74
Individual Task Adaptivity	4.10	4.11	.65	.59	-0.91	73	.92
Individual Task Proactivity	3.65	3.72	.87	.73	-0.61	74	.53
Team Member Proficiency	4.19	4.21	.63	.56	-0.26	77	.79
Team Member Adaptivity	3.96	4.10	.67	.58	-1.64	70	.10
Team Member Proactivity	2.95	3.29	1.03	1.19	-2.10	69	.03
Organisation Member Proficiency	4.04	3.91	.62	.98	1.00	65	.31
Organisation Member Adaptivity	3.93	4.05	.66	.66	-1.18	68	.24
Organisation Member Proactivity	2.75	2.97	1.21	1.16	-1.30	69	.19

N= 90

A longitudinal examination of the impact of formal training on apprentices' competencies

Following the principles of change score models (Bednall, 2013), longitudinal data was analysed performing the autoregressive relationship of performance at Time 2 on its baseline assessment at Time 1. In testing the hypotheses, I entered the controls (level) and the Time 1 assessment for the criterion in step 1, followed by the hypothesised predictors. Hence, transfer design was entered at step 2; supervisor support at step 3; supervisor feedback at step 4; colleagues' feedback at step 5; and opportunity to use at step 6.

Results

When considering the impact of formal training on apprentices' technical knowledge, the correlation between training transfer at Time 1 and training transfer at Time 2 is small and non-significant. Additionally, as reported in Table 5.8, the criterion (training transfer T2) is not significantly correlated with any of the predictors at Time 1. This lack of correlation is reflected in the hierarchical regression results which are non-significant, indicating that the model of formal training fails to predict training transfer at Time 2 (Table 5.9).

Table 5.8: Correlations of formal training factors and training transfer at T1 and T2

	1	2	3	4	5	6	7
1 Training Transfer T1	1						
2 Training Transfer T2	.094	1					
3 Transfer Design T1	.474**	-.050	1				
4 Supervisor Support T1	.285*	.067	.400**	1			
5 Supervisor Feedback T1	.297**	.176	.389**	.497**	1		
6 Colleagues Feedback T1	.216	.069	.398**	.345**	.509**	1	
7 Opportunity Use T1	.401**	-.088	.564**	.333**	.375**	.306**	1
8 Level	-.104	-.012	-.050	.166	-.008	-.149	-.062

* p< .05; ** p< .01.

Table 5.9: Results of hierarchical regression analysis showing the effects of formal training factors on training transfer at T2

Independent Variables	Step 1	Step 2	Step 3	Step 4	Step 5
	β	β	β	B	β
Transfer design	-.08	-.12	-.17	-.17	-.10
Supervisor support		.13	.04	.04	.05
Supervisor feedback			.20	.19	.22
Colleagues feedback				.01	.01
Opportunity to use					-.17
R²	.03	.05	.08	.08	.09
ΔR^2	.00	.01	.02	.00	.01

Note: Dependent variable: **training transfer**

* $p < .05$ ** $p < .01$; all equations control for training transfer at T1 and level.

A longitudinal examination of the impact of informal learning on apprentices' competencies

The same procedure was adopted for analysing data related to the impact of informal learning on apprentices job competence and work and business skills. Hierarchical regression analyses were conducted controlling for level and performance at Time 1. In step 1 social support was entered, followed by feedback in step 2. In step 3 problem solving was entered and experimenting was entered in step 4. Finally, task autonomy was entered in step 5 followed by task interdependence in step 6.

Results

As reported in Table 5.10, a large number of significant small and medium correlations between performance behaviours at Time 1 and Time 2 is observed. Specifically, individual task proficiency at Time 1 ($r = .43, p < .01$), individual task adaptivity at Time 1 ($r = .48, p < .01$) and team member adaptivity at Time 1 ($r = .35, p < .01$) are moderately correlated with their counterpart at Time 2. With the exception of individual task proactivity at Time 1 which

is not significantly correlated with its counterpart at Time 2, all the other performance behaviours have small correlations with their counterparts at Time 2.

When considering the correlations between the predictors and the criteria (performance behaviours at time 2), social support is significantly and positively correlated with the ability to perform one's job (individual task proficiency: $r = .35, p < .01$), and with adaptivity at team and organisational level (team member adaptivity: $r = .26, p < .05$; organisation member adaptivity: $r = .23, p < .05$). Problem solving is also significantly and positively correlated with the ability to adapt to changes affecting the team and the organisation (team member adaptivity: $r = .24, p < .05$; organisation member adaptivity: $r = .29, p < .01$). Additionally, problem solving is significantly correlated with proactivity in improving the effectiveness of the team (team member proactivity: $r = .27, p < .05$), and with behaviours contributing to the effectiveness of the organisation (organisation member proactivity: $r = .25, p < .05$). Feedback is positively correlated with the ability to perform the job (individual task proficiency: $r = .27, p < .05$) and with proactivity in initiating better ways of doing one's job (individual task proactivity: $r = .25, p < .05$). When considering the control variables, age is significantly and negatively correlated with organisation member proactivity ($r = .28, p < .01$) indicating that older apprentices are less likely to engage in self-directed behaviours aimed at improving the efficiency of the organisation. Correlations are reported in Table 5.11.

Hierarchical regression analysis results indicate that performance at Time 1 is the only significant predictor of individual task proficiency ($\beta = .33, p < .05$), individual task adaptivity ($\beta = .52, p < .01$) and team member adaptivity ($\beta = .32, p < .05$) at Time 2. When considering the hypothesised predictors, feedback is positively and significantly associated with apprentices exhibiting proactivity in initiating better ways of doing core tasks (individual task proactivity: $\beta = .31, p < .05$). Similarly, problem solving is significantly and positively associated with proactivity in advancing suggestions for improving the effectiveness of the organisation (organisation member proactivity: $\beta = .29, p < .05$) and with adaptivity to changes affecting the way the organisation operates (organisation member adaptivity: $\beta = .29, p < .05$). The other predictors are not significantly associated with performance at Time 2. Results of the final step of each regression analysis along with the R^2 are presented in Table 5.12.

Summary of results

On the basis of the results obtained from the longitudinal data analysis, we can confidently conclude that:

- The availability of feedback in the workplace from both colleagues and supervisors contributes to the development of work and business skills such as creative thinking in performing ones tasks.
- Problem solving leads to work and business skills such as self-management and creative thinking in contributing to the organisation effectiveness.

Table 5.10: Correlations of individual, team and organisation performance behaviours at T1 and T2; * p< .05 (2-tailed). ** p< .01 (2-tailed).

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1 Individual task proficiency T2	1																
2 Individual task adaptivity T2	.531**	1															
3 Individual task proactivity T2	.342**	.506**	1														
4 Team member proficiency T2	.663**	.392**	.311**	1													
5 Team member adaptivity T2	.563**	.529**	.496**	.630**	1												
6 Team member proactivity T2	.400**	.425**	.654**	.476**	.632**	1											
7 Org member proficiency T2	.418**	.077	.158	.375**	.274*	.280*	1										
8 Org member adaptivity T2	.451**	.310**	.253*	.405**	.517**	.318**	.499**	1									
9 Org member proactivity T2	.160	.305**	.452**	.337**	.489**	.768**	.241*	.285*	1								
10 Individual task proficiency T1	.434**	.281*	.074	.325**	.136	.087	-.001	.143	-.029	1							
11 Individual task adaptivity T1	.282*	.488**	.188	.319**	.266*	.220	-.040	.159	.129	.625**	1						
12 Individual task proactivity T1	.080	.022	.145	.107	.069	.150	.017	.060	.140	.285**	.327**	1					
13 Team member proficiency T1	.380**	.334**	.325**	.279*	.217	.246*	.165	.261*	.171	.495**	.385**	.447**	1				
14 Team member adaptivity T1	.439**	.352**	.284*	.413**	.354**	.319**	.137	.423**	.192	.426**	.505**	.356**	.599**	1			
15 Team member proactivity T1	.163	.131	.316**	.298*	.199	.264*	.079	.222	.254*	.112	.197	.616**	.416**	.399**	1		
16 Org member proficiency T1	.366**	.150	.214	.155	.135	.165	.260*	.364**	.086	.545**	.256*	.256*	.588**	.336**	0.217	1	
17 Org member adaptivity T1	.319**	.172	.129	.214	.151	.170	.037	.255*	.030	.447**	.439**	.383**	.430**	.445**	.334**	.656**	1
18 Org member proactivity T1	-.023	.061	.201	.025	.016	.119	.038	.141	.271*	-.039	.048	.549**	.399**	0.154	.666**	.367**	.368**

Table 5.11: Correlations of informal learning factors and individual, team and organisation performance behaviours at T2;

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1 age	1																
2 level	.310**	1															
3 tenure	.397**	-.113	1														
4 Social support T1	-.022	.147	-.301**	1													
5 Feedback availability T1	.047	.181	-.333**	.545**	1												
6 Problem solving T1	-.061	.142	-.145	.377**	.366**	1											
7 Experimenting T1	-.118	.163	-.354**	.442**	.576**	.433**	1										
8 Autonomy T1	-.071	.236*	.060	.108	.008	.037	.063	1									
9 Interdependency T1	.173	.161	.428**	.204	.113	.366**	-.045	.158	1								
10 Individual task proficiency T2	-.048	.136	-.063	.350**	.279*	.209	.079	.075	.160	1							
11 Individual task adaptivity T2	.159	.101	-.027	.042	.123	.079	-.086	.001	.094	.531**	1						
12 Individual task proactivity T2	.043	.175	-.045	.102	.259*	.144	.084	.133	.047	.342**	.506**	1					
13 Team member proficiency T2	.042	.076	.042	.189	.153	.145	-.022	.049	.128	.663**	.392**	.311**	1				
14 Team member adaptivity T2	-.020	.122	-.120	.269*	.158	.245*	.055	.190	.131	.563**	.529**	.496**	.630**	1			
15 Team member proactivity T2	-.156	-.059	-.152	.167	.206	.279*	.145	.015	.109	.400**	.425**	.654**	.476**	.632**	1		
16 Organisation member proficiency T2	-.033	-.020	-.036	.164	.166	.252*	.202	-.087	.034	.418**	.077	.158	.375**	.274*	.280*	1	
17 Organisation member adaptivity T2	-.111	.026	-.069	.235*	.141	.298**	.080	.205	.151	.451**	.310**	.253*	.405**	.517**	.318**	.499**	1
18 Organisation member proactivity T2	-.286**	-.141	-.026	-.075	-.053	.174	-.036	.116	-.013	.160	.305**	.452**	.337**	.489**	.768**	.241*	.285*

* p< .05 (2-tailed). ** p< .01 (2-tailed).

Table 5.12: Summary of hierarchical regression analysis showing the effects of informal learning factors on individual, team and organisation performance behaviours at T2

Time 2	Individual Task Behaviours			Team Member Behaviours			Organisation Member Behaviours		
	Proficiency	Adaptivity	Proactivity	Proficiency	Adaptivity	Proactivity	Proficiency	Adaptivity	Proactivity
T1 performance	.33*	.52**			.32*				
Social support T1									
Feedback T1			.31*						
Problem solving T1									
Experimenting T1									
Autonomy T1									
Interdependency T1							.29*		.29*
R²	.24	.28	.12	.11	.21	.14	.12	.17	.16

* p< .05 (2-tailed). ** p< .01 (2-tailed). All equations control for level and performance at Time 1

5.5 Chapter summary and conclusion

This chapter has presented the results of two studies empirically testing the apprenticeship development model advanced in Chapter 2. Overall, the findings provide compelling support for the apprenticeship development model indicating that both formal and informal learning contribute to apprentices' competencies. With regards to the former, transfer design, supervisor support and opportunity to use the knowledge and skills acquired in formal training are associated with apprentices transferring technical knowledge to the workplace. Given that transfer design accounts for most variance in training transfer, this factor calls for particular consideration. Additionally, the role of the supervisor is important in assisting apprentices with transferring the knowledge acquired at college and university and in providing them with opportunities for applying such knowledge in the workplace.

When considering the factors supporting apprentices' engagement in informal learning, results of Study 1 cross-sectional analysis confirm the significance of social support and feedback in contributing to apprentices' job competence and work and business skills, whilst task autonomy is associated only with work and business skills. Surprisingly, problem solving and experimenting are not associated with apprentices' competencies, however inspection of qualitative data reveals that these factors are relevant for apprentices. Apprentices' statements clearly indicate a link between challenging tasks and learning, suggesting that although the cross-sectional analysis did not find problem solving and experimenting to be significant, these factors should not be discarded.

Additionally, the results present preliminary evidence of the significance of task interdependence as structural factor in contributing to both apprentices' job competence and work and business skills. Generally, the results of Study 1 cross-sectional analysis complemented by qualitative data present strong insight into the training intervention and work environment factors contributing to particular apprentices' competencies.

Notably, whilst Study 1 cross-sectional analysis sought to investigate the association between the apprenticeship development model and resultant competencies, Study 2 longitudinal analysis sought to more explicitly determine a causal link between the two. Considering the results, although in Study 1 cross-sectional analysis an association is apparent between most training intervention and work environment factors and apprentices' performance-based competencies, this association disappears in Study 2 longitudinal analysis once previous performance levels are taken into account. However, whilst the results of Study 2 longitudinal analysis do not present sufficient evidence to prove that the

factors investigated cause apprentices' competence development, these results do not dismiss the findings of Study 1 cross-sectional analysis.

Given that prior levels of performance are identified as main significant predictors in Study 2 longitudinal analysis, there is the possibility that the effects of training intervention and work environment factors may have already accrued, hence being apparent in Study 1 cross-sectional analysis but not in Study 2 longitudinal analysis. As discussed by Guest, Michie, Conway and Sheehan (2003) if the gains from implementing HR practices have already accrued, no further change will be detected when exploring causal relationships over time.

Additionally, problem solving, non-significant in Study 1 cross-sectional analysis but significant in Study 2 longitudinal analysis when controlling for prior performance levels, may suggest that the effects of this factor become apparent over time. This finding is consistent with research examining how long the effects of HR practices take to emerge resulting in performance improvements. In a longitudinal study on the effects of HR practices on company productivity, Birdi, Clegg, Patterson and others (2008) found compelling evidence that different time lags exist for specific HR practices before their effects translate to organisational performance. Whilst the effects of empowerment became evident from 1 to 4 years after implementation, the effects of teamworking took 6 to 9 years to result in productivity improvements. Although this study investigated the effects of HR practices on organisational performance it is reasonable to expect similar time lags for the effects of the apprenticeship factors on individual performance.

Overall, the findings presented in this chapter are consistent with the theoretical model anticipated and on balance predominantly positive. Implications for theory and practice will be discussed next.

Chapter 6

The role of the HRM system strength, performance appraisal and learning goal orientation in apprenticeship

6.1 Introduction

This chapter investigates the influence of contextual and individual boundary conditions on the apprenticeship development model. At contextual level, the role of the HRM system strength (Hypothesis 3) and PA (Hypothesis 4) in the apprenticeship learning process are tested. At individual level, the role of learning goal orientation (Hypothesis 5) is examined. In so doing, the chapter investigates whether such boundary conditions have an impact on the formal and informal learning factors associated with apprentices' competence development. Statistical analysis supplemented by qualitative data is used to test hypotheses.

6.2 Hypothesis 3: the role of the HRM system strength in apprenticeship

Preliminary analysis

Before considering the moderating effect of the HRM system strength on the relationship between the apprenticeship training and performance behaviour-based competencies, some considerations are warranted. Whilst the cross-sectional sample resulted in 233 responses, a lower number of responses on the HRM system constructs of distinctiveness, consistency and consensus reduced the sample size for the moderation analysis to 84 observations. As indicated in Table 6.1, missing data in scales measuring distinctiveness, consistency and consensus resulted in a reduced sample when the scales were aggregated to compute an average measure of the HRM system strength.

As the extent of missing data significantly exceeds the generally tolerated proportion of missing items below 10% (Peyre, Leplege and Coste, 2011), no imputation method was considered suitable and only complete cases were retained for the analysis. Furthermore, as the data are not missing at random but are rather concentrated on particular questions, further tests are required to exclude biased results. Following Tabachnick and Fidell (1989), a test of mean differences on variables of interest between those who did and those who did not report perceptions of the HRM system where conducted in order to establish any particular patterns in the missing data.

Table 6.1: Missing data for the HRM system strength construct

	N	Mean	SD	Missing	
				Count	Percentage
Distinctiveness	132	3.22	.86	101	43.3
Consistency	124	3.17	.82	109	46.8
Consensus	112	3.21	.76	121	51.9
HRM strength	84	3.20	.75	149	63.9

An independent-sample t-test was performed to compare performance scores for those who did and those who did not report perceptions of HRM system strength. As reported in Table 6.2 there was no significant difference in scores for respondents and non-respondents, indicating no critical patterns associated with respondents' reluctance to rate the HRM system. This analysis allowed to establish that no systematic association between missing and valid data is present, excluding the possibility of biased results.

Table 6.2: Means, standard deviations and T-test for respondents and non-respondents

		N	M	SD	t	df	Sig. 2-tailed
Training transfer	HR response	78	3.57	.79	.48	187	.631
	HR no response	111	3.63	.77			
Individual performance	HR Response	79	4.03	.49	-1.58	186	.116
	HR no response	109	3.90	.56			
Team performance	HR response	78	3.81	.59	-.77	179	.442
	HR no response	103	3.74	.61			
Organisation performance	HR response	74	3.51	.70	-.08	153	.935
	HR no response	81	3.50	.66			

Further inspection of the missing data revealed that respondents chose to answer 'do not know' when asked to rate the HRM system, suggesting that the refusal to respond was due to no opinion or insufficient knowledge on the question (Hair et al., 2014). This finding is in line with the multivariate and qualitative analysis results discussed next pointing to the triviality of the HRM system for apprentices as particular category of employees.

Data analysis: testing for moderation

In testing for moderation the analysis considered the association between formal and informal learning respectively and apprentices' competencies. In so doing, in this study four main moderated relationships were tested:

- the interaction effect of the HRM system strength and formal learning on:
 - 1) training transfer
- the interaction effect of the HRM system strength and informal learning on:
 - 2) Individual performance behaviours
 - 3) Team performance behaviours
 - 4) Organisation performance behaviours

As previously discussed, the sample size for the analysis did not meet the recommended requirements of 15 participants for predictor (Stevens, 1996), however a complete model controlling for the effects of level, tenure and age is equally essential for valuable results.

6.2.1 The association between formal training and apprentices' competencies: the role of the HRM system strength

In line with the hypotheses tested in Chapter 5 (H1a, H1b, H1c, H1d, H1e), this study investigates the association between formal training factors and training transfer as proxy for apprentices' technical knowledge.

Table 6.3 reports correlations and reliability coefficients for the constructs of interest. All variable scales exhibit acceptable reliability ($\alpha > .70$) and significant correlations are observed between the predictors and the criterions. Whilst both formal and informal learning are positively and significantly correlated with all criterions, formal learning displays the largest correlation with training transfer ($r = .55, p < .01$), while informal learning displays the largest correlations with individual ($r = .46, p < .01$), team ($r = .49, p < .01$) and organisation ($r = .41, p < .01$) performance behaviours. The HRM system strength presents small significant correlations with formal learning ($r = .27, p < .05$), training transfer ($r = .24, p < .05$) and organisation performance behaviours ($r = .28, p < .05$). Of the control variables, tenure is negatively and significantly correlated with formal learning ($r = -.20, p < .01$); level

is positively and significantly correlated with informal learning ($r = .15, p < .05$), and age and tenure are significantly and negatively correlated with the HRM system strength ($r = -.26, p < .05$; $r = -.31, p < .01$ respectively). Whilst the positive correlations between formal and informal learning with the criteria were expected, the small and non-significant correlations of the HRM system strength with the criteria along with the negative correlation with tenure and age were unanticipated.

Table 6.3: Correlations of formal and informal learning, HRM system strength and performance behaviours

	1	2	4	5	6	7	8	9
1 Informal learning	(.86)							
2 Formal learning	.470**	(.88)						
3 HRM system strength	.134	.279*						
4 Individual performance behaviours	.468**	.291**	(.83)					
5 Team performance behaviours	.496**	.267**	.684**	(.84)				
6 Organisation performance behaviours	.418**	.363**	.498**	.593**	(.85)			
7 Training transfer	.323**	.552**	.250**	.202**	.351**	(.91)		
8 Tenure	-.038	-.207**	.022	.021	-.057	-.147*		
9 Level	.152*	.005	.040	-.038	.013	-.015	-.081	
10 Age	.103	-.065	.007	-.040	-.099	-.097	.482**	.200**

* $p < .05$ (2-tailed); ** $p < .01$ (2-tailed) Cronbach's alpha (if applicable) is reported in brackets.

Formal training and training transfer

In order to test the moderating role of the HRM system strength, three models were considered. Based on Model 1, all control variables fail to predict transfer of knowledge acquired at college or university to the workplace. Model 2 indicates that formal training is positively and significantly associated with training transfer ($\beta = .55, p < .01$), whilst the HRM system strength is non-significant. Model 3 reveals that the HRM system strength does not moderate the relationship between formal training and training transfer as the interaction coefficient is non-significant (Table 6.4).

Notably, the relationship between formal training and performance is not influenced by HRM system strength, suggesting that the effects of training on performance for apprentices are likely to be independent of the HR system.

Table 6.4: Hierarchical regression of training transfer onto formal training, HRM system strength and the interaction between the two

	Model (1) Control variables	Model (2) Control variables and main effects	Model (3) Control variables, main effects and interaction
Tenure			
Level	-.07	.16	.35
Age	-.04	-.06	-.09
	-.20	-.26	-.48
Formal training		.55**	.79**
HRM strength		.07	.07
Formal training x HRM strength			-.11
R²	.07	.37	.37
ΔR²	.07	.29**	.00

N= 73; * p<.05 ** p<.01

6.2.2 The association between informal learning and apprentices' competencies: the role of the HRM system strength

Informal learning and individual-, team-, organisation-performance behaviours

In testing the influence of the HRM system strength on the association between informal learning and apprentices' competencies, individual, team and organisation performance behaviours are regressed onto informal learning. As hypothesised in the apprenticeship development model, learning in the workplace contributes to developing the skills and behaviours required to perform a particular role (i.e. job competence) along with general and transferable skills required in any occupation (i.e. work and business skills).

As reported in Table 6.5, when considering individual performance behaviours, Model 1 indicates that tenure, level and age are non-significant predictors; in Model 2 informal learning is significantly associated with the criterion ($\beta = .54, p < .01$), while the interaction term in Model 3 is non-significant indicating that the HRM system strength does not moderate the relationship between informal learning and individual performance behaviours.

Similarly, when considering team performance behaviours, the control variables in Model 1 are non-significant and informal learning in Model 2 is significantly associated with the criterion ($\beta = .50, p < .01$); in Model 3 the interaction term is non-significant while informal learning and tenure are significantly associated with team performance behaviours ($\beta = .46, p < .01$; $\beta = .41, p < .05$ respectively).

When considering organisation performance behaviours, in Model 1 age is significantly and negatively associated with the criterion ($\beta = -.35, p < .05$). In Model 2 age ($\beta = -.36, p < .05$), informal learning ($\beta = .39, p < .01$) and the HRM system strength ($\beta = .23, p < .05$) are significant predictors, while Model 3 indicates that the interaction term between HRM system strength and informal learning is non-significant.

In light of the HRM system strength being significant in relation to organisation performance behaviours (Model 2: $\beta = .23, p < .05$) (Table 6.5), further moderated regression analyses were conducted to explore whether the HRM system strength had an influence on the individual variables forming the informal learning construct. In testing the association of individual variables with specific organisation performance behaviours (i.e. proficiency, adaptivity, proactivity), the HRM system strength was found to significantly and negatively moderate the relationship between social support and organisation member proficiency.

As reported in Table 6.6, Model 1 indicates that the control variables are not significant predictors. In Model 2 social support ($\beta = .37, p < .01$) and the HRM system strength ($\beta = .30, p < .01$) are significantly associated with organisation member proficiency. Model 3 indicates that the interaction term is significant ($\beta = -.74, p < .05$) hence the HRM system strength significantly and negatively moderates the relationship between social support and organisation member proficiency.

Table 6.5: Summary of hierarchical regression of individual, team and organisation performance behaviours onto informal learning, HRM system strength and the interaction between the two.

	Individual performance behaviours			Team performance behaviours			Organisation performance behaviours		
	Model (1) Control variables	Model (2) Control variables and main effects	Model (3) Control variables, main effects and interaction	Model (1) Control variables	Model (2) Control variables and main effects	Model (3) Control variables, main effects and interaction	Model (1) Control variables	Model (2) Control variables and main effects	Model (3) Control variables, main effects and interaction
Tenure	.10	.19	.26	.14	.23	.41*	.14	.24	.47
Level	-.01	-.18	-.18	-.04	-.21	-.26	.14	-.03	-.02
Age	-.01	-.03	-.04	-.17	-.18	-.24	-.35*	-.36*	-.55**
Informal learning		.54**	.40**		.50**	.46**		.39**	.59**
HRM strength		.05	.05		.08	.04		.23*	.22
Informal learning x HRM strength			-.06			.10			-.34
R²	.01	.28	.28	.02	.26	.26	.09	.29	.31
ΔR²	.01	.27**	.00	.02	.23**	.00	.09	.20**	.02
N		71			70			66	

* p< .05 ** p< .01

The negative interaction indicates a compensating effect whereby when the HRM system strength is low, social support exerts a stronger effect on organisation member proficiency, whilst when the HRM system strength is high, social support does not influence organisation member proficiency. This becomes evident when probing the interaction with the slope test which reveals that social support has a larger effect on organisation member proficiency at relatively low levels of the HRM system strength ($\beta = 1.10$, $p < .01$), and ceases to be significant at relatively high levels of the HRM system strength (Table 6.7).

As organisation member proficiency resembles constructs of organisational loyalty and support (Griffin, Neal and Parker, 2007), the moderation suggests a compensation effect of social support for low levels of HRM system strength. Specifically, in situations of low HRM system strength, where apprentices do not perceive the HR message as intended by the organisation (i.e. the organisation valuing their development and wellbeing), social support more strongly contributes to apprentices engaging in behaviours that support the organisation's effectiveness.

Generally, informal learning contributes to individual, team and organisation performance behaviours and its effects are independent of the HRM system strength. As for formal training, the findings reveal that the HRM system strength does not influence the relationship between informal learning and performance, with the exception of the association between social support and organisation member proficiency. The latter appears to be the only outcome sensible to HRM, suggesting a compensation effect whereby social support contributes to organisation member proficiency when the HRM system strength is weak.

Table 6.6: Hierarchical regression of organisation member proficiency onto social support, HRM system strength and the interaction between the two.

	Model 1 (control variable)	Model 2 Control variable and main effects	Model 3 Control variable, main effects and interaction
Level	.05	-.05	.05
Age	-.05	-.03	-.51*
Tenure	-.05	.09	.33
Social Support		.39**	.54**
HRM strength		.30**	.25*
Social Support x HRM strength			-.74**
R²	.01	.26	.35
ΔR²	.01	.25**	.08*

N= 71 * p< .05 ** p< .01

Table 6.7: Conditional effect of social support on organisation member proficiency at values of the HRM system strength

	HRM strength	Effect	se	t	p
1 SD below the M	-.76	1.10	.35	3.07	.00
M level	.00	.54	.18	2.95	.00
1 SD above the M	.76	-.02	.31	-.08	.92

Note: variables are mean-centred

6.3 Qualitative data analysis

Inspection of qualitative data provides further insight into the role of the HRM system strength in apprenticeships. Following the HR process approach (Ostroff and Bowen, 2000, 2016; Bowen and Ostroff, 2004) the research analyses the communicative function of the HRM system, considering how implementation of HR practices allows apprentices to make confident attributions about the attitudes and behaviours expected by the organisation. As discussed by Bowen and Ostroff (2004), HRM systems characterised by high levels of distinctiveness, consistency and consensus lead to strong situations where messages are communicated clearly.

Whilst it was hypothesised that a strong HRM system would make apprentices feel part of a high-quality employment relationship with the organisation (Tsui et al., 1997) portraying concern towards apprentices' development and wellbeing and in turn augmenting the impact of the apprenticeship training on performance, the results of moderation analysis indicate that the effects of learning are independent of HRM.

The findings indicate that the HRM system strength does not influence apprentices' competence development in strengthening the positive effects of formal and informal learning on performance. Surprisingly, the results suggest that for apprentices as particular category of employees, the HRM system embedding the apprenticeship does not influence competence development. However, before further discussion some considerations are warranted.

Moderated analysis was based on a small sample (N= 84) which may have affected the power for statistical inference tests (Hair et al., 2014); additionally, measures of HRM process are relatively new and in need of further development and validation (Ehrnrooth and Bjorkman, 2012; Sanders, Shipton and Gomes, 2014). As recently discussed by Ostroff and Bowen (2016), the field is in need of a comprehensive measure of the HRM system strength intended as higher-level construct representing a contextual property of a unit or the organisation. The scholars maintain that, diverting from the original conceptualisation of the HRM system strength (Bowen and Ostroff, 2004), most research up to date has operationalised the construct as individual level perceptions, treating it as an individual-difference variable rather than a higher-level contextual variable (Ostroff and Bowen, 2016). In referring to the measure developed by Delmotte and colleagues (2012) in particular, Ostroff and Bowen (2016) consider the operationalisation of the HRM system strength as idiosyncratic perceptions of individual interpretations of the social context, rather than shared perceptions

at unit or organisational level. The scholars maintain that inconsistencies in operationalising the construct have led to an indirect use of the HRM system strength concept, which although meaningful in explaining how individual perceptions relate to individual outcomes, differ from the original theorisation.

Additionally, when considering the particular items making up the scale measuring the HRM system strength construct (Delmotte et al., 2012), it is evident how some may appear extraneous to apprentices. Items reading ‘HR practices in this organisation achieve their intended goals’ and ‘One can have faith that the HR practices realise the goals for which they were designed’ may seem vague and ambiguous to junior employees. Furthermore, the items tend to present general statements referring to policies and practices applicable to all employees (i.e. ‘The procedures and practices developed by HR are easy to understand’; ‘The HR instruments for staff appraisal succeed in reinforcing the desired behaviours’), however apprentices as subgroup of employees may only be exposed to particular practices, and may have a dedicated department running independently of HR. Accordingly, apprentices’ perceptions of their relationship with the organisation may not be well represented by the HRM system strength construct, but may result from other factors.

Inspection of qualitative data collected via an open question in the survey has shed light onto apprentices’ perceptions of the HRM system. Apprentices’ statements indicate that whilst the immediate context as in the learning environment where the apprenticeship takes place is crucial for their development, the HRM system appears secondary. As exemplified in the following quotes, apprentices perceive the HRM system as distant and remote and have limited knowledge about the function:

‘I have had no contact with my HR department that I know of, I do not know who the HR representative is for me and nor do any of the other apprentices who are based on the same site as me. This was highlighted at a recent apprentice forum.’

‘As a planning and control apprentice I know very little about HR. I am not sure (apart from recruitment, redundancy, performance ratings) what they are responsible for. We have not really been informed of what the function does.’

‘As an apprentice, some of the questions, I think become more applicable the further I go in my career – I struggle to give an opinion on something, I know very little about the HR function and the opinions of others.’

‘I do not have a lot of knowledge on the HR department and it is a reflection of my role and the company as a whole.’

This finding is consistent with the low number of responses on the scales measuring the constructs of distinctiveness (N= 132), consistency (N= 124) and consensus (N= 112) as

many respondents refused to answer the question or chose to answer ‘do not know’ indicating limited knowledge on the topic.

When considering the role of the HRM system strength from a social exchange perspective (Blau, 1964), a strong HRM system was expected to communicate to apprentices that the organisation values their development and well-being. Inspection of apprentices’ statements reveals that apprentices do feel valued, however this feeling of appreciation and recognition stems from the immediate learning environment, as exemplified in the following quotes:

‘I have really enjoyed my first year of my apprenticeship. I’ve always felt like a valued, significant member of the team and the company.’

‘As an apprentice in the training school you are treated like a child more than a working individual. However, when entering the business you are treated from day one like a member of the team and you are accepted, and given proper meaningful jobs whether they be individual or team jobs.’

‘The opportunities the company provides are brilliant, and being an apprentice usually does not get in the way of this. I have never felt disadvantaged or overlooked by my colleagues as an apprentice, and my opinions and inputs are always listened to and considered.’

Generally, apprentices feel valued by the organisation and this positive perception derives from having meaningful roles within the team, being given adequate levels of responsibility in carrying out tasks and in contributing toward projects. Whilst team working and job involvement appear significant for apprentices in feeling as valued members of the organisation, HR practices as career development do not seem to contribute to a relational employment relationship with the organisation, as exemplified in the following quotes:

‘Unorganised, poor planning towards our future.’

‘The fact that my career direction has been decided – without me being able to have an input, or anyone listening to my concerns – has led me to look for another career at the earliest opportunity.’

‘I am a practical apprentice and have had a varied training programme that has allowed me a breadth of knowledge in different aspects of practical machining but in terms of my eventual job role I have had no idea what that could be and when I have continually asked it was completely vague.’

Uncertainty around and poor planning of career progression emerges as a prevalent theme, with several respondents expressing dissatisfaction with their ability to influence their career and with poor planning and communication with regards to job progression within the company. Overall, results of quantitative and qualitative data analyses suggest that content as in the apprenticeship training is crucial in making apprentices feel valued whilst process, as in the HRM system strength emerges as secondary. As discussed in the previous chapter,

apprentices consider the work environment as critical for securing positive learning experiences, valuing the challenges, the support and the autonomy provided. On the other hand, the HRM system is perceived as distant given the limited exposure to practices as career development and little contact with the HR function.

Apprentices' views of the HRM system strength may be further explained by considering the items measuring the HRM strength construct (Delmotte et al., 2012). Whilst the HR process approach focuses on the way HR practices are administered (Bowen and Ostroff, 2004) turning the spotlight onto how they are implemented by line management (Guest, 2011), most items used to measure the HRM system strength construct refer to the HR department and HR employees. Items reading 'In general the HR employees in this organisation are highly appreciated' and 'When one asks the HR department for help, they provide clear answers' focus exclusively on the HR function with no reference to line management, providing a limited representation of how practices are implemented.

Generally, the measure employed to assess apprentices' perceptions of the HRM system strength may not fully represent how HR practices are implemented; relatedly, the measure may not fully portray the communicative function of the HRM system in sustaining a relational relationship with the organisation (Tsui et al., 1997). Whilst it was hypothesised that a strong HRM system would communicate the organisation's commitment towards apprentices, qualitative data reveals that apprentices have little exposure to the HRM system. Conversely, the learning environment emerges as paramount in making apprentices feel valued.

Nonetheless, the findings suggest that apprentices engage with the formal and informal learning opportunities provided regardless of the relationship with the organisation as portrayed by the HRM system strength. This would indicate that as junior category of employees apprentices are mainly concerned with the apprenticeship training as this appears to satisfy the short-term objectives and immediate needs of getting a qualification, gaining work experience and stepping into employment. Additionally, apprentices appear to rely on colleagues, peers and supervisors both at college and within the company as important sources of support.

Overall, the findings suggest that the HRM system may need to be formally introduced to apprentices in order to sustain a positive relational employment relationship and have a

positive impact on the apprenticeship training. Practical and theoretical implications are discussed in the following chapter.

6.4 Hypothesis 4: the influence of performance appraisal on the informal learning factors of problem solving, task autonomy and feedback

In testing the moderating effects of PA on the relationship between the informal learning factors of a) problem solving; b) task autonomy and c) feedback and apprentices competencies, nine moderated relationships were tested:

- the interaction effect of PA and problem solving on:
 - 1) Individual task proficiency
 - 2) Team member proficiency
 - 3) Organisation member proficiency
- the interaction effect of PA and task autonomy on:
 - 4) Individual task proficiency
 - 5) Team member proficiency
 - 6) Organisation member proficiency
- The interaction effect of PA and feedback on:
 - 7) Individual task proficiency
 - 8) Team member proficiency
 - 9) Organisation member proficiency

In so doing, this study examines the influence of PA on the learning processes contributing to developing job competence (individual task proficiency), team working skills (team member proficiency) and effective participation skills (organisation member proficiency).

The association between problem solving and apprentices' competencies: the role of PA

Table 6.8 reports correlations and reliability coefficients for the constructs of interest. All scales present acceptable reliability ($\alpha > .70$) and significant correlations are observed between predictors and criterions. PA is positively and significantly correlated with both problem solving ($r = .28, p < .01$) and feedback ($r = .57, p < .01$), and presents small significant correlations with individual task performance ($r = .19, p < .01$) and organisation member performance ($r = .39, p < .01$). When considering the control variables, age is negatively and

significantly associated with PA ($r = -.29, p < .01$) suggesting that older apprentices are less satisfied with it. Similarly, tenure is negatively and significantly associated with feedback ($r = -.26, p < .01$) and with PA ($r = -.38, p < .01$) suggesting that apprentices employed for longer than one year receive less regular feedback from colleagues and supervisors and are less satisfied with PA.

In testing for moderation three models were considered. To test the direct effects, the considered performance outcome was first regressed onto the control variables (Model 1). In a second step the investigated predictor (problem solving, task autonomy and feedback respectively) and PA were included. To test for moderation, the interaction term between PA and the considered predictor was included in a third step (Model 3). The sample size for the analysis ranged between $N = 154$ and $N = 173$, meeting the minimum requirements for conducting regression analysis with six predictors (Tabanick and Fidell, 2007).

Based on Model 1, all control variables failed to predict the performance outcomes. Based on Model 2, problem solving is positively and significantly associated with team member proficiency ($\beta = .24, p < .01$) and organisation member proficiency ($\beta = .16, p < .05$). Model 3 reveals that PA positively and significantly moderates the relationship between problem solving and team member proficiency ($\beta = .21, p < .01$) and between problem solving and organisation member proficiency ($\beta = .25, p < .05$). Regression analysis results are reported in Table 6.9 and the significant interaction effects are shown in Fig. 6.1 and 6.2.

Table 6.8: Correlations among problem solving, task autonomy feedback, PA and performance work-role behaviours

	1	2	3	4	5	6	7	8	9
1 Problem solving	(.81)								
2 Feedback	.404**	(.83)							
3 Task autonomy	.268**	.148*	(.69)						
4 Individual task proficiency	.099	.254**	.143	(.82)					
5 Team member proficiency	.242**	.214**	.135	.505**	(.77)				
6 Organisation member proficiency	.260**	.414**	.158*	.330**	.351**	(.86)			
7 PA	.285**	.576**	.091	.197**	.094	.391**	(.86)		
8 Tenure	-.029	-.264**	.167*	.030	.029	-.143	-.381**		
9 Level	.115	.100	.073	-.047	.014	.043	.146	-.114	
10 Age	.047	-.022	.160*	.038	-.087	-.135	-.291**	.463**	.206**

* p< .05 ** p< .01 Cronbach's alpha (if applicable) is reported on the diagonal.

Table 6.9: Summary of hierarchical regression of performance work-role behaviours onto problem solving, PA and the interaction between the two.

	Individual task proficiency			Team member proficiency			Organisation member proficiency		
	Model (1) Control variables	Model (2) Control variables and main effects	Model (3) Control variables, main effects and interaction	Model (1) Control variables	Model (2) Control variables and main effects	Model (3) Control variables, main effects and interaction	Model (1) Control variables	Model (2) Control variables and main effects	Model (3) Control variables, main effects and interaction
Tenure	.00	.07	.10	.09	.10	.15	-.08	.01	.03
Level	-.04	-.09	-.08	.06	.03	.06	.05	-.00	.00
Age	.03	.07	.08	-.14	-.15	-.21	-.11	-.05	-.11
Problem solving		.03	.04		.24**	.24**		.16*	.24**
PA		.24**	.17**		.00	.00		.32**	.34**
Problem solving x PA			.09			.21**			.25*
R²	.00	.05	.06	.01	.07	.12	.03	.17	.20
ΔR²	.00	.05**	.01	.01	.06**	.05**	.03	.14**	.03*

* p< .05 ** p< .01

Significant interaction effects of problem solving and PA satisfaction on 1) team member proficiency and 2) organisation member proficiency

Fig. 6.1 Team member proficiency

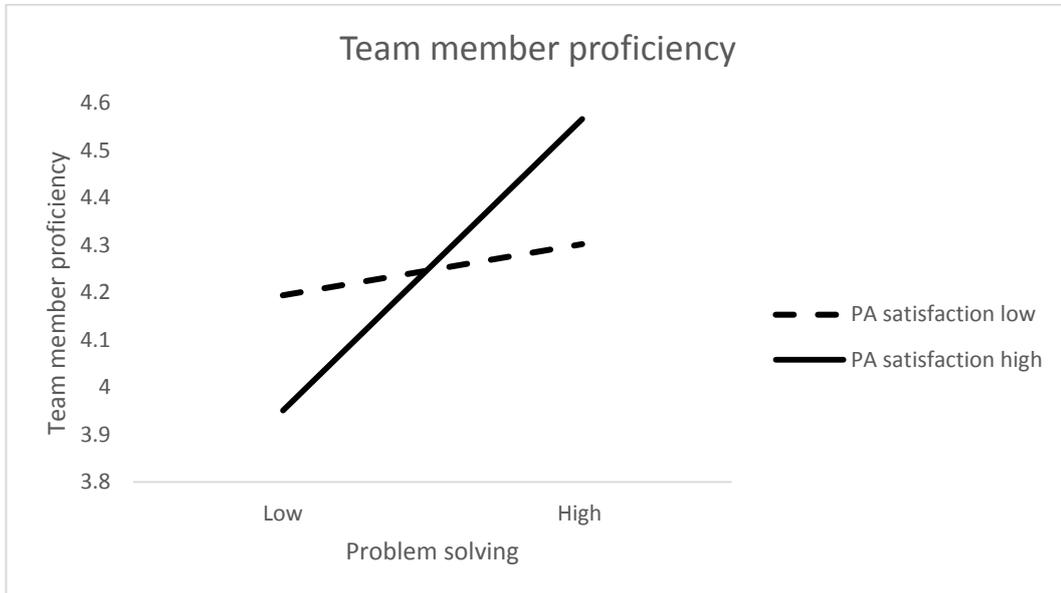
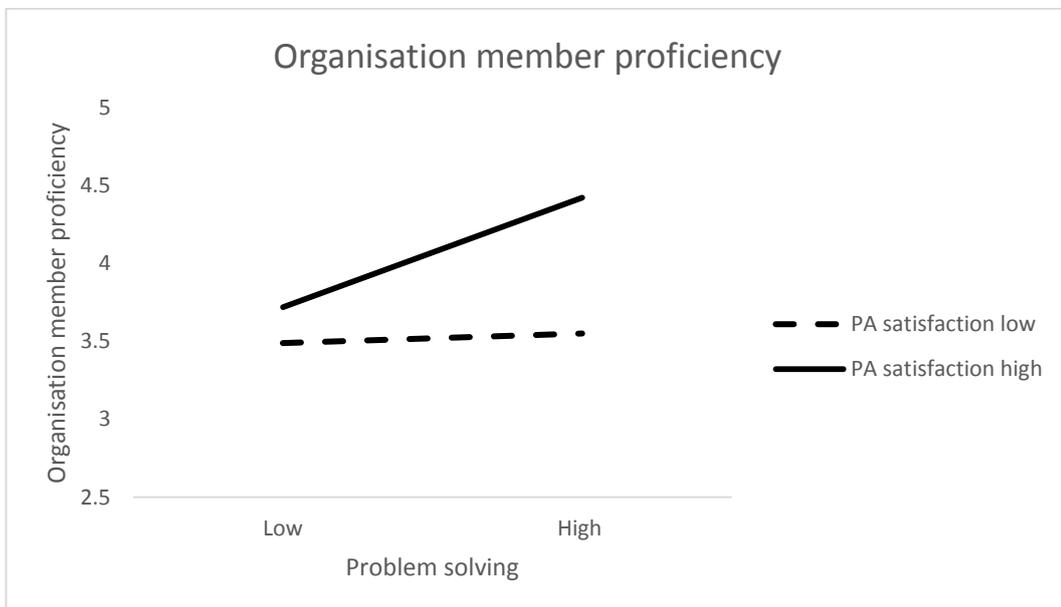


Fig. 6.2 Organisation member proficiency



The association between task autonomy and apprentices' competencies: the role of PA

When considering the association between task autonomy and the considered performance behaviours, Model 1 reveals that the control variables are not significant predictors. Based on Model 2, task autonomy is positively and significantly associated only with organisation member proficiency ($\beta = .16, p < .05$). Model 3 reveals that the interaction between task autonomy and PA is non-significant. Regression analysis results are reported in Table 6.10

The association between feedback and apprentices' competencies: the role of PA

When considering the association between feedback and the considered performance behaviours, Model 1 indicates that the control variables are not significant predictors. Based on Model 2, feedback is positively and significantly associated with individual task proficiency ($\beta = .23, p < .05$), team member proficiency ($\beta = .32, p < .01$) and organisation member proficiency ($\beta = .31, p < .01$).

Model 3 reveals that PA satisfaction positively and significantly moderates the relationship between feedback and team member proficiency ($\beta = .16, p < .01$). For this outcome, the positive effects of feedback are stronger when PA satisfaction is high. Regression analyses results are reported in Table 6.11 and the significant interaction effects are shown in Figure 6.3.

Table 6.10: Summary of hierarchical regression of performance work-role behaviours onto task autonomy, PA and the interaction between the two.

	Individual task proficiency			Team member proficiency			Organisation member proficiency		
	Model (1) Control variables	Model (2) Control variables and main effects	Model (3) Control variables, main effects and interaction	Model (1) Control variables	Model (2) Control variables and main effects	Model (3) Control variables, main effects and interaction	Model (1) Control variables	Model (2) Control variables and main effects	Model (3) Control variables, main effects and interaction
Tenure Level	.00	.04	.06	.11	.10	.16	-.09	-.00	.02
Age	-.06	-.09	-.10	.05	.04	.04	.06	-.00	-.02
	.05	.07	.08	-.15	-.15	-.19	-.10	-.04	-.09
Task autonomy		.13	.11		.14	.14		.16*	.24*
PA		.19*	.13*		.06	.04		.38**	.41**
Task autonomy x PA			-.01			.01			-.18
R²	.00	.06	.06	.01	.04	.04	.03	.19	.20
ΔR²	.00	.05*	.00	.01	.02	.00	.03	.16**	.01

* p< .05 ** p< .01

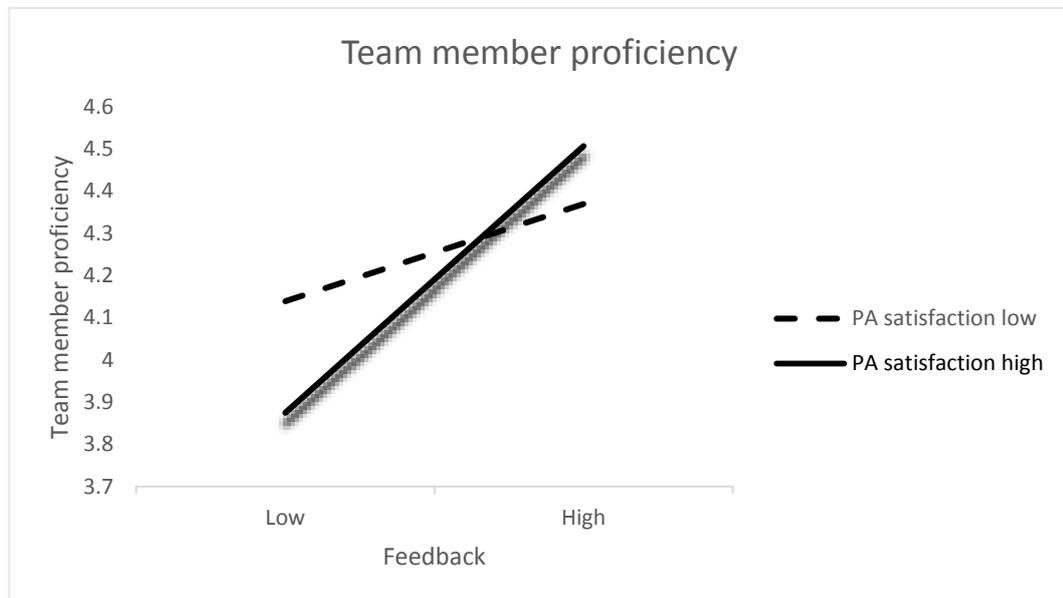
Table 6.11: Summary of hierarchical regression of performance work-role behaviours onto feedback, PA and the interaction between the two.

	Individual task proficiency			Team member proficiency			Organisation member proficiency		
	Model (1) Control variables	Model (2) Control variables and main effects	Model (3) Control variables, main effects and interaction	Model (1) Control variables	Model (2) Control variables and main effects	Model (3) Control variables, main effects and interaction	Model (1) Control variables	Model (2) Control variables and main effects	Model (3) Control variables, main effects and interaction
Tenure	.02	.12	.21	.11	.18*	.38**	-.08	.07	.18
Level	-.06	-.06	-.09	.05	.05	.07	.04	.00	.00
Age	.02	.02	.01	-.16	-.22*	-.31**	-.11	-.10	-.19
Feedback		.23*	.17*		.32**	.27**		.31**	.34**
PA		.10	.08		-.11	-.04		.19	.21*
Feedback x PA			.04			.16**			.03
R²	.00	.09	.09	.02	.08	.13	.02	.21	.21
ΔR²	.00	.08**	.00	.02	.06**	.05**	.02	.18**	.00

* p< .05 ** p< .01

Significant interaction effects of feedback and PA satisfaction on 3) team member proficiency

Fig. 6.3 Team member proficiency



Summary of results

Overall, the findings indicate that problem solving is associated with team working and effective participation skills. Additionally, the effects of problem solving on proficiency in operating as an effective team and organisational member are stronger when PA satisfaction is high.

Similarly, feedback is associated with the whole spectrum of competencies including job competence, team working and effective participation skills. Notably, the effects of feedback on the ability to operate as effective team member are stronger when satisfaction with PA is high.

Task autonomy is only associated with the work and business skills of effective participation and its effects are not influenced by PA satisfaction.

6.5 Hypothesis 5: the role of learning goal orientation in apprenticeship

Moderated regression was conducted to test the influence of learning goal orientation as individual determinant of apprentices' responses to formal and informal learning, on the relationship between the apprenticeship training and resultant competencies.

In so doing, in this study the following main moderated relationships were tested:

- the interaction effect of learning goal orientation and formal training on:
 - 1) Training transfer
- the interaction effect of learning goal orientation and informal learning on:
 - 2) Individual performance behaviours
 - 3) Team performance behaviours
 - 4) Organisation performance behaviours

In testing for moderation, the same procedure adopted for testing the influence of the HRM system strength on the apprenticeship training was applied. The sample size for the analysis ranged between $N= 166$ and $N= 188$, meeting the minimum requirements for conducting regression analysis with 10 predictors (Tabanick and Fidell, 2007).

6.5.1 The association between formal training and apprentices' competencies: the role of learning goal orientation

Table 6.12 reports correlations and reliability coefficients for the constructs of interest. All scales present acceptable reliability ($\alpha > .70$) and significant correlations are observed between predictors and criterions. Learning goal orientation is significantly and positively correlated with both formal training ($r = .17, p < .05$) and informal learning ($r = .36, p < .01$), displaying a larger correlation with the latter. When considering the outcome variables, learning goal orientation is positively and significantly correlated with all four outcomes, presenting a small correlation with training transfer ($r = .23, < .01$), and medium correlations with individual performance behaviours ($r = .41, p < .01$), team performance behaviours ($r = .37, p < .01$) and organisation performance behaviours ($r = .37, p < .01$). No significant correlations are observed between learning goal orientation and the control variables.

Table 6.12: Correlations among formal and informal learning, learning goal orientation and performance work-role behaviours.

	1	2	3	4	5	6	7	8	9
1 Formal training	(.88)								
2 Informal learning	.478**	(.86)							
3 Learning goal orientation	.179*	.365**	(.74)						
4 Training transfer	.552**	.327**	.235**	(.91)					
5 Individual performance behaviours	.291**	.462**	.416**	.250**	(.83)				
6 Team performance behaviours	.267**	.496**	.377**	.202**	.684**	(.84)			
7 Organisation performance behaviours	.363**	.411**	.379**	.351**	.498**	.593**	(.85)		
8 Tenure	-.207**	-.053	-.045	-.147*	.022	.021	-.057		
9 Level	.005	.142	.019	-.015	.040	-.038	.013	-.081	
10 Age	-.065	.087	.043	-.097	.007	-.040	-.099	.482**	.200**

*p< .05 (2-tailed); ** p< .01 (2-tailed) Cronbach's alpha (if applicable) is reported in brackets.

Formal training and training transfer

In line with the procedure followed to test the previous hypotheses, training transfer is regressed onto formal training as proxy for apprentices' technical knowledge. In testing the moderating role of learning goal orientation three models were considered. Based on Model 1, tenure, level and age fail to predict transfer of knowledge and skills acquired at college or university to the workplace. Model 2 indicates that formal training is positively and significantly associated with training transfer ($\beta = .55$, $p < .01$), while learning goal orientation is not significant. Model 3 reveals that no moderation occurs between learning goal orientation and formal training as the interaction coefficient is non-significant (Table 6.13).

Moderated regression analysis was also conducted for each formal training factor to assess whether LGO influenced the relationship between individual factors and training transfer, however the analysis did not detect any significant interaction.

Table 6.13: Hierarchical regression of training transfer onto formal training, learning goal orientation and the interaction between the two

	Model (1) Control variables	Model (2) Control variables and main effects	Model (3) Control variables, main effects and interaction
Tenure			
Level	-.15	-.01	-.03
Age	-.02	.01	.03
	.00	-.05	-.09
Formal training		.55**	.80**
LGO		.08	.13
Formal training x LGO			.05
R²	.02	.34	.34
ΔR²	.02	.32**	.00

N= 167 ; * p< .05 ** p< .01

Summary of results

Overall, the findings do not provide support for the influence of learning goal orientation on the relationship between formal training and apprentices' technical knowledge. Additionally, when considered as predictor, learning goal orientation is not significantly associated with training transfer.

6.5.2 The association between informal learning and apprentices' competencies: the role of learning goal orientation

In testing the influence of learning goal orientation on the relationship between informal learning and apprentices' competencies, individual, team and organisation performance behaviours were regressed onto informal learning as proxies for job competence and work and business skills. Although no moderation was detected when considering informal learning as composite measure, further tests were conducted to explore whether learning goal orientation had an influence on particular variables forming the informal learning construct.

In testing the association of individual informal learning factors with specific organisation performance behaviours (i.e. proficiency, adaptivity, proactivity) at individual, team and organisational level, learning goal orientation was found to influence the association of a) social support; b) feedback; c) task autonomy; d) task interdependence with a spectrum of performance behaviours.

Table 6.14 reports the correlations between the constructs of interest. Learning goal orientation is positively associated with all performance outcomes and presents positive significant correlations with all informal learning factors with the exception of problem solving and task interdependence.

Social support

Moderated regression analysis reveals that the relationship between social support and team member adaptivity is influenced by learning goal orientation (Table 6.15).

Based on Model 1, all control variables fail to predict team member adaptivity. Model 2 reveals that social support ($\beta = .24, p < .01$) and learning goal orientation ($\beta = .15, p < .05$) are positively and significantly associated with the predicted outcome. Model 3 indicates that learning goal orientation positively and significantly moderates the relationship between social support and team member adaptivity ($\beta = .42, p < .05$).

As reported in Table 6.16, the slope test reveals that social support is positively and significantly associated with team member adaptivity at average ($\beta = .25, p < .01$) and relatively high levels of learning goal orientation ($\beta = .46, p < .01$), indicating that as learning goal orientation increases so does the strength of the association between social support and team member adaptivity.

Table 6.14: Correlations between learning goal orientation, informal learning factors and performance behaviours

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1 Learning goal orientation	1														
2 Social Support	.296**	1													
3 Feedback availability	.193**	.465**	1												
4 Problem solving	.111	.285**	.313**	1											
5 Experimenting	.236**	.393**	.467**	.486**	1										
6 Task autonomy	.194**	.181*	.104	.249**	.213**	1									
7 Task interdependence	.142	.172*	.053	.246**	-.001	.278**	1								
8 Individual task proficiency	.282**	.365**	.274**	.065	.085	.104	.218**	1							
9 Individual task adaptivity	.361**	.280**	.259**	.145*	.200**	.183*	.135	.646**	1						
10 Individual task proactivity	.264**	.214**	.304**	.205**	.264**	.281**	.171*	.279**	.324**	1					
11 Team member proficiency	.214**	.302**	.232**	.221**	.156*	.130	.309**	.495**	.416**	.297**	1				
12 Team member adaptivity	.218**	.255**	.286**	.264**	.225**	.164*	.269**	.471**	.519**	.422**	.550**	1			
13 Team member proactivity	.326**	.160*	.286**	.230**	.234**	.125	.136	.217**	.252**	.660**	.333**	.421**	1		
14 Organisation member proficiency	.250**	.418**	.404**	.257**	.188*	.190*	.131	.325**	.290**	.349**	.367**	.350**	.315**	1	
15 Organisation member adaptivity	.261**	.273**	.207**	.153*	.118	.147*	.103	.435**	.447**	.158*	.436**	.451**	.219**	.467**	1
16 Organisation member proactivity	.312**	.024	.131	.147*	.079	.266**	.132	.111	.152*	.530**	.253**	.231**	.609**	.327**	.337**

* p < .05 ** p < .01

Table 6.15: Hierarchical regression of team member adaptivity onto social support, learning goal orientation and the interaction between the two

	Model (1) Control variables	Model (2) Control variables and main effects	Model (3) Control variables, main effects and interaction
Tenure	-.01	.04	.02
Level	-.04	-.09	-.11
Age	.03	.00	.00
Social support		.24**	.25**
LGO		.15*	.21*
Social support x LGO			.42*
R²	.00	.09	.12
ΔR²	.00	.09**	.03*

N= 175; * p< .05 ** p< .01

Table 6.16: Conditional effect of social support on team member adaptivity at values of learning goal orientation

	LGO	Effect	se	t	p
1 SD below the M	-.49	.03	.12	.31	.75
M level	.00	.25	.09	2.73	.00
1 SD above the M	.49	.46	.11	3.92	.00

Note: variables are mean-centred

Feedback

Similarly, the effects of feedback on team member adaptivity are moderated by learning goal orientation. As reported in Table 6.17, Model 1 indicates that the control variables are not associated with team member adaptivity. Based on Model 2, both feedback ($\beta = .27, p < .01$) and learning goal orientation ($\beta = .16, p < .05$) are positively and significantly associated with

the criterion. Model 3 reveals that learning goal orientation positively and significantly moderates the relationship between feedback and team member adaptivity ($\beta = .19, p < .05$).

These findings are supported by the slope test which reveals that the effects of feedback on team member adaptivity are stronger for individuals with higher levels of learning goal orientation. As reported in Table 6.18, at average levels of learning goal orientation the effects of feedback on team member adaptivity are $\beta = .21, p < .01$; whilst at relatively high levels of learning goal orientation the effects of feedback on team member adaptivity increase to $\beta = .31, p < .01$.

Table 6.17: Hierarchical regression of team member adaptivity onto feedback, learning goal orientation and the interaction between the two

	Model (1) Control variables	Model (2) Control variables and main effects	Model (3) Control variables, main effects and interaction
Tenure	-.01	.07	.12
Level	-.04	-.06	-.07
Age	.03	-.01	-.04
Feedback		.27**	.21**
LGO		.16*	.22*
Feedback x LGO			.19*
R²	.00	.11	.13
ΔR^2	.00	.11**	.02*

N= 180 ; * p< .05 ** p< .01

Table 6.18: Conditional effect of feedback on team member adaptivity at values of learning goal orientation

	LGO	Effect	se	t	p
1 SD below the M	-.49	.12	.07	1.53	.12
M level	.00	.21	.06	3.59	.00
1 SD above the M	.49	.31	.07	4.13	.00

Task autonomy

Surprisingly, learning goal orientation was found to negatively interact with task autonomy on individual task proficiency, team member proficiency and organisation member adaptivity. As for the former (Table 6.19), Model 1 reveals that the control variables are not significant predictors. Based on Model 2, learning goal orientation is positively and significantly associated with the criterion ($\beta = .27$, $p < .01$) whilst autonomy is non-significant. Model 3 reveals that learning goal orientation negatively and significantly moderates the relationship between autonomy and individual task proficiency ($\beta = -.33$, $p < .05$). When probing the interaction (Table 6.20), the slope test indicates that the effect of autonomy on individual task proficiency is positive and significant only at low levels of learning goal orientation ($\beta = .25$, $p < .05$), whilst at average and high levels is non-significant and potentially negative.

Similarly, when considering team member proficiency, Model 2 reveals that only learning goal orientation is positively and significantly associated with the criterion ($\beta = .20$, $p < .01$) whilst autonomy is non-significant. Based on Model 3, learning goal orientation negatively and significantly moderates the relationship between autonomy and team member proficiency ($\beta = -.31$, $p < .05$). As confirmed in the slope test (Table 6.21), the effects of autonomy on team member proficiency are positive and significant only at low levels of learning goal orientation ($\beta = .28$, $p < .01$), whilst at average and high level the association is not significant and potentially negative.

Ultimately, organisation member adaptivity presents similar results. Based on Model 1, the controls are not significant predictors. Model 2 reveals that only learning goal orientation is positively and significantly associated with organisation member adaptivity ($\beta = .23$, $p < .01$). Based on Model 3, learning goal orientation negatively and significantly moderates the relationship between autonomy and organisation member adaptivity ($\beta = -.39$, $p < .05$). The slope test (Table 6.22) indicates that autonomy is positively and significantly associated with organisation member adaptivity at average ($\beta = .22$, $p < .05$) and low levels of learning goal orientation ($\beta = .42$, $p < .01$), whilst at high levels is non-significant.

Overall, the findings suggest that task autonomy is significant in predicting individual task proficiency, team member proficiency and organisation member adaptivity only when learning goal orientation is low. Accordingly, low learning-oriented apprentices appear to benefit from task autonomy, whilst for high learning-oriented apprentices the effects of task autonomy are non-significant and potentially negative.

Table 6.19: Summary of hierarchical regression of individual task proficiency; team member proficiency and organisation member adaptivity onto task autonomy, learning goal orientation and the interaction between the two.

	Individual Task Proficiency			Team Member Proficiency			Organisation Member Adaptivity		
	Model (1) Control variables	Model (2) Control variables and main effects	Model (3) Control variables, main effects and interaction	Model (1) Control variables	Model (2) Control variables and main effects	Model (3) Control variables, main effects and interaction	Model (1) Control variables	Model (2) Control variables and main effects	Model (3) Control variables, main effects and interaction
Tenure Level	.01	.02	.04	.11	.11	.19	-.03	-.03	-.06
Age	-.05	-.06	-.10	.08	.08	.10	-.04	-.05	-.09
	.02	-.00	.03	-.13	-.16	-.21	-.09	-.13	-.14
Autonomy LGO		.05 .27**	.08 .33**		.09 .20**	.12 .27**		.13 .23**	.22** .30**
Autonomy x LGO			-.33*			-.31*			-.39*
R²	.00	.08	.13	.01	.07	.11	.01	.10	.13
ΔR²	.00	.08**	.02*	.01	.05**	.02*	.01	.09**	.02*
N		187			188			176	

* p< .05 ** p< .01

Table 6.20: Conditional effect of task autonomy on individual task proficiency at values of learning goal orientation

	LGO	Effect	se	t	p
1 SD below the M	-.51	.25	.11	2.31	.02
M level	.00	.08	.06	1.24	.21
1 SD above the M	.51	-.08	.09	-.90	.36

Note: variables are mean-centred

Table 6.21: Conditional effect of task autonomy on team member proficiency at values of learning goal orientation

	LGO	Effect	se	t	p
1 SD below the M	-.51	.28	.11	2.36	.01
M level	.00	.12	.07	1.63	.10
1 SD above the M	.51	-.03	.09	-.39	.69

Note: variables are mean-centred

Table 6.22: Conditional effect of task autonomy on organisation member adaptivity at values of learning goal orientation

	LGO	Effect	se	t	p
1 SD below the M	-.52	.42	.13	3.13	.00
M level	.00	.22	.08	2.60	.00
1 SD above the M	.52	.01	.11	.12	.89

Note: variables are mean-centred

Task interdependence

Learning goal orientation was found to positively and significantly moderate the effects of task interdependence on a range of emergent performance behaviours.

As reported in Table 6.23, when considering individual task proactivity based on Model 1, the control variables are not significant predictors. Model 2 indicates that task interdependence is not significantly associated with the criterion whilst learning goal orientation presents a positive and significant association with individual task proactivity ($\beta = .25, p < .01$). Model 3 reveals that learning goal orientation positively and significantly moderates the relationship between task interdependence and proactivity in conducting ones job.

Specifically, when probing the interaction (Table 6.24), the effects of task interdependence on individual task proactivity are significant only for individuals with relatively high levels of learning goal orientation ($\beta = .44, p < .01$), whilst for individuals with average or low levels of learning orientation the effects of task interdependence are not significant. The findings suggest that the effects of task interdependence on individual task proactivity are contingent upon high levels of learning goal orientation.

Similar results were found for the outcome of organisation member proactivity. As reported in Table 6.23, Model 2 reveals that only learning goal orientation is significantly associated with organisation member proactivity ($\beta = .30, p < .01$) whilst task interdependence is not significant. Model 3 indicates that learning goal orientation positively and significantly moderates the relationship between task interdependence and organisation member proactivity ($\beta = .56, p < .05$). Correspondingly, the slope test (Table 6.27) shows that task interdependence is positively and significantly associated with organisation member proactivity only for individuals displaying relatively high levels of learning goal orientation ($\beta = .43, p < .01$).

When considering adaptive performance behaviours, learning goal orientation is found to moderate the effects of task interdependence on both team member and organisation member adaptivity. With regards to the former, based on Model 2 both task interdependence ($\beta = .30, p < .01$) and learning goal orientation ($\beta = .17, p < .05$) are positively and significantly associated with team member adaptivity. Model 3 reveals that learning goal orientation positively and significantly moderates the relationship between task interdependence and the criterion ($\beta = .34, p < .05$). As indicated by the slope test (Table 6.25), the effects of task

interdependence on team member adaptivity are stronger for individuals with higher levels of learning goal orientation ($\beta = .44, p < .01$).

Equally when considering organisation member adaptivity, Model 2 reveals that only learning goal orientation is positively and significantly associated with the criterion ($\beta = .24, p < .01$) whilst task interdependence is non-significant. Model 3 indicates that learning goal orientation positively and significantly moderates the relationship between task interdependence and organisation member adaptivity ($\beta = .28, p < .05$). The slope test reported in Table 6.26 indicates that the association between task interdependence and organisation member adaptivity is positive and significant at average ($\beta = .16, p < .05$) and relatively high ($\beta = .31, p < .01$) levels of learning goal orientation, but not at relatively low levels. This reveals that apprentices with higher levels of learning goal orientation gain more from task interdependence in terms of resultant performance than those with lower levels of learning orientation.

Table 6.23: Summary of hierarchical regression of individual task proactivity; team member adaptivity, organisation member adaptivity and organisation member proactivity onto task interdependence, learning goal orientation and the interaction between the two.

	Individual Task Proactivity			Team member adaptivity			Organisation member adaptivity			Organisation member proactivity		
	Model (1) Control Variables	Model (2) Control variables and main effects	Model (3) Control variables, main effects and interaction	Model (1) Control Variables	Model (2) Control variables and main effects	Model (3) Control variables, main effects and interaction	Model (1) Control Variables	Model (2) Control variables and main effects	Model (3) Control variables, main effects and interaction	Model (1) Control Variables	Model (2) Control variables and main effects	Model (3) Control variables, main effects and interaction
Tenure Level	.08	.06	.15	-.01	-.09	-.17	-.03	-.05	-.08	.09	.09	.26
Age	.12	.11	.18	-.04	-.08	-.12	-.04	-.06	-.12	-.03	-.04	-.12
	-.04	-.09	-.19	.03	-.04	-.07	-.09	-.14	-.26	-.06	-.11	-.32
Task interdependence LGO		.13	.10		.30**	.27**		.15	.16*		.09	.14
		.25**	.54**		.17*	.21*		.24**	.33**		.30**	.74**
Task interdependence x LGO			.65**			.34*			.28*			.56*
R²	.01	.10	.15	.00	.12	.16	.01	.10	.14	.01	.12	.16
ΔR²	.01	.08**	.05**	.00	.12**	.03*	.01	.08**	.03*	.01	.11**	.03*
N		179			175			172			172	

* p< .05 ** p< .01

Table 6.24: Conditional effect of task interdependence on individual task proactivity at values of learning goal orientation

	LGO	Effect	se	t	p
1 SD below the M	-.51	-.23	.15	-1.46	.14
M level	.00	.10	.11	.92	.35
1 SD above the M	.51	.44	.14	3.10	.00

Note: variables are mean-centred

Table 6.25: Conditional effect of task interdependence on team member adaptivity at values of learning goal orientation

	LGO	Effect	se	t	p
1 SD below the M	-.49	.10	.10	1.02	.30
M level	.00	.27	.07	3.70	.00
1 SD above the M	.49	.44	.09	4.73	.00

Note: variables are mean-centred

Table 6.26: Conditional effect of task interdependence on organisation member adaptivity at values of learning goal orientation

	LGO	Effect	se	t	p
1 SD below the M	-.52	.01	.11	.15	.87
M level	.00	.16	.07	2.05	.04
1 SD above the M	.52	.31	.10	3.04	.00

Note: variables are mean-centred

Table 6.27: Conditional effect of task interdependence on organisation member proactivity at values of learning goal orientation

	LGO	Effect	se	t	p
1 SD below the M	-.51	-.14	.18	-.78	.43
M level	.00	.14	.13	1.10	.27
1 SD above the M	.51	.43	.16	2.57	.01

Note: variables are mean-centred

Summary of results

Overall the results present partial support for Hypothesis 5. Although learning goal orientation was expected to enhance the relationship between informal learning and apprentices' performance outcomes, no moderation was detected when informal learning was considered as composite measure.

When considering the informal learning variables individually, learning goal orientation emerges as critical personal factor affecting the instrumentality of social support, feedback and task interdependence for competence development. The former are work environment factors influenced by learning goal orientation in relation to the ability to adapt to changes affecting ones role as team member. The latter is a task factor particularly sensitive to learning goal orientation in relation to behaviours of adaptivity and proactivity at all considered levels of contribution.

The negative interaction between learning goal orientation and task autonomy suggest that contrary to expectations, providing autonomy to learning-oriented individuals may nullify the effects of their motivational disposition towards learning on resultant performance. Conversely, low learning-oriented individuals appear to benefit from the provision of autonomy to enhance performance.

The results generally reveal positive relationships for apprentices with high learning goal orientation validating the importance of nurturing this personal factor to maximise the impact of informal learning on resultant performance.

6.6 Chapter summary and conclusion

This chapter has considered the influence of important boundary conditions on the apprenticeship development model presenting a nuanced understanding on factors affecting competence development. At contextual level, Hypothesis 3 considered the role of the HRM system strength as determinant of a positive employment relationship, and Hypothesis 4 examined PA as facilitator of informal learning. At individual level Hypothesis 5 considered the role of learning goal orientation as apprentices' favourable disposition towards learning.

Whilst it was hypothesised that under these conditions the impact of the apprenticeship training on apprentices' end-state competencies would be stronger, the results present mixed evidence. The HRM system strength did not moderate the relationship as expected and in contrast was found to contend with informal learning factors on particular outcomes. On the other hand, PA satisfaction was identified as important determinant of apprentices' responses to feedback and problem solving, revealing that the effects of these informal learning factors on apprentices' resultant performance are stronger when PA satisfaction is high.

Additionally, learning goal orientation was found to strengthen the association of informal learning factors with apprentices' performance behaviours and to significantly predict apprentices' job competence and work and business skills.

Although not all in the expected direction, the results present strong insight into the influence of particular boundary conditions on apprentices' competence development shedding light on the role of HR practices in apprenticeship and on the impact of learning goal orientation on particular informal learning factors. Implications for theory and practice are discussed in the following chapter.

Chapter 7: Discussion

7.1 Introduction

This study was driven by the fact that in spite of extensive investments in apprenticeships both on an international scale (Fuller and Unwin, 2011; Sappa et al., 2016) and locally in England (Lee, 2012; Rowe et al., 2017; Saraswat, 2016), knowledge on the factors enhancing apprentices' professional development is still limited (Gambin and Hogarth, 2015; Moon, 2018). Organisations investing in apprenticeships as strategy for talent development need to better understand how to support apprentices' competence development considering the learning potential of the work environment. Accordingly, this study aims to understand how apprentices' competence development can be supported turning the spotlight onto the work environment. Considering apprenticeships as models of learning rather than instruments of Government policy (Lewis, 2014), this study sought to achieve two main objectives: firstly, to develop and empirically test an apprenticeship development model that relates formal and informal learning factors to apprentices' resultant competencies; secondly, to investigate whether important boundary conditions at contextual and individual level influence professional development.

The hypothesised relationships were tested with empirical data from 233 apprentices operating in two large engineering organisations in England collected at two points in time. The results suggest that the work environment is an important determinant of professional development and identify specific factors related to apprentices' end-state competencies. Additionally, the results evidence that contextual factors such as HR practices and individual factors such as learning goal orientation influence how apprentices respond to the learning opportunities provided by the immediate work environment with consequences for resultant performance. This chapter discussed theoretical, practical and policy implications arising from this study, drawing attention to its limitations and suggesting directions for future research. Lastly, the chapter presents an overall conclusion evaluating the study.

7.2 Theoretical implications

Overall, introducing an organisational perspective to the study of apprenticeship this research turns the focus to the work environment and presents three important implications for the apprenticeship literature. First, adopting an integrative approach accounting for the formal and informal learning processes contributing to apprentices' professional development, this study provides a comprehensive theoretically derived and empirically tested apprenticeship development model. As exemplified in Chapter 2, adopting a situated perspective on learning which assumes knowledge as socially distributed among actors, tools and the structure of work (Lave and Wenger, 1991; Nielsen and Pedersen, 2011), this study turns the focus to the work environment as determinant of professional development. In accordance with the conceptualisation of apprenticeships as paid jobs incorporating training on- and off-the-job (House of Commons Library, 2016), the study focuses on theories of training transfer (Baldwin and Ford, 1998; Baldwin, Ford, Blume, 2017) and theories of workplace learning (Cerasoli et al., 2018; Eraut, 2007; Skule, 2004) to discern pertinent training intervention and work environment factors contributing to apprentices' professional development. In so doing, the study identifies critical factors supporting apprentices to learn the knowledge and skills required for effectiveness.

Secondly, following the apprenticeship statutory requirements (SASE, 2017) this study advances a categorisation of apprentices' competencies encompassing job competence, technical knowledge and work and business skills. Whilst effective performance requires the integration of such interrelated components (Le Deist and Winterton, 2005), a multidimensional representation allows investigating the association between particular formal and informal learning factors and specific resultant competencies. Table 7.1 presents an overview of the apprenticeship formal and informal learning factors and the associated competencies. Accordingly, in testing the association of specific formal and informal learning factors with apprentices' competencies as outcome of interest, this study extends research that previously considered only learning as outcome of interest (i.e. Messman and Mulder, 2015; Raemdonck et al., 2014). In so doing, the study adds knowledge to the apprenticeship domain which scarcely investigated the relationship between learning conditions and learning outcomes intended as changes in competencies. Given that different learning conditions may be related to different learning outcomes, insights into this relation are valuable in identifying the formal and informal learning factors that are most important for apprentices' professional development (Clarke, 2005; Janseens et al., 2017).

Table 7.1: The association between formal and informal learning factors and resultant competencies

	Technical knowledge	Job competence	Team working	Effective participation	Self-management	Creative thinking
Formal learning						
Transfer design	•					
Supervisor support	•					
Opportunity to use	•					
Informal learning						
Social support		•	•	•	•	
Feedback from colleagues and supervisors		•		•	•	•
Problem solving					•	•
Task autonomy					•	•
Task interdependence		•	•		•	

Thirdly, in accounting for contextual factors such as the HRM system (Bowen and Ostroff, 2004; Kuvaas, 2008; Lepak and Snell, 1999) and individual differences such as learning goal orientation (Dweck and Leggett, 1988) this study identifies important boundary conditions that influence apprentices' competence development. In considering the former, this study extends knowledge on apprenticeship presenting much needed insight on the influence of HRM lacking in prior research. Whilst commentators have discussed the potential influence of HR practices on the success of apprenticeships (Hogarth, Gambin and Hasluck, 2012b; Lewis, 2014), this relationship has been mainly assumed rather than tested.

Building on research which found HRM effectiveness to be contingent on the nature of specific employment groups (Kinnie et al., 2005; Liao et al., 2009), this study identifies the high-commitment HRM system as the strategy for managing the employment relationship with apprentices as high value employees (Lepak and Snell, 1999; 2002). In testing the influence of the HRM system strength (Bowen and Ostroff, 2004) and PA (Kuvaas, 2006) on apprentices' competence development, this study provides empirical support for the notion that the employment relationship as portrayed by HR practices influences the success of the programme (i.e. Kuvaas, 2008).

Added to this, in including individual differences as important boundary conditions this study addresses the limitations of prior research that only considered contextual factors as determinants of learning (i.e. Messman and Mulder, 2015). In so doing, it answers calls for professional development research integrating the learner and the context as inextricably interrelated factors (Webster-Wright, 2009). Accounting for the construct of learning goal orientation this study identifies an important personal factor explaining variation into how apprentices respond to critical informal learning factors.

In particular, in finding PA satisfaction and learning goal orientation to foster apprentices' engagement with informal learning, this research lends support to an interactionist approach to the study of informal learning. As discussed by Jeong and colleagues (2018), the relationships between informal learning factors and engagement in informal learning behaviours are complex and interrelated. Accordingly, the scholars advocate a multi-level examination of the individual, group and environmental factors influencing engagement in informal learning. The joint-effects of PA (at organisational level) and learning goal orientation (at individual level) with critical informal learning factors identified in this study provide novel insight into meaningful cross-level interactions. The result is a nuanced

understanding of how best to facilitate informal learning and support apprentices' professional development in the workplace.

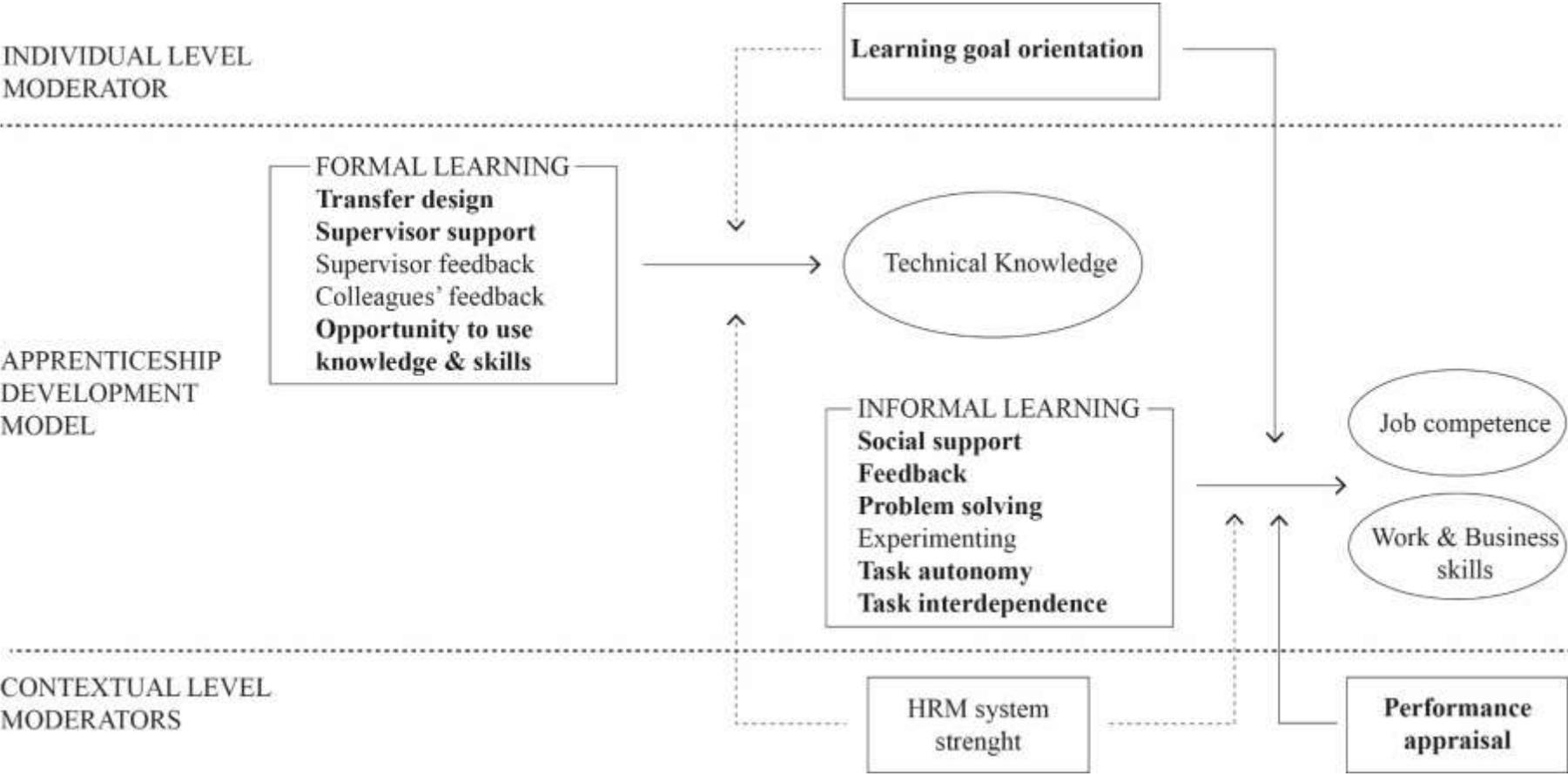
Overall, this research reveals critical formal and informal learning factors contributing to the developmental quality of apprenticeships and identifies contextual and individual boundary conditions influencing apprentices' responses to the learning opportunities provided in the workplace.

In sum, when considering formal learning in apprenticeship, three factors have emerged as pivotal for supporting apprentices in transferring and applying the technical knowledge acquired at college and University to the workplace: transfer design, supervisor support and opportunity to use knowledge and skills. When considering informal learning, the work environment factors of social support, feedback, problem solving, task autonomy and task interdependence are critical in fostering apprentices' job competence and work and business skills.

At individual level, the results of the study reveal that learning goal orientation is a critical personal factor affecting the instrumentality of informal learning, fostering apprentices' professional development in the workplace. At contextual level, while the HRM system strength did not influence apprentices' responses to formal and informal learning factors, PA emerged as important HR practice facilitating apprentices' engagement with informal learning.

Fig. 7.1 presents an overview of the results of the study integrated in a revised theoretical framework, followed by a detailed discussion of the findings.

Fig. 7.1 Revised theoretical framework of the study



Note: Solid lines represent significant relationships between constructs ($p < .05$). Dotted lines represent non-significant relationships. The significant constructs in the study are presented in bold.

7.2.1 Formal learning in apprenticeship

The results of this study reveal the training intervention and work environment factors that contribute to apprentices transferring and applying the technical and theoretical knowledge acquired at college and University in the workplace. This is an important consideration given that learning at college and University is not enough to render the apprenticeship effective, but needs to be transferred and applied to the workplace resulting in improved performance.

In exploring the factors promoting transfer of learning across education and work this research identifies the mechanisms required in order to foster the link between vocational and higher education and develop higher skills levels necessary for future economic prosperity (Lee, 2012). As reported by Brown (2009), engaging with a substantive knowledge base is crucial for developing higher levels of skills, however the transfer of knowledge between contexts is problematic. This study thus presents compelling evidence on the factors that help apprentices to transfer knowledge and skills to the workplace improving performance, and in turning the focus onto the work environment identifies crucial actors (i.e. supervisor and colleagues) who play a critical role in supporting this process. In so doing, the study contributes to growing research on the relationship between school and work in VET (Pineda-Herrero et al., 2015; Mulder, Messman and Konig, 2015; Renta Davids et al., 2017), providing additional evidence to the view that learning across sites needs to be purposely connected and integrated in order to contribute to the development of valuable knowledge (Sappa, Choy and Aprea, 2016). Added to this, considering the training intervention factor of transfer design, the study responds to recent calls for research investigating instructional methods that explicitly aim at transfer rather than learning as outcome of interest (Baldwin, Ford and Blume, 2017).

Training intervention: transfer design

In particular, the results of this study point to the importance of the training intervention factor of transfer design (Holton et al., 2000) for the development and application of a strong knowledge base. With transfer design accounting for most variance in training transfer, this study supports the notion that the way formal training is designed and delivered is critical for securing positive results in apprenticeships. This indicates that training should not only deliver the knowledge and skills underpinning the occupation, but should also foster the understanding of how that knowledge relates to practice (Laker, 1990; Velada et al., 2007). In finding transfer design in positive association with training transfer, this study presents evidence of the importance of providing training content aligned with the job, and of

providing apprentices with an understanding through examples and exercises of how knowledge and skills are implemented in the workplace.

This finding is in line with previous research on training transfer (i.e. Velada et al., 2007) and can be explained considering the impact of transfer design on self-efficacy. In finding a direct relationship between transfer design and trainees' self-efficacy, Diamantidis and Chatzoglou (2014) suggest that when training is designed to reflect job requirements and to guide trainees in the application of knowledge and skills in the workplace, trainees' self-confidence is sustained in turn resulting in higher knowledge transfer to the job.

Additionally, this finding supports and extends research on apprenticeships that found the integration of work-oriented learning at school in positive association with apprentices engaging in learning activities at work. Specifically, the study conducted by Messman and Mulder (2015) found that when organisational case studies were integrated as examples in formal learning at school along with elucidations on how the learning content can be applied to accomplish work tasks, apprentices would approach challenging tasks with enquiring, thus engage in further learning. Evidence of this process is reflected in the positive correlations between transfer design and both colleagues' and supervisor's feedback, indicating that learning relevant and applicable knowledge at college or University encourages apprentices to request feedback in the workplace. Although this research considers only direct effects and does not investigate possible intervening mechanisms such as increased self-efficacy and further engagement in workplace learning, in finding a positive association between transfer design and training transfer this study demonstrates that an alignment between school and work in apprenticeship fosters apprentices' application of knowledge and skills in the workplace resulting in increased performance.

Work environment post-training

Turning the focus onto the work environment is imperative because even well designed and delivered training programmes will not produce positive results if the work environment post-training does not support the transfer of knowledge and skills (Grossman and Salas, 2011). Extant research has investigated the work environment as either an aggregate construct or considering variables independently in order to capture the different effects that each variable may exert on transfer (Burke and Hutchins, 2007). In line with the latter conceptualisation, this study hypothesised that supervisor support, the availability of feedback from both colleagues and supervisors, and the opportunity to apply the knowledge

and skills acquired in training in the workplace would support apprentices in transferring knowledge and skills to the workplace resulting in increased performance.

Supervisor support

Among the work environment factors, supervisor support emerged as significant predictor of training transfer suggesting that the supervisor plays an influential role in facilitating apprentices in transferring the knowledge and skills acquired at college and University to the workplace. Consistent with prior research (Bates et al., 2000; Cromwell and Kolb, 2004; Lim and Johnson, 2002; Van den Bossche et al., 2010), supervisors are a proximal source of support that positively affect training transfer. Extant research has explored both the direct effects of supervisor support on transfer (Bates et al., 2000) and the indirect effects via the influence of supervisor support on trainees' self-efficacy, learning goal orientation and motivation to transfer (Chiaburu, Van Dam and Hutchins, 2010; Fecteau et al., 1995). Contrary to studies which did not find a significant relationship between supervisor support and training transfer (Awoniyi et al., 2002; Chiaburu and Marinova, 2005), this study provides evidence of a direct and positive effect drawing attention to the role of the supervisor in the context of apprenticeships.

Specifically, given that the construct of supervisor support has been operationalised differently in transfer research (Burke and Hutchins, 2007; Govaerts and Dochy, 2014), this study measured particular behaviours that yield positive transfer results. The dominant conceptualisation of supervisor support in transfer research encompasses behaviours that reinforce the use of learning on the job (Holton et al., 2000), however without specifying when such supportive behaviours should occur (Govaerts and Dochy, 2014). In line with Chiaburu and Marinova (2005), supervisor support is here operationalised encompassing a general view of employee development as part of a supervisor managerial role along with specific behaviours such as providing trainees with reminders and time for practice. Accordingly, this study evidences that apprentices benefit from both immediate supervisor support for and reinforcement of training on the job (Holton et al., 2000) and from general supervisor support for career development (Yarnall, 1998). An important implication is that supervisors need to have key competencies for supporting apprentices' development in order to maximise training transfer. Among these, supervisors need to show attitudes and behaviours as coaching apprentices in their general development; providing feedback on general performance; along with opportunities to practice and apply the newly learned knowledge in the job (Govaerts and Dochy, 2014).

Whilst the latter behaviours refer to the post-training time period, those related to career development are important throughout the apprenticeship, presenting further evidence on the notion that supervisors influence transfer before, during and after the training programme (Grossman and Salas, 2011). The negative correlation between supervisor support and tenure is therefore alerting suggesting that apprentices who have been employed for more than one year experience lower levels of supervisor support, with potential implications for training transfer. As evidenced by the negative correlation between tenure and training transfer, the application of knowledge and skills acquired in formal training to the workplace declines over time, drawing attention to the role of the supervisor for maintaining knowledge and skills over time (Ford and Weissbein, 1997).

Feedback from colleagues and supervisors

In addition to supervisor support, this study examined the influence of feedback as particular support-mechanism for training transfer. Whilst interpersonal support in the form of co-workers and supervisor support is generally viewed as important determinant of transfer (Bates et al., 2000), the influence of feedback in particular has been under-researched (Van den Bossche et al., 2010). In line with research conducted by Diamantidis and Chatzoglou (2014), this study explored whether the degree of feedback from peers and supervisors influenced apprentices' training transfer. The assumption is that apprentices engaging in discussions with peers and supervisors about the application of training on the job and receiving information and encouragement regarding the execution of tasks would positively sustain training transfer.

Surprisingly, this study found a non-significant relationship between both supervisor's and colleagues' feedback and training transfer, indicating that apprentices' application of the knowledge base in the workplace is not associated with job environment feedback. A possible explanation for the non-significant association between colleagues' feedback and transfer is that apprentices depend more on their supervisors for training outcomes than on support from colleagues. When considering the non-significant result of supervisor feedback, this should be viewed with caution given that supervisor support, encompassing also behaviours as the provision of feedback on performance (Chiaburu and Marinova, 2005; Yarnall, 1998), presents a positive association with training transfer.

Additionally, when considering the operationalisation of the constructs, feedback from the work environment is conceptualised as feedback *request* suggesting that trainees feel

comfortable in seeking information from colleagues and supervisors about their actual performance (Diamantidis and Chatzoglou, 2014). The study conducted by Diamantidis and Chatzoglou (2014) identified a strong relationship between trainees' self-efficacy and work environment feedback request, indicating that the proactive request of feedback may be dependent upon adequate levels of self-efficacy. Given that apprentices are emergent professionals, attention should be given to fostering a positive disposition towards feedback as supportive learning factor. Whilst in this study feedback has not emerged as salient work environment factor, the findings do not discard the importance of interpersonal support for training transfer (Grossman and Salas, 2011). Research indeed suggests that feedback from various sources on the application of newly acquired knowledge and skills in the workplace can help to close the gap between current and desired performance, validating the significance of this factor for training transfer (Sparr, Knipfer and Willems, 2017; Van den Bossche et al., 2010).

Opportunity to use knowledge and skills on-the-job

Finally, consistent with prior research (Lim and Johnson, 2002; Bates et al., 2000; Seyler et al., 1998), this study provides empirical support for the notion that opportunities to use the newly acquired knowledge and skills in the workplace enhance training transfer resulting in higher performance. Whilst extant research measured the construct of opportunity to use as in having resources, tools and information required to apply the training content along with being allowed to use the training on the job (Seyler et al., 1998), here opportunity to use is measured as in the actual application of training content on the job. Apprentices rated the incorporation of knowledge and skills in their daily work activities and the frequent application of these in their work. As discussed by Blume and colleagues (2010), using the knowledge and skills is a necessary, but not sufficient requirement for effective transfer given that the latter involves performance improvements.

In finding a positive association between the application of training content on the job and training transfer, this study provides further evidence on the fact that positive training outcomes (i.e. improved performance) are largely dependent on the application of training content on the job (Ballesteros-Rodriguez et al., 2012; Diamantidis and Chatzoglou, 2014). This is an important finding in the context of the apprenticeship in validating the effectiveness of investments in formal training for improved performance. In finding a positive association between the application of training content in the workplace and

apprentices' increased performance, this study draws attention to the work environment as catalyst for training transfer.

Notably, the positive correlation between the opportunity to use knowledge and skills acquired in formal training and supervisor support points to the crucial role of supervisors in sustaining training transfer. As reported by Clarke (2002) managers play an important role in modifying trainees' normal workload in order to enable the opportunity to apply the newly acquired knowledge and skills in the workplace. Added to this, the positive correlation between opportunity to use knowledge and skills in the workplace and transfer design indicates that a strong match between training content and the job role fosters the opportunity to apply the newly acquired competencies to the job (Lim and Johnson, 2002).

Training transfer over time

When considering the longitudinal examination of how formal training contributes to apprentices' development and application of the technical knowledge-base, the results of this study reflect the challenging nature of training transfer (Chiaburu et al., 2010). In line with extant research, the results of the T-test reveal that over the course of ten months the transfer of knowledge and skills to the workplace decreased significantly. This finding is consistent with a study conducted by Saks and Belcourt (see Zumrah and Boyle 2015 p. 237) where only 44 per cent of employees was using the knowledge acquired in training after a six months period, and only 34 per cent after a one year period. Similar findings were reported by Wexley and Latham (see Diamantidis and Chatzoglou 2014, p. 150) suggesting that as time passes trainees may be less motivated or less able to maintain and apply the knowledge acquired in formal training in their job (Velada et al., 2007). Relatedly, the significant decrease of supervisor support for career development and for training transfer over the course of ten months is alerting, suggesting that support mechanisms need to be retained in order to fully benefit from investments in training.

On the other hand, the decrease in training transfer over time is consistent with a large scale study conducted by Felstead and colleagues (2005) on a sample of 1943 employees based in the UK. The survey revealed that formal training courses and the related accreditations were rated as least helpful for improving work performance, in comparison with the informal learning arising from the workplace. As discussed by the scholars, this finding suggests that 'codified knowledge is at its most useful when gaining *initial* competence at work, but its potency declines as a means of *improving* performance' (Felstead et al, 2005, p. 368). When

applying this interpretation to the context of apprenticeships, the decrease in training transfer may suggest that the technical knowledge base is most valuable for the first stages of the apprenticeship when apprentices refer to the knowledge acquired at college and University as platform for performing in the workplace. Conversely, as apprentices progress through the programme the application of the knowledge-based acquired in formal training becomes less relevant for performance effectiveness.

Additionally, the lack of correlation between training transfer measured at Time 2 and the considered predictors (transfer design; supervisor support; supervisor feedback; colleagues' feedback; opportunity to use) measured at Time 1 is consistent with meta-analysis results reported by Blume, Ford, Baldwin and Huang (2010). In investigating whether the time between the end of training and the timing of the transfer measure affects the relationship between the predictors and the criterion, the scholars found a significant negative moderation, revealing that as the amount of time increases, the strength of the relationship between post-training knowledge and post-training self-efficacy with transfer decreases (Blume et al., 2010). Whilst the meta-analysis did not find the relationship between work environment factors and training transfer to be conditional upon time measurement, overall the results suggest that when transfer is measured immediately after the training the relationships with the predictors are stronger than when a time lag is introduced (Blume et al., 2010). In light of this evidence and considering that the reduced sample size of the longitudinal sample (N= 90) may have affected the power for statistical inference tests (Hair et al., 2014), these non-significant results should be viewed with caution.

7.2.2 Informal learning in apprenticeship

In turning the focus onto informal learning as determinant of apprentices' job competence and work and business skills, this study draws on the assumption that learning is embedded in the processes, tasks and social relations of the workplace (Pirrioni, Shipton, Wu, 2016). This conceptualisation is aligned with an increasing scholarly focus on the workplace as resource for learning (Froehlich, Beausaert and Segers 2017) and with a growing field of research considering the triggers and antecedents of informal learning at work (Cerasoli et al., 2018; Jeong et al., 2018; Segers, Messman and Dochy, 2018). In turning the spotlight to the work environment, this study adds knowledge on the contextual factors fostering professional development building on studies that considered the influence of job characteristics on workplace learning (Gijbels et al., 2010; Raemdonck et al., 2014). In line with this strand of research, the developmental quality of the apprenticeship is

conceptualised as dependent on the configuration of the work environment in providing apprentices with an optimal balance of challenges, autonomy and support (Messman and Mulder, 2015). Accordingly, this research identifies specific factors contributing to creating positive learning experiences fostering apprentices' professional development.

Social support

Social support is here operationalised as in the degree to which the social environment provides apprentices with opportunities for advice and assistance. By demonstrating a positive relationship between social support and apprentices' job competence (task proficiency) and skills such as team working, effective participation and self-management, this study substantiates the importance of social relationships in the workplace (Brown, 2013; Eraut, 2007). In finding social support in association with competence development, this study complements results presented by Morgeson and Humphrey (2006) who identified social support in negative association with training requirements. As suggested by the scholars, the ability to rely on positive relationships in the workplace fosters workplace learning, lowering the requirements for formal training to improve employees' performance.

In particular, the influence of social support on the development of a wide range of competencies can be explained in light of the quality of human relationships in the workplace (Eraut, 2004). Attention, encouragement and advice from colleagues and supervisors are set to foster engagement in informal learning (Doornbos et al., 2004) resulting in competence development. This is reflected in the positive correlation between social support and both problem solving and experimenting, suggesting that helpful social relationships promote apprentices' perceptions of challenging and novel tasks as learning opportunities. Additionally, in line with extant research (Eraut, 2007) social support is important in nurturing a proactive learning orientation through its impact on confidence. It follows that when apprentices experience social support they feel confident in accessing a support network of experts and peers for seeking help, sharing knowledge and receiving feedback whilst doing their job.

Feedback

This study provides evidence that feedback from colleagues and supervisors contributes to apprentices' job competence (task proficiency) and skills such as effective participation, creative thinking and self-management. The positive association of feedback with the spectrum of end-state competencies is consistent with research that found feedback to

positively affect performance (Kluger and DeNisi, 1996). This finding supports the proposition that feedback from managers and colleagues stimulates workplace learning (Doornbos et al., 2004) and underlines the value of regular day-to-day feedback for emergent professionals (Eraut, 2007).

The association between feedback and the range of end-state competencies has at least two interpretations. Firstly, regular feedback from colleagues and supervisors consistently leads to reflection (Bednall et al., 2014), an important informal learning activity where individuals assess the effectiveness of their experience in order to improve performance (Van Woerkom and Croon, 2008). Secondly, regular feedback from colleagues and supervisors helps apprentices to cope with the challenges and the uncertainties faced as emergent professionals learning a trade (DeRue and Wellman, 2009). Feedback is therefore an important support mechanism in both enhancing engagement in informal learning activities (Mulder, 2013) and in sustaining apprentices' motivation to learn (Eraut, 2007).

Remarkably, whilst both social support and feedback are positively associated with job competence (task proficiency) and effective participation (organisation member proficiency), they differ in their association with skills of self-management and creative thinking. Specifically, the positive association of social support with individual task adaptivity and organisation member adaptivity indicates that positive social relationships in the work environment sustain apprentices' displaying self-management skills as in embracing change and positively responding to new priorities. Conversely, the positive association of feedback with individual task proactivity and team member proactivity suggest that the regular day-to-day feedback from colleagues and supervisors enhances apprentices' creative thinking, as in generating innovative ideas to improve effectiveness. The findings thus reveal that positive social relationships need to be complemented by regular feedback in order to foster the development of a spectrum of competencies required for apprentices' effectiveness.

Notably, the negative correlation between tenure and both social support and feedback reveals that as time passes, apprentices receive lower levels of support and regular feedback from colleagues and supervisors. This finding is in line with the negative correlation between tenure and supervisor support for formal training discussed above, and may indicate that having developed a certain level of proficiency, apprentices are less dependent on interpersonal support structures. Whilst on one hand this finding has a positive connotation

revealing that as apprentices develop into competent professionals they tend to rely less on the support network, on the other hand it may indicate that support structures lose traction over time with potential negative implications for professional development. In light of the positive correlation between feedback and both problem solving and experimenting it is important that support mechanisms remain in place over time to capitalise on the learning opportunities presented by challenging and novel tasks.

Problem solving

When considering the challenges presented by the work environment, problem solving was here regarded as important component of challenging work experiences that in presenting novel and complex situations activates a learning response (Doornbos et al., 2004; Messman and Mulder, 2015), resulting in the development of critical end-state competencies (Dragoni et al., 2009). Whilst problem solving did not emerge as significant in the cross-sectional analysis when considered along the other informal learning predictors, the longitudinal study reveals that problem solving is positively associated with work and business skills of self-management and creative thinking. As previously discussed, this finding may indicate that the effects of problem solving on the development of critical competencies become apparent over time (i.e. Birdi et al., 2008) validating the benefits of presenting apprentices with challenges in order to develop professionally.

This finding is indeed supported by the qualitative data revealing a clear link between challenging tasks and learning, and is consistent with studies exploring the influence of challenging job demands on employees' creativity. Specifically, Zhou, Hirst and Shipton (2012) identified problem-solving demand in positive association with employees' creative performance uncovering how the cognitive requirements of the job promote skill development and new solutions to problems. It follows that in experiencing novel and unexpected events apprentices undergo challenging situations that foster learning in the workplace (Doornbos et al., 2004). This in turn leads to the development of skills required to deal with the constant changes affecting the work contexts (van Rijn, Yang and Sanders, 2013) and to anticipate or initiate change to bring about performance improvements (Griffin, Neal and Parker, 2007).

Additionally, turning the focus on the direct effects of problem solving when considered along PA as predictors of work-role behaviours (Model 2), other positive associations have emerged. In particular, problem solving presents a positive association with work-role

behaviours of team member and organisation member proficiency, embodying team working and effective participation skills. These relationships can be interpreted through an indirect effect on apprentices' psychological state of perceived responsibility. As discussed by Pearce and Gregersen (1991), when individuals feel responsibility towards the organisation and their colleagues, they are more likely to engage in extra role behaviours as helping others. Whilst research has linked task autonomy and task interdependence with felt responsibility (Hackman & Oldham, 1975; Pearce and Gregersen, 1991), problem solving in requiring unique ideas and solutions to complex situations may also lead to felt responsibility for work outcomes.

Overall, this study identifies a job characteristic conducive to professional development that is more specific than the broad construct of challenging work (i.e. Messman and Mulder, 2015) and expands knowledge on the behaviours potentially stimulated by problem solving.

Experimenting

Based on experiential learning theory (Kolb, 1984), I predicated that experimenting as in trying things out and engaging in trial and error would be associated with the development of critical competencies. The assumption is that learning arises from experience in a cyclical process where the learner moves from a concrete experience to a stage of observation and reflection, followed by generalisation and abstract conceptualisation, leading onto active experimentation (Kolb, 1984). Contrary to expectations, the results of this study did not find experimenting in association with the investigated work-role behaviours, rejecting the hypothesised relationships. A possible explanation for this finding is that the reflection process standing at the basis of active experimentation requires a certain amount of built expertise on which to reflect before becoming effective. As reported by Cheetham and Chivers (2001), whilst reflection is a valuable process for ongoing professional performance, it appears less relevant for initial employee development. The scholars thus argue that the reflection process cannot be fully effective until emergent professionals have developed sufficient experience on which to reflect (Cheetham and Chivers, 2001). When applying this interpretation to apprentices, it is apparent that as emergent professionals learning a trade they may not benefit from active experimentation with working methods and techniques, but they may benefit from methods as observation, shadowing and working alongside others (Eraut, 2007) to develop initial competencies.

Task autonomy

An important work characteristic for professional development is that of task autonomy. Whilst originally widely examined in relation to motivational work design approaches (i.e. Hackman and Oldman, 1976), autonomy has recently been investigated as predictor of workplace learning (Cerasoli et al., 2018; Kwakman, 2003; Fealsted et al., 2005). In line with research conducted by Messman and Mulder (2015), this study predicated that granting apprentices with autonomy would contribute to perceptions of empowerment, counterbalancing the demands of challenging work situations (Karasek and Theorell, 1990). Additionally, granting apprentices with discretion in conducting their job would enable them to approach challenging work with the learning activities deemed appropriate, thus fostering engagement in workplace learning (Doornbos et al., 2004).

In testing the relationship between task autonomy and performance, this study identified a positive association between the former and work-role behaviours of adaptivity and proactivity, embodying skills of self-management and creative thinking. In particular, examination of the beta weights reveals that task autonomy is strongly related with proactivity, as in apprentices' self-directed behaviours aimed at initiating change to improve their individual work tasks and to enhance the functioning of the organisation. This finding is in line with studies which found autonomy in relation with role breadth as in the extent individuals integrate a variety of tasks in their focal role (Morgeson, Delaney-Klinger and Hemingway, 2005). As discussed by Morgeson and colleagues (2005) when granted autonomy, employees are given the discretion required to integrate a variety of job aspects in their job, enticing them to perform work tasks beyond formal job requirements. In line with this interpretation, when apprentices have discretion in performing their tasks, they are more likely to engage in emergent self-started and future-oriented behaviours to bring about performance improvements.

Additionally, autonomy is set to promote a sense of responsibility for work outcomes (Hackman and Oldman, 1976), in turn fostering apprentices' proactivity to initiate constructive change. The critical psychological state of felt responsibility has indeed been found in positive association with performance behaviours of taking charge (Morrison and Phelps, 1999), revealing that employees feeling responsibility tend to engage in constructive efforts aimed at improvement. These interpretations are reflected in the positive correlation between autonomy and problem solving, indicating that empowered apprentices are more likely to engage with challenging situations to generate performance improvements. In

finding task autonomy in positive association with work-role behaviours of proactivity, this study extends research on apprenticeship that identified autonomy as predictor of reflection as particular informal learning activity (Messman and Mulder, 2015), providing preliminary evidence of the influence of this task characteristic on specific performance outcomes.

Overall, the findings support the proposition that a work environment providing an optimal balance of challenges, autonomy and support enhances an active work orientation, fostering engagement in informal learning (Karasek and Theorell, 1990; Messman and Mulder, 2015). The positive correlations between support factors (social support and feedback), challenges (problem solving) and autonomy (task autonomy) demonstrate that when demanding work situations are counterbalanced by autonomy and support, constructive learning experiences arise. Additionally, the association of each factor with particular apprentices' end-state competencies presents a nuanced understanding of the relative contribution of the work environment factors to apprentices' professional development.

Task interdependence

Lastly, this study explored whether the interdependent nature of the job would influence apprentices' competence development resulting in increased performance. Task interdependence is a situational variable representing the 'connectedness' of jobs to each other (Morgeson and Humphrey, 2006), reflecting the extent to which performance of one depends on the successful performance on the other (Kiggundu, 1983). As such, task interdependence is a multidimensional construct encompassing a) initiated interdependence, as in the extent to which work flows from one job to other jobs; and b) received task interdependence, as in the extent to which a job is affected by work from other jobs (Kiggundu, 1983). As discussed by Van der Vegt, Emans and Van de Vliert (1998), interdependence among team members influences individuals' attitudes and responses presenting implications as motivational work factor.

In investigating the association between task interdependence and apprentices' work-role behaviours this study identifies a job characteristic conducive to apprentices' competence development and presents evidence on the fact that a challenging, empowering and supportive work environment (Karasek and Theorell, 1990; Messman and Mulder, 2015) does not uniquely explain professional development. In fact, adding task interdependence to the informal learning factors discussed above appears to result in an increase in the amount of explained variance in reported job competence, team member and self-management skills.

When considering the former, in finding a positive association between task interdependence and individual task proficiency embodying job competence, this study presents evidence on the fact that jobs entailing collaboration and interaction among team members facilitate competence development. Although the degree of task interdependence varies among jobs, within roles and tasks, as well as over time (Van der Vegt and Van de Vliert, 2005), it emerges as critical structural factor for facilitating informal learning. This finding is in line with those of Cheetham and Chivers (2001) who found team working and collaborations to benefit the learning of professionals, and those of Eraut (2007) reporting how nurses, engineers and accountants identified group working as crucial source of learning.

The finding can be explained considering task interdependence as structural factor that influences knowledge sharing in team settings, contributing to competence development. As discussed by Staples and Webster (2008), situations of high interdependence where team members rely on each other facilitate knowledge sharing enhancing learning processes. Knowledge sharing encompasses activities such as the exchange of ideas among colleagues, the discussion of problems and the request for advice (Bednall et al., 2014). Thus, when apprentices operate in interdependent systems, they benefit from interactions within their network and in being exposed to the sharing of tacit knowledge, gain competencies required for effectiveness.

Additionally, the association between task interdependence and team member behaviours of proficiency and adaptivity is in line with the conceptualisation of work-role performance advanced by Griffin, Neal and Parker (2007). As discussed by the scholars, interdependence is pervasive to organisations and in determining the extent to which work roles are embedded in social systems, it defines whether individuals need to support the broader social context of the organisation. With organisations increasingly adopting team-based structures (Han and Williams, 2008) this study demonstrates that emergent professionals can learn how to operate as effective team members early in their career.

The association between task interdependence and work role behaviours contributing to team effectiveness is in line with research that found task interdependence in positive relationship with helping behaviour in work teams (Van der Vegt and Van de Vliert, 2005). This finding can be explained considering that the interactive nature of work in interdependent contexts stimulates employees' experienced responsibility for others' team member outcomes (Kiggundu, 1983; Pearce and Gregersen, 1991). Correspondingly, when operating in

conditions of high interdependence apprentices internalise a sense of obligations towards colleagues and the team, and engage in behaviours contributing to the team effectiveness. Thus, an interpretation for this finding is that task interdependence influences apprentices' team work-role behaviours through its effects on the cognitive state of felt responsibility (Pearce and Gregersen, 1991).

In sum, this study presents preliminary evidence for the argument that structural features of the work environment such as task interdependence can support professional development. In so doing, this research extends scholarly knowledge on apprenticeships identifying task interdependence along with features promoting a challenging, empowering and supportive work environment as determinants of competence development. The positive association between informal learning factors and apprentices' performance is consistent with meta-analysis results demonstrating that informal learning behaviours explain a significant amount of variability in performance (Cerasoli et al., 2018), providing renewed evidence of the positive impact of informal learning for organisational effectiveness.

Apprentices' professional development over time

When considering the longitudinal examination of the informal learning factors, the results of the T-test indicate that the drivers of informal learning remain stable over time, contributing to a positive environment for apprentices' professional development. Notably, over the course of ten months apprentices report a significant increase in team member proactivity indicating that as they develop professionally, they engage more in self-initiated behaviours to bring about changes directed at improving the effectiveness of their team. This finding substantiates the relevance of regular day-to-day feedback from colleagues and supervisors for developing apprentices' creative thinking skills. Feedback has indeed emerged as significant factor in relation to apprentices' proactivity in both the cross-sectional and the longitudinal study, validating its importance in relation to professional development.

7.2.3 HRM system strength

Based on the HRM process approach (Bowen and Ostroff, 2004), I posited that the HRM system strength would intensify the relationship between the apprenticeship training, encompassing formal and informal learning, and resultant competencies. The non-significant results of this study are in contrast with prior research which found the HRM system strength to enhance the positive relationship between PA and participation in informal learning activities (Bednall et al., 2014) and between formal training and

subsequent participation in informal learning (Bednall and Sanders, 2016). As discussed in the previous chapter, the unanticipated results are however ascribed to the peculiarity of the sample under investigation and to the operationalisation of the HRM system strength construct.

In particular, when considering apprentices transferring the knowledge and skills acquired at college and University to the workplace, the HRM system strength does not appear to influence training transfer in isolation. Additionally, the HRM system strength does not appear to influence the relationship between formal training and training transfer, suggesting that the impact of formal training on apprentices' technical knowledge is independent of the HRM system. These findings are consistent with extant research on training transfer where job and career variables appear unrelated to the transfer process. Whilst some studies have found positive relationships between organisational commitment and training transfer (Kontoghiorghes, 2004), others have found non-significant relationships (Facteau et al., 1995). As reported by Cheng and Hampson (2008), no solid evidence exists to suggest that variables as job involvement and career commitment present a significant relationship with training transfer.

Additionally, the lack of influence of the HRM system strength on apprentices' transferring the technical knowledge to the workplace can be interpreted in light of the dual status of worker and learner (Fuller and Unwin, 2003b) whereby apprentices are an integral part of two communities such as the organisation and the educational institution. As indicated by the qualitative data, apprentices appear to rely on colleagues, peers and supervisors both at college and within the company as important sources of support, whilst the HRM system emerges as distant. Accordingly, given that apprentices determine to which social group they should refer, these referent others (i.e. peers, college instructors, workplace supervisors) rather than the HRM system appear to play a determinant role in the transfer process (Cheng and Hampson, 2008). As argued by Cheng and Hampson (2008), in order to enhance training transfer salient referent others should be identified. Applying the principle of subjective norm, Cheng, Sanders and Hampson (2015) argue that in order to be effective the factors enhancing the transfer behaviour need to be valued by trainees, suggesting that the effects of support factors are hindered when trainees do not hold them as relevant. Consistent with this interpretation, the non-significant effect of the HRM system strength can be explained in light of apprentices not perceiving HR as salient referent group. Accordingly, the HRM system may need to be formally introduced to apprentices in order to sustain a positive

relational employment relationship (Tsui et al., 1997) and enhance the effects of formal training on performance.

Similarly, the effects of informal learning on apprentices' work-role performance have emerged as independent of the HRM system strength. The latter influences only the relationship between social support and organisation member proficiency, however in the negative direction. The negative interaction between social support and HRM system strength suggests a compensation effect whereby social support contributes to organisation member proficiency when the HRM system strength is weak. This finding can be explained considering the peculiarity of the outcome in relation to HRM. As discussed by Griffin, Neal and Parker (2007), organisation member proficiency refers to behaviours that contribute to the organisational effectiveness including supporting and defending organisational objectives (Borman and Motowidlo, 1993) and promoting the organisational image (Podsakoff et al., 2000). It is a construct closely related to organisational loyalty (Podsakoff et al., 2000), strongly resembling HR-related outcomes as commitment and organisation citizenship behaviours (Katou et al., 2014; Nishii et al., 2008). Given that such attitudes and behaviours are generally influenced by the HRM system (Huselid, 1995; Nishii and Wright, 2008), the results of this study indicate that informal learning factors take prominence in situations of low HRM system strength compensating for low HR influence. This mechanism is aligned with the principles of substitutes for leadership theory (Kerr and Jermier, 1978; Podsakoff, MacKenzie and Bommer, 1996) in presenting a competing and complementing effect. According to the theory, a variety of situational variables related to the subordinate, the task and the organisation may substitute, neutralise or enhance the leaders' influence on employees' performance. As argued by the original contributors, in situations where these variables are scarce, leadership becomes important; conversely, in situations where these variables are present, leadership becomes irrelevant (Kerr and Jermier, 1978). Correspondingly, social support is a prominent factor in contributing to organisation member proficiency in situation of low HRM system strength, acting as substitute for HRM.

7.2.4 Performance appraisal satisfaction

Although the HRM system strength did not emerge as instrumental for the apprenticeship effectiveness, this study presents original insight in establishing the influence of HRM on apprentices' competence development by means of PA satisfaction. In so doing, this study provides empirical support for the notion that a positive employment relationship (Tsui et

al., 1997) as portrayed by the HR practice of PA strengthens the effects of informal learning on apprentices' competence development.

Observing the interaction between PA as a mechanism for developing and motivating employees and the considered work environment factors, this study reveals that apprentices experiencing PA satisfaction approach problem solving and feedback as learning opportunities. The findings support extant research on early career professionals which identified the significance of long-term strategic feedback on general progress (Eraut, 2007), explaining why this matter in relation to apprentices engaging with informal learning. This can be explained considering that apprentices experiencing developmental PA feel part of a relational employment relationship characterised by open-ended exchanges and long-term mutual investments (Lepak and Snell, 1999) in turn fostering their reciprocation by making greater use of informal learning opportunities.

This interpretation is aligned with the principles of social exchange (1964), where organisations' investments in employees' development in turn foster employees' reciprocation with positive attitudes and behaviours (Eisenberger et al., 1990; Setton et al., 1996). It follows that PA satisfaction engenders apprentices' in experiencing a feeling of organisational support contributing to a positive employment relationship (Kuvaas, 2008; Tsui et al., 1997). Consecutively, apprentices feel obliged to reciprocate the organisation for investing in their development by making greater use of the developmental opportunities provided by the immediate work environment. As revealed by this study, apprentices' experiencing PA satisfaction approach problem solving as mean for competence development and make greater use of the informal day-to-day feedback received from colleagues and supervisors.

Additionally, in uncovering a moderating effect of PA satisfaction on the relationships between both problem solving and feedback and apprentices' work-role behaviours contributing to the team and the organisational effectiveness, this study identifies PA as potential mechanism in converting individual learning to better functioning of the team and the organisation. This cross-transfer of benefits (Aguinis and Kraiger, 2009) can be explained considering that PA entails the communication of organisational strategies, goals and vision (Kuvaas, 2006). In so doing, PA has the potential to elucidate how the work of the individual is related to team and organisational goals (Kuvaas, 2011) and to uphold the identification of the individual with the organisation and the team (Levy and Williams,

2004). It follows that, given that performance is a cross-level construct in that individual performance influences team and organisational performance (Den Hartog, Boselie and Paauwe, 2004), PA fosters apprentices' understanding of the interdependency of their role within the organisation and so helps them to understand how their role supports the broader social context (Griffin, Neal and Parker, 2007). This finding is insightful in illustrating the influence of PA on contextual performance, as in behaviours that support the broader organisational, social and psychological environment (Borman and Motowidlo, 1993) and in so doing responds to previous calls for an investigation of the influence of PA on different types of performance (Kuvaas, 2006).

Overall, the findings underscore the importance of positive appraisal reactions (Kuvaas, 2006) and extend research by demonstrating that PA influences how employees respond to the learning potential of the work environment. In so doing, the findings provide novel insight into the many unanswered questions about the effectiveness of performance management (Schleichter et al., 2018). In particular, the findings complement research that found regular daily feedback from multiple sources to contribute to a positive relationship between PA reactions and performance (Kuvaas, 2011). More specifically, the positive interaction between PA and feedback is consistent with the argument that feedback needs to be provided regularly between PA activities (Kuvaas, Buch and Dysvik, 2017) and demonstrates how PA satisfaction fosters engagement with daily feedback and problem solving as learning opportunities. Additionally, identifying PA as the mechanism fostering contextual performance (Borman and Motowidlo, 1993), this research enhances the understanding of how individual learning results in better functioning of the team and the organisation (Aguinis and Kraiger, 2009) providing novel insight into the effectiveness of PA.

7.2.5 Learning goal orientation

Extant research has established that learning goal orientation is consistently associated with learning and performance (i.e. Kozlowski et al., 2001; VandeWalle et al., 1999). This study extends knowledge by empirically testing how the motivational trait of learning goal orientation interacts with work environment factors to influence apprentices' competence development and resultant performance. The results are insightful in revealing that learning goal orientation is particularly critical for emergent performance behaviours such as adaptivity and proactivity (Griffin, Neal and Parker, 2007) illustrating how apprentices with high learning goal orientation make greater use of social support, feedback from colleagues

and supervisors and task interdependence. The effects of these informal learning factors on apprentices' adaptivity and proactivity are indeed stronger when apprentices display high levels of learning goal orientation.

In uncovering the moderating role of learning goal orientation between work environment factors and emergent performance behaviours, this study explains why some apprentices are more likely to engage in work-role behaviours of adaptivity and proactivity than others are. Accordingly, learning goal orientation is a crucial individual dimension for engaging in emergent change-oriented behaviours critical for effectiveness (Griffin, Neal and Parker, 2007). As discussed by Griffin, Parker and Mason (2010), adaptivity and proactivity are emergent behaviours that differ between each other in relation to the locus of change. Whilst the former reflects a successful response to an externally initiated change, the latter reflects self-initiated efforts to change the self or the environment (Griffin, Parker and Mason, 2010). Given that both behaviours are initiated by the individual, rather than imposed or standardised (Griffin, Neal and Parker, 2007), learning goal orientation is critical to explain how these behaviours emerge.

Learning goal orientation and adaptivity

The effects of goal orientation on adaptive performance are well established (Baard et al., 2014; Pulakos et al., 2000; Pulakos et al., 2002). As discussed by Baard, Rench and Kozlowski (2014), learning goal orientation has emerged as salient individual difference that in affecting the self-regulatory mechanisms in the learning process contributes to adaptive performance. In particular, learning goal orientation has been found to hold important implications for both cognitive and affective self-regulatory processes such as self-evaluation activities (Kozlowski and Bell, 2006), feedback seeking (VandeWalle and Cummings, 1997) and emotional control (Porath and Bateman, 2006). Here, this study demonstrates how the motivational disposition of learning goal orientation interacts with work environment factors to enhance apprentices' adaptivity.

In finding the relationships between both social support and feedback from colleagues and supervisor with team member adaptivity influenced by learning goal orientation, this study illustrates how the effects of a supportive work environment on competence development may differ depending on individuals' goal orientation. Specifically, learning goal orientation is important for strengthening the effects of social support and regular day-to-day feedback from colleagues and supervisors on apprentices' self-management skills, as in the ability to

adapt to changes affecting their role as team members. This finding suggests that learning-oriented apprentices try to establish high quality exchanges with colleagues and supervisors and to take advantage of informal feedback in order to develop competence and skills.

In line with research conducted by Janssen and Van Yperen (2004) learning goal orientation shapes the way individuals interpret and react to the interpersonal context in achievement situations. Consistent with results presented by Janssen and Van Yperen (2004) where employees with stronger learning orientations were more effective on their job because they established high-quality exchanges with their supervisors, goal orientation here explains why apprentices engage differently with relevant social actors. Accordingly, given that learning oriented apprentices strive towards competence development, colleagues and supervisors are perceived as valuable sources of knowledge and expertise. Similarly, the moderating effect of learning goal orientation on the relationship between task interdependence and team member- and organisation member- adaptivity reveals how learning-oriented apprentices take greater advantage of this structural factor benefitting from knowledge sharing in interdependent systems (Runhaar et al., 2016; Staples and Webster, 2008).

The moderating effect of learning goal orientation on apprentices' adaptivity has at least two interpretations. Adaptivity represents how individuals cope with and support changes that affect the task or the work environment (Griffin, Neal and Parker, 2007) and in manifesting a response to an externally initiated change involves efforts to develop new competencies in order to successfully respond to the new situation (Shoss, Witt and Vera, 2012). Given that learning-oriented individuals hold an incremental view of their abilities, as malleable attribute that can be further developed through effort and experience (Dweck and Leggett, 1988), they are more adept at adaptivity as effort is perceived as the strategy required for task mastery (Bell and Kozlowski, 2002).

Secondly, research has established that learning goal orientation helps to increase or maintain self-efficacy (i.e. Bell and Kozlowski, 2002; Button et al., 1996; Ford et al., 1998) and is a motivational factor leading to persistence in face of difficulties (Dweck, 1986; Dweck and Leggett, 1988). In particular, self-efficacy is central to adaptability given that adaptable behaviours depend on having the confidence to perform such behaviours (Griffin and Hesketh, 2003) and has been found to predict performance adaptability emerging as important determinant of self-regulation when changes in task demands occur (Kozwloski

et al., 2001). Similar findings arose in the social domain, where scholars investigated the influence of learning goal orientation in situations of cross-cultural adjustment where new norms, skills and behaviours need to be learnt in order to function effectively. Gong and Fan (2006) present compelling evidence that learning goal orientation leads to the development and maintenance of self-efficacy during the cultural acquisition process, in turn leading to successful cultural adjustment.

When applying these interpretations to the context of apprenticeships, learning-oriented apprentices are adept at adaptivity because in perceiving effort as in the strategy required for task mastery, they draw on the support provided by their social network to develop their knowledge and skills. Additionally, learning-oriented apprentices hold high levels of self-efficacy, which enables them to remain focused and persevere when facing challenges in the competence acquisition process (Bandura, 1982; VandeWalle et al., 2001).

Learning goal orientation and proactivity

The moderating effect of learning goal orientation on the relationship between task interdependence and both individual task- and organisation member- proactivity, identifies the conditions under which informal learning drivers contribute to emergent performance behaviours embodying skills of creative thinking. The finding is consistent with research that found learning goal orientation in direct association with proactive behaviour (Belschak and Den Hartog, 2010; Parker and Collins 2010), innovative behaviour (Janssen and Van Yperen, 2004; Runhaar et al., 2016) and creativity (Hirst, Van Knippenberg and Zhou, 2009).

The moderating effects of learning goal orientation on apprentices' proactivity has several interpretations. Firstly, given that proactivity reflects self-initiated change to actively transform oneself or the environment (Griffin, Parker and Mason, 2010), learning goal orientation is critical in shaping apprentices self-regulatory proactive behaviours. As reported by Porath and Bateman (2006), learning orientation predicts proactive behaviour encompassing actions leading to constructive change rather than passive adaptation, resulting in higher job performance. Secondly, given that learning goal orientation is associated with a preference for challenging and demanding tasks leading to self-improvement (VandeWalle, 1997), learning-oriented individuals tend to view proactive behaviours as worthwhile developmental opportunities (Parker and Collins, 2010).

Similarly, learning-oriented individuals are more strongly motivated to pursue creative activities involving uncertainty and potential for failure (Hirst et al., 2009).

Consistent with research exploring the influence of goal orientation on the relationship between task conflict and creativity (De Clercq, Rahman and Belausteguigoitia, 2015), this study provides evidence that a strong learning orientation fosters the learning potential of interdependent systems resulting in proactive behaviours required for effectiveness. In particular, a learning orientation increases the person's ability to extricate knowledge from social exchanges typical of team working settings (Staples and Webster, 2008). It also fosters feedback seeking behaviours as a means to gather information and develop skills (Vandewalle and Cummings, 1997), sustaining apprentices in taking advantage of social interactions in interdependent systems.

Additionally, research presents compelling evidence that self-efficacy predicts proactive behaviours as taking charge (Morrison and Phelps, 1999). In particular, role-breadth self-efficacy defined as the individual beliefs in ones' abilities to carry out broader and more proactive roles (Parker, 1998) has been found to directly influence behaviours of taking charge (McAllister, Kamdar, Morrison and Turban, 2007). In a subsequent study, leader vision was associated with increases in proactivity over time when individuals displayed high role breadth self-efficacy illustrating how individuals with strong self-efficacy respond to the challenges presented by the leader by proactively taking charge (Griffin, Parker and Mason, 2010). Overall, self-efficacy has emerged as important determinant of proactive performance and can explain why learning-oriented apprentices tend to benefit from working in interdependent systems developing the competencies required to engage in proactive work-behaviours. In sum, these findings demonstrate that learning goal orientation is a motivational characteristic with significant implications for apprentices' competence development in informal and unstructured learning processes. Correspondingly, the findings suggest that the informal learning drivers of the work environment may not be universally beneficial for individuals in fostering the competencies required for engaging in proactive and adaptive work-role behaviours.

Learning goal orientation and task autonomy

Conversely, the negative interaction of learning goal orientation and task autonomy on individual task proficiency, team member proficiency and organisation member adaptivity was unexpected. The results suggest that although learning goal orientation is a significant

predictor of the considered performance outcomes, when interacting with task autonomy, its effects are nullified. This finding is consistent with the proposition that situational characteristics can restrict the expression of individual traits and limit their influence on performance. As argued by Meyer, Dalal and Hermida (2010), the simultaneous and interactive study of individual differences and situational characteristics enables to discern the conditions under which individual traits are important predictors of performance, providing evidence on the relative utility of various predictors.

Accordingly, in this study learning goal orientation emerges as significant predictor only when unrelated to task autonomy, suggesting that learning-oriented individuals do not benefit from autonomy for specific performance outcomes. In particular, the findings illustrate that task autonomy is positively and significantly related to performance (individual task- and team member-proficiency) only for individuals with low levels of learning goal orientation. On the contrary, for learning-oriented individuals the effects of task autonomy on proficient work-role behaviours are non-significant and potentially negative. Additionally, when considering the outcome of organisation member adaptivity, task autonomy has a significant effect only for individuals with average or low levels of learning goal orientation, and its effect increases for apprentices scoring low on the motivational trait of learning orientation. In general, the negative interaction suggest that providing autonomy to apprentices produces different results depending on their learning orientation. Specifically, apprentices displaying low levels of learning goal orientation appear to benefit from the provision of autonomy, whilst learning oriented apprentices do not appear to value task autonomy or perceive it negatively.

The positive association between task autonomy and work-role performance behaviours for low learning-oriented apprentices can be explained considering the influence of autonomy on self-efficacy (Bandura, 1982). The positive influence of autonomy on self-efficacy has been demonstrated by Wang and Netemeyer (2002) illustrating how providing employees with autonomy sends the message that the organisation has confidence in their abilities to carry out the job successfully in turn enhancing employees' self-confidence. Accordingly, presenting low learning-oriented apprentices with discretion and control in carrying out their jobs positively influences their efficacy judgements, with implications for performance outcomes. Additionally, given that in situations of high autonomy, positive work outcomes are dependent on individuals' efforts and initiatives (Hackman and Oldman, 1976),

providing low-learning oriented apprentices with autonomy is likely to entice them to exert efforts to achieve effective performance.

On the other hand, learning-oriented apprentices do not appear to benefit from autonomy as they are by disposition confident in their ability to expand their competencies through effort and experience (Dweck and Leggett, 1988). The nullified and potentially negative effect of task autonomy for learning-oriented apprentices can be interpreted in light of the attributions apprentices make concerning the use of such practice. Highly learning-oriented apprentices, striving towards developing knowledge and skills, may perceive the organisation efforts to provide them with autonomy as motivated by self-interest rather than concern for their development. Apprentices may thus perceive that the organisation provides them with autonomy in order to exploit them as in getting more out of them in terms of productivity. As demonstrated by Nishii and colleagues (2008), attributions that HR practices reflect management intentions to exploit employees, rather than investing in employees' development and wellbeing, are negatively related to employees' commitment and satisfaction. Accordingly, learning-oriented apprentices are likely to perceive high autonomy as a deterrent to their competence development, which in constraining them to secure productive results limits their learning processes. Overall, the findings suggest that when empowering apprentices, organisations need to consider their learning orientation as the effects of task autonomy vary among individuals depending on the motivational disposition.

Learning goal orientation and formal learning

Although learning goal orientation emerged as important personal factor in fostering professional development in the work environment, when considered in relation to formal training at college and University the results were non-significant. Learning goal orientation neither predicted transfer of knowledge and skills to the workplace in isolation, nor reinforced the effects of formal training on training transfer. The results suggest that learning goal orientation is a critical trait in unstructured situations where engagement in informal learning is dependent on individual initiative (Billett, 2001; Bednall et al., 2014), and is less relevant in highly structured settings such as formal training. Although this finding is in contrast with prior research which found learning goal orientation in positive relationship with training transfer (i.e. Chiaburu and Marinova, 2005), meta-analysis results presented by Blume and colleagues (2010) found learning goal orientation to present only small correlations (.14) with training transfer. Additionally, the scholars report how most studies

investigating learning goal orientation examined transfer in laboratory settings with little or no time lag between training and the transfer measurement yielding consistently stronger relationships than studies where a time lag was introduced (Blume et al., 2010). Overall, the motivational factor of learning goal orientation is a critical contingency associated with apprentices' benefitting from informal learning in the workplace, illustrating how apprentices' ability to learn from the experiences provided by the work environment may vary.

7.3 Practical implications

Implications for organisations

This study offers a number of practical implications for organisations investing in apprenticeship and for promoting employees' development more generally. First, management can foster the transfer of knowledge and skills acquired at college and University securing alignment between formal training and work. In this respect, the content of training should be inspired by the actual job description, reflecting current and prospective roles and responsibilities. As advocated by the Chartered Institute of Personnel and Development (2017) apprenticeships should be embedded in a workforce planning approach whereby the training is structured around the knowledge and skills required for the role profile envisioned for the apprentice. Additionally, training should present practical examples and exercises through case studies or consultancy projects facilitating apprentices' understanding of the application of technical knowledge in practice. In identifying transfer design as crucial for securing returns on investments, this study evidences that when selecting the training provider for delivering the apprenticeship technical knowledge, organisations should consider whether the training content is relevant for practice, and whether it includes activities and exercises supporting the transfer of training to the workplace.

Furthermore, having identified the role of the supervisor as critical for sustaining apprentices in transferring the knowledge acquired in formal training to the workplace, this study draws attention to the role of line managers. These are key figures that should be included in discussions related to the choice of training content and in setting out a plan for supporting apprentices in the transfer process. As reported by Grossman and Salas (2011), goal setting can significantly enhance transfer, enabling trainees to agree proximal and distal goals with

their supervisors and work towards these in a supportive environment. Notably, the goal setting process should involve both managers and apprentices, with the former establishing predetermined goals and the latter actively participating to the goal-setting process. As discussed by Gibb (2014), involvement of the individual is critical to ensure self-regulation in achieving the intended behaviours given the motivational processes brought into place when individuals take ownership of the goals.

Added to this, line management involvement is beneficial to ensure high quality training in apprenticeship given that line managers are critical figures with an all-embracing understanding of both the organisational and the individual needs (Gibb, 2003). Accordingly, involving line managers in the design and delivery of apprenticeships is essential for ensuring apprenticeships contribute to the organisation's long-term strategy providing the skills required for responding to current and future business needs, and for securing their commitment. As reported by Shipton, Pirrioni and Wu (2016), close involvement of line managers allows organisations to secure the best results possible and to develop talent aligned with the business strategy. This is particularly important in the context of Degree Apprenticeships where line managers are deemed critical support figures in integrating academic and workplace learning (Rowe et al., 2017).

Secondly, organisations can adopt a number of interventions to promote apprentices' competence development in the workplace. A supportive work environment characterised by positive relationships among colleagues and superiors and regular day-to-day informal feedback is particularly important for developing job competence, team working and effective participation skills. Added to this, challenging work experiences that in presenting novel and complex situations activate a learning response towards the task are valuable to develop creative thinking and self-management skills. Likewise, the structure of work in both empowering apprentices with autonomy in conducting their job and in presenting a certain degree of interdependence within the work system increasing interpersonal contacts is crucial for enabling professional development. Attention to the allocation and structure of work is therefore crucial for enhancing the quantity and quality of learning in the workplace (Eraut, 2007). Again, the role of the line manager is critical in designing apprentices' workload to ensure the right level of challenge, autonomy, interdependence and support. As discussed by Cheetham and Chivers (2001) and echoed by Becker and Bish (2017), although learning in the workplace is a natural process, planning and structuring work experiences is important in ensuring trainees gain maximum benefit from informal learning.

In particular, given the relevance of regular feedback from colleagues, line managers ought to prepare existing employees in sustaining apprentices' development sharing experience, imparting knowledge and recognising apprentices' expected contributions. Additionally, a positive learning environment should present apprentices with opportunities to seek help and assistance when required, whilst operating in interdependent systems should enable apprentices to acquire valuable tacit knowledge. Notably, when designing apprentices' workload, line managers should be attentive to individuals' dispositional goals in achievement situations. Specifically, when empowering apprentices in providing them with discretion in carrying out tasks and setting objectives, line managers should be aware that apprentices might respond differently depending on their learning orientation. As suggested by the findings, only low learning-oriented apprentices rather than high learning-oriented apprentices are likely to positively perceive task autonomy, as a means to boost their self-efficacy and sustain performance. On the other hand, high learning-oriented apprentices may perceive high autonomy as pressure to perform, constraining them from expanding their knowledge and skills. Accordingly, when providing task autonomy to foster competence development, management should ensure a fit between the level of task autonomy and individual differences in terms of learning goal orientation.

Another important practical implication arises from the finding that satisfaction with PA moderates the relationship between problem solving and regular day-to-day feedback respectively and performance. The findings reveal that apprentices benefit the most from informal learning if constructive PA is in place, drawing attention to the role of line managers in delivering high quality appraisals. In order to obtain satisfaction with PA apprentices need to perceive the appraisal as developmental practice aimed at developing competent professionals (Kuvaas, 2006). The delivery of normative feedback should thus be contextualised into communicating development plans related to apprentices' career progression in the organisation. Additionally, as reported by DeNisi and Sonesh (2011), factors determining employees' satisfaction with PA include trust towards the evaluator, two-way communication, perceptions that the appraisal fosters future improvements, identification of individuals' strengths and weaknesses, and frequent and consistent feedback. These are important consideration given that PA satisfaction contributes to maintaining a positive employment relationship between the apprentice and the employer in turn fostering engagement with informal learning.

Overall, the role of the line manager emerges as critical in both crafting apprentices' workload to ensure positive learning experiences and in delivering high quality PA. Consequently, enhancing supervisor's ability to support apprentices' professional development should be integrated into management training programmes. Alternatively, mentoring of line managers with more experienced colleagues or HR professionals could support the development of competencies required for delivering effective apprenticeships. Accordingly, organisations investing in apprenticeships should give priority to develop line management competencies for supporting apprentices featuring them in management development programmes and in management appraisals.

Additionally, the moderating role of the individual disposition of learning goal orientation on the relationship between task interdependence and performance indicates that apprentices may benefit differently from the learning potential of the work environment. For high learning-oriented individuals, task interdependence provides an opportunity to learn in knowledge-sharing settings, whilst for low learning-oriented individuals, task interdependence may be less effective in terms of acquiring knowledge and skills. Similarly, the effects of feedback and social support on competence development are likely to differ depending on apprentices' learning orientation. Accordingly, managers need to facilitate a learning orientation so that apprentices can better self-regulate and effectively benefit from the learning potential of the work environment.

Ultimately, the results highlight that practitioners need to consider both individual dispositions and contextual factors as boundary conditions influencing the learning potential of the immediate work environment. On the individual level, learning goal orientation can be considered during the selection process as relevant criteria in apprenticeships (i.e. VandeWalle et al., 1999). Additionally, given that learning goal orientation is a malleable trait with both situational and dispositional aspects (Button et al., 1996), it presents potential for being stimulated by managerial interventions. As reported by DeRue and Wellman (2009), organisations can evoke and reinforce a learning orientation emphasising that errors and mistakes are an ordinary aspect of learning and should be viewed as cues for further development. Similarly, line managers placing emphasis on development, encouraging learning from mistakes and measuring progress using learning goals, can prime a learning goal orientation (Dragoni, 2005). Socialisation processes are also pivotal in influencing apprentices' orientation towards competence development, and changing apprentices' attributions about ability and performance can positively influence their learning orientation

(VandeWalle, 2003). Additionally, practices such as developmental PA can maintain a learning orientation in identifying learning needs and setting development goals (Elicker, 2006) rather than encouraging competition and interpersonal comparisons which can encourage a performance orientation and detract from learning (VandeWalle, 2003).

On the contextual level, HR practices such as developmental PA communicate the organisation's intent towards the apprentice and contribute to establishing a high-quality relationship based on mutuality and trust. Given the influence of satisfaction with PA on apprentices' responses to problem solving and feedback as informal learning drivers, this study draws attention to the communicative function of the HR system (Guest, 2011). In particular, the benefits of PA have emerged as exceptionally salient for emergent professionals in both establishing a relational employment relationship with the organisation, and in elucidating how the role of the individual apprentice contributes to team and organisational goals. It follows that investments in HR practices should be viewed as the strategy for building and managing the high quality employment relationship required for securing maximum returns from apprenticeships. This is particularly important in ensuring apprentices positively respond to the learning opportunities provided by the immediate work environment in ways that benefit themselves and the organisation (Kuvaas, 2008) and in securing apprentices' retention in the long term. Overall, this study presents insights into how organisations investing in apprenticeships can maximise emergent professionals' development and benefit from a productive and committed workforce.

Implications for apprentices

Lastly, the study presents practical implications for apprentices as learners. Firstly, higher and degree apprenticeships are valid alternatives to traditional university programmes, particularly in relation to increasing discussions over the work readiness of university graduates (Lowden et al., 2011; Tomlinson, 2012). In combining higher education with a job, higher and degree apprenticeships offer the opportunity to develop transferable skills and professional competence whilst gaining high level qualifications, tackling issues related to employability (Rowe et al., 2017). However, when considering lower level apprenticeships (Level 2 and 3), the review of the literature has revealed how approaches to apprentices development range from expansive to restrictive (Fuller and Unwin, 2003b) resulting in great variability for career and educational progression. Accordingly, when choosing an apprenticeship at intermediate or advanced level, attention should be given to

the extent the programme provides apprentices with the skills and qualifications required for future career and educational progression.

When in the workplace, apprentices should approach challenges as positive developmental opportunities. In particular, engaging in problem solving is beneficial for developing the ability to adapt to constant changes as well as the ability to proactively initiate changes bringing performance improvements. These skills are exceptionally valuable in knowledge-intensive industries where innovation and development are central and are increasingly required in the workplace. Additionally, apprentices should strive to learn from daily feedback provided from colleagues and supervisors as well as to extricate knowledge from informal daily interactions. In sum, approaching work with a learning orientation can foster the development of critical competencies enabling apprentices to fully develop professionally.

7.4 Policy implications

This study presents implications for policy that in light of the current apprenticeship reform can improve the quality of the programme. Transfer design has emerged as critical factor for securing returns from investments in formal training delivered at College and University. This finding underscores the importance of school-work alignment in apprenticeships (Messman and Mulder, 2015; Pineda-Herrero et al., 2015; Renta Davids et al., 2017) and points to the need to develop synergies between employers and the education system (Lee, 2012). Accordingly, in order to ensure that colleges and Universities design and deliver training in ways that promote transfer, transfer design should become a mandatory criterion. Employers and training providers (colleges and Universities) should discuss and agree a *training transfer strategy* to ensure the delivery of training content aligned with the job along with activities elucidating how theory relates to practice. Such ex ante measure, can further the alignment between school and work and secure returns from investments in formal training.

Added to this, given that line managers are critical figures in designing and delivering effective apprenticeships, training of line managers should become mandatory for organisations relying on public funds. Correspondingly, organisations recruiting apprentices should invest in line management capacity to ensure the organisation has the capabilities to deliver quality apprenticeships. Line management training should cover areas as designing

apprentices' workload, delivering inductions and PA, managing career development, fostering a learning orientation and supporting training transfer. Making line management training a mandatory requirement for drawing on public funds has the potential to increase consistency among apprenticeships and improve the quality of the programme.

7.5 Limitations and directions for future research

Although this study made significant contributions to the apprenticeship literature, it presents some limitations. Firstly, the cross-sectional design precludes any inferences about causality. Whilst a second wave of data collection was conducted to introduce a longitudinal design, the restricted sample size limited the power for inference test (Hair et al., 2014). Future research is needed to validate the results with a larger sample size adopting a longitudinal approach to examine causality. Additionally, although apprenticeships follow a standardised format and the survey was designed to be generic and applicable over a range of job types, this study is based exclusively on apprentices operating in the engineering sector. Cross-validation of the results with apprentices operating in other sectors such as health and social care, business and administration, media and construction would be valuable. Equally, given that the study is based on survey data complemented by qualitative data in the form of statements, further data sources may be useful. Interviews may provide further insight into the understanding of how and why various factors hinder or enhance apprentices' competence development.

Secondly, the use of self-report measurements presents a limitation of the study. Although appropriate steps were adopted in the research design in order to minimise common method bias and Harman's one-factor test (Podsakoff and Organ, 1986) revealed that common method bias was not problematic, future research may improve the research design by collecting data from different sources. For example, data on the independent and moderator variables may be collected from apprentices, whilst data on the dependent variables may be collected from supervisors. Additionally, introducing a time lag in the data collection of the predictors and the criterion can limit the possibility of reverse causality. Supposedly, apprentices performing well may be granted more autonomy in conducting their jobs; alternatively, high performers may report a positive perception of feedback availability. As suggested by Morrison and Bies (1991) individuals are more likely to seek feedback when they perform well (see VandeWalle, 2003 pp. 586) indicating that highly performing apprentices may perceive the availability of feedback from colleagues and supervisors more

positively. Accordingly, collecting data on the independent and the dependent variables in subsequent waves can rule out similar eventualities.

Despite these limitations, the study presents an empirical basis for theoretical advances on the factors facilitating emergent professionals' development. In particular, this study considered the direct relationship between the apprenticeship programme and apprentices' resultant performance without investigating the mechanisms underlying this process. Multiple mediators can explain the relationship between the independent and dependent variables, thus future research can further the understanding of the mechanisms linking the formal and informal learning factors with resultant performance. When considering the former, research could examine whether the relationship between transfer design and training transfer is mediated by work environment feedback request (Diamantidis and Chatzoglou, 2014). Additionally, this mechanism could potentially be moderated by the role of the supervisor, as individuals perceiving high levels of supervisor support (Chiaburu and Marinova, 2005) may be more likely to engage in requesting feedback on their application of knowledge and skills acquired in training.

When considering the influence of the informal learning factors on performance several mechanisms could be investigated. Firstly, research could examine the mediating effects of particular informal learning activities on performance. For example, the relationship between task interdependence and performance could be mediated by knowledge-sharing with colleagues (Bednall et al., 2014). Similarly, reflection on daily activities (Bednall and Sanders, 2016) may mediate the relationship between task autonomy and performance. Secondly, psychological states such as felt responsibility (Pearce and Gregersen, 1991) and self-efficacy (Wang and Netemeyer, 2002) may mediate the relationship between task autonomy and problem solving with performance. Exploring these mechanisms may provide an enhanced understanding of the complex processes at the basis of emergent professionals' development.

Additionally, this study investigated only two boundary conditions that influence the relationship between the apprenticeship and apprentices' resultant competencies (i.e. HRM system and individual learning goal orientation). Further research is needed to identify potential contextual and individual factors that may interact with the formal and informal learning factors to affect apprentices' performance. For example, cognitive ability has been identified as significant predictor of training transfer (Burke and Hutchins, 2007) in that

individuals high in cognitive ability can more easily acquire and apply new competencies (Grossman and Salas, 2011). Given the well-established relevance of cognitive ability in formal training contexts, this variable presents potential implications for the success of less structured learning programmes such as apprenticeships. Investigating cognitive ability as moderator of the relationship between informal learning factors and resultant performance may provide a clearer understanding of the individuals who may benefit the most from workplace learning. Added to this, individual predispositions such as personality and propensity factors have been associated with engagement with informal learning behaviours (Cerasoli et al., 2018; Noe, Tews and Marand, 2013). Accordingly, Raemdonck and colleagues (2014) have called for studies investigating the moderating role of proactive personality on the relationship between job characteristics and learning outcomes.

At contextual level, this study measured HR practices (i.e. PA) as determinants of a high quality employment relationship. The latter may however be measured in terms of perceived organisational support, affective organisational commitment, procedural and interactional justice as different indicators of the employment relationship (Kuvaas, 2008). In so doing, particular attitudes and attributions could illustrate why individuals engage differently with the learning opportunities presented in the immediate work environment.

Ultimately, whilst this study focused on apprentices as emergent professionals, the findings present valuable implications for employee development more generally. Given that the apprenticeship development model draws on theories of training transfer (Baldwin and Ford, 1988), workplace learning (Eraut, 2007; Raemdonck et al., 2014; Skule, 2004) and the well-established Demand-Control-Support Model (Karasek and Theorell, 1990), the findings are relevant for human resource development in general and could be replicated in other contexts.

7.6 Conclusion

This research introduced an organisational perspective to the study of apprenticeship turning the focus to the work environment as enabler of competence development. In so doing, it constructed and empirically tested a model for apprenticeship development that specifies how formal and informal learning contribute to the development of apprentices' competencies. In testing the association of formal and informal learning factors with particular competencies, the study demonstrates that by intertwining educational experiences

with developmental activities inside the workplace, organisations can achieve optimum value from key talent. Additionally, in incorporating both contextual and individual boundary conditions into the apprenticeship development model this study provides a nuanced understanding of 1) the situations where the apprenticeship produces the strongest results and 2) the types of individuals who benefit the most from the learning opportunities provided by the immediate work environment.

The study presents significant theoretical and practical implications. As for the former, this research introduces a comprehensive model that integrating the formal and informal learning literatures within the apprenticeship context exemplifies the factors contributing to the developmental quality of apprenticeships. In so doing, the research illustrates the factors associated with apprentices' competence development, revealing how particular factors are associated with specific competencies. In particular, transfer design and supervisor support have emerged as significant in supporting the development and application of apprentices' technical knowledge. Conversely, social support and feedback from colleagues and supervisors in the workplace are related to apprentices' job competence and work and business skills as team working, effective participation, self-management and creative thinking. Similarly, problem solving has emerged as critical for the development of a range of work and business skills, whilst task autonomy has emerged as significant for skills of self-management and creative thinking. Ultimately, task interdependence has emerged as important determinant of job competence and work and business skills such as team working and self-management.

In addition, this research is informative regarding the role of HRM in apprenticeship providing novel insight into the influence of HR practices as determinant of a positive employment relationship for emergent professionals. In particular, the moderating effect of PA satisfaction on the relationship between problem solving and feedback with resultant performance demonstrates a boundary condition that influences the impact of particular informal learning factors on apprentices' competence development. The findings reveal how PA satisfaction can foster a positive employment relationship in turn enhancing apprentices' engagement with informal learning. Additionally, the research identifies PA as potential mechanism for converting individual learning to better functioning of the team and the organisation. Overall, the study presents first hand evidence of the influence of HRM in apprenticeship providing much needed insight for practitioners and academics.

Moreover, the moderating effects of learning goal orientation on the association between social support, feedback from colleagues and supervisors, task autonomy and task interdependence respectively with resultant performance shows that the influence of particular informal learning factors is contingent upon individual motivational dispositions. In so doing, the findings provide a nuanced understanding of the type of apprentices that learn the most from the learning potential of the work environment.

Based on the findings, organisations are advised to adopt appropriate interventions to support apprentices' competence development. Among these, regular interpersonal support and challenging tasks complemented by task autonomy and interdependence present apprentices with a positive learning environment conducive to professional development. At the same time, organisations are advised to view investments in HR practices as strategy for building and sustaining a high quality employment relationship, paying particular attention to apprentices' satisfaction with PA. Similarly, managers ought to nurture apprentices' orientation towards learning promoting competence development in a positive learning environment. In sum, an organisational perspective has introduced a holistic view on apprenticeship that accounting for both formal and informal learning, the HRM system and the individual disposition of learning goal orientation, presents novel insight into the phenomenon.

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Appendix 1: Information sheet, consent form and questionnaire



APPRENTICESHIP AND INFORMAL LEARNING

Nottingham Business School

We would like to invite you to participate in Nottingham Trent University's research project by completing this survey. This survey is part of a study on apprenticeship which aims to understand how organisations can improve the apprentices' learning experience.

We are therefore interested in your opinions about the quality of the apprenticeship training, about your learning experiences as part of your daily job, and about the HRM practices used in your organisation.

We hope you will take between 15 to 20 minutes to complete the survey.

All information will be held in the strictest confidence and will remain anonymous. Responses to individual questionnaires will only be seen by the research team and **will not** be disclosed to your line manager, colleagues and superiors.

Participating in the survey is voluntary and you have the right to withdraw at any time when completing it. The email has presented you with a unique identifier which you can use to withdraw from the survey if you wish to do so within two weeks of completion.

If you have any questions or would like more information, please do not hesitate to contact me via email (silvia.pirrioni2014@my.ntu.ac.uk) or on 077 2641 0323. You can also make contact with my supervisor, Prof Helen Shipton on helen.shipton@ntu.ac.uk and with the School Director of Research, Prof. Steve Allin (steve.allin@ntu.ac.uk) for any concerns or complaints.

Agreement to consent

Please read and confirm your consent to complete the survey by ticking the following check-boxes.

1. I confirm that the purpose of the project has been explained to me, that I have been given information about it in writing, and that I have had the opportunity to ask questions about the research

2. I understand that my participation is voluntary, and that I am free to withdraw at any time when completing the survey, and within 2 weeks of submitting it.

3. I understand that my responses are confidential and will not be disclosed to others

4. I agree to take part in this project

Please insert the unique identifier you have been provided with in the email

The following statements refer to your formal training: the training you attend at college, university or at the company's training academy. Please indicate your level of agreement for each statement, reflecting on the training you received since the beginning of your apprenticeship.

During the training:	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Do not Know	Refuse to answer
Several examples are given about the way to use learning on my daily job activities	1	2	3	4	5		
The activities and exercises I undertake (in class or as part of my individual study) help me understand how to apply learning on the job	1	2	3	4	5		
Teaching is focused on how to apply learning on my daily job activities	1	2	3	4	5		
The way the trainer(s) teach the content makes me feel more comfortable to apply it	1	2	3	4	5		

The following statements refer to the work environment, following your attendance of training courses at college, university or the company's training academy.

After completion of the training programme:	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree	Do not know	Refuse to answer
I have post-training conversations with my colleagues about how to improve my job performance	1	2	3	4	5		
I ask my colleagues how well I apply the training content on the job	1	2	3	4	5		
My colleagues present me with opinions that help me improve my job performance	1	2	3	4	5		
I often discuss with my supervisor the possible ways to apply training on the job	1	2	3	4	5		
I often discuss with my supervisor the problems in using training on the job	1	2	3	4	5		

I often ask feedback from my supervisor regarding my post-training job performance	1	2	3	4	5
I can incorporate much of the skills learned in the training course in my daily work activities	1	2	3	4	5
I can use at work, the knowledge and skills learned off-the-job (at college)	1	2	3	4	5
My supervisor provides me with the time I need to practice the skills learned in training	1	2	3	4	5
My supervisor provides me with constant reminders on how to apply the acquired skills	1	2	3	4	5
My supervisor shows me how to improve my performance	1	2	3	4	5
My supervisor lets me know how well I am performing	1	2	3	4	5
My supervisor utilises a variety of methods to assist me with my development	1	2	3	4	5
My supervisor has the skills to coach me effectively in my development	1	2	3	4	5

My supervisor views employee development as an important aspect of his/her job

1 2 3 4 5

The following statements refer to your job and work environment. Please indicate your level of agreement for each statement, reflecting on your work experience since the beginning of the apprenticeship.

Your job and work environment	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Do not know	Refuse to answer
The job involves solving problems that have no obvious correct answer	1	2	3	4	5		
The job requires me to be creative	1	2	3	4	5		
The job often involves dealing with problems that I have not met before	1	2	3	4	5		
The job requires unique ideas or solutions to problems	1	2	3	4	5		
In my job I have the opportunity to try things out, even if it does not directly support the progress of the job	1	2	3	4	5		

In my job, I have the opportunity to experiment with different working methods	1	2	3	4	5
In my job I have the opportunity to try out new techniques or tools	1	2	3	4	5
I have the opportunity to develop close friendships in my job	1	2	3	4	5
I have the chance in my job to get to know other people	1	2	3	4	5
I have the opportunity to meet with others in my work	1	2	3	4	5
My supervisor is concerned about the welfare of other people that work for him/her	1	2	3	4	5
People I work with take a personal interest in me	1	2	3	4	5
People I work with are friendly	1	2	3	4	5
I receive a great deal of information from my supervisor and colleagues about my job performance	1	2	3	4	5

Other people in the organisation, such as supervisors and colleagues, provide information about the effectiveness (e.g. quality and quantity) of my job performance

1 2 3 4 5

I receive feedback on my performance from other people in my organisation (such as my supervisor and colleagues)

1 2 3 4 5

The following statements refer to your organisational practices. As an apprentice, we are interested to see how you make sense of HR practices in the workplace. Please indicate your level of agreement for each statement.

In this organisation:	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Do not know	Refuse to answer
Great effort is taken to select the right person	1	2	3	4	5		
Long-term employee potential is emphasised	1	2	3	4	5		
Considerable importance is placed on the recruitment process	1	2	3	4	5		
Very extensive efforts are made in recruitment	1	2	3	4	5		

I am satisfied with the way the organisation provides me with feedback	1	2	3	4	5
The feedback I receive on how I do my job is highly relevant	1	2	3	4	5
My organisation is good at providing recognition for good performance	1	2	3	4	5
The feedback I receive agrees with what I have actually achieved	1	2	3	4	5
I think that my organisation attempts to conduct performance appraisal the best possible ways	1	2	3	4	5
My organisation seems more engaged in providing positive feedback for good performance than criticising poor performance	1	2	3	4	5
It seems like my organisation really cares about my career opportunities	1	2	3	4	5
The organisation puts a great deal of effort in organizing for internal career development	1	2	3	4	5

In my organisation one is engaged on creating lifelong career opportunities	1	2	3	4	5
Staying in this organisation is good for my career	1	2	3	4	5
I don't think this organisation is engaged on my promotional opportunities	1	2	3	4	5
It often appears random who gets the best career opportunities in this organisation	1	2	3	4	5
In this organisation it is clear what belongs to the field of HR and what is outside the field of HR	1	2	3	4	5
When one asks the HR department for help, they provide clear answers	1	2	3	4	5
The procedures and practices developed by HR are easy to understand	1	2	3	4	5
In general, the HR employees in this organisation are highly appreciated	1	2	3	4	5

The HR department undertakes exactly those actions that meet our needs

1 2 3 4 5

Employees in this organisation experience HR practices as relevant

1 2 3 4 5

The suggestions, procedures and practices that HR comes up with actually contribute to the better functioning of this organisation

1 2 3 4 5

The HR instruments for staff appraisal succeed in reinforcing the desired behaviours

1 2 3 4 5

The appraisal system is designed in such a way that desired performance is being encouraged

1 2 3 4 5

One can have faith that the HR practices realise the goals for which they were designed

1 2 3 4 5

HR practices in this organisation achieve their intended goals

1 2 3 4 5

In our organisation there is clear consistency between words and deeds of the HR department	1	2	3	4	5
The people responsible for HR in our organisation have a mutual agreement about how to deal with employees	1	2	3	4	5
If employees perform well, they get the necessary recognition and rewards	1	2	3	4	5
Employees consider promotions as fair in this organisation	1	2	3	4	5
The HR department in this organisation takes decisions impartially	1	2	3	4	5

The following statements refer to your job. Please select the most appropriate answer.

How much influence do you have over:	None	A little	Some	A lot	Do not know	Refuse to answer
The tasks you do in your job	1	2	3	4		
The pace at which you work	1	2	3	4		

How you do your work	1	2	3	4
The order in which you carry out the tasks	1	2	3	4
The time you start or finish your working day	1	2	3	4

About your job	Not much	Little	Somewhat	A significant amount	A great deal	Do not know	Refuse to answer
How much does your work require you to coordinate with others?	1	2	3	4	5		
To what extent is dealing with other people part of your job?	1	2	3	4	5		
How much does your success depend on cooperating with others?	1	2	3	4	5		
How much do you rely on people in other units?	1	2	3	4	5		

How often do you start work that is finished by others?	1	2	3	4	5
How often do you finish work that is started by others?	1	2	3	4	5
How often do you work by yourself?	1	2	3	4	5

The following statements refer to your performance as a result of attending formal training (at college, university, training academy). Please indicate your level of agreement for each statement, reflecting on your performance over the last 12 months.

Following my training	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Do not know	Refuse to answer
Using the new technical/theoretical knowledge has helped me improve my work	1	2	3	4	5		
I can accomplish my job tasks faster than before attending the training	1	2	3	4	5		

I have accomplished my job tasks faster than before attending the training	1	2	3	4	5
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I can accomplish job tasks better by using new technical/theoretical knowledge	1	2	3	4	5
--	---	---	---	---	---

The quality of my work has improved after using new technical/theoretical knowledge	1	2	3	4	5
---	---	---	---	---	---

I make fewer mistakes in production when using new technical/theoretical knowledge	1	2	3	4	5
--	---	---	---	---	---

The following statements refer to your general performance at work looking at your role as an individual, a team and an organisation member. Please indicate *how often* you have carried out the behaviour, reflecting on your performance over the last 12 months.

	Not much	Little	Somewhat	A significant amount	A great deal	Do not know	Refuse to answer
Over the last 12 months							
Individual task performance							
I carried out the core parts of my job well	1	2	3	4	5		

I completed my core tasks well using the standard procedures	1	2	3	4	5
I ensured my tasks were completed properly	1	2	3	4	5
I adapted well to changes in core tasks	1	2	3	4	5
I coped with changes to the way I have to do my core tasks	1	2	3	4	5
I learned new skills to help me adapt to changes in my core tasks	1	2	3	4	5
I initiated better ways of doing my core tasks	1	2	3	4	5
I came up with ideas to improve the way in which my core tasks are done	1	2	3	4	5
I made changes to the way my core tasks are done	1	2	3	4	5
Team member performance					
I coordinated my work with colleagues	1	2	3	4	5

I communicated effectively with my colleagues	1	2	3	4	5
I provided help to colleagues when asked, or needed	1	2	3	4	5
I dealt effectively with changes affecting my work unit (e.g. new members)	1	2	3	4	5
I learnt new skills or took on new roles to cope with changes in the way my unit works	1	2	3	4	5
I responded constructively to changes in the way my team works	1	2	3	4	5
I suggested ways to make my work unit more effective	1	2	3	4	5
I developed new and improved methods to help my work unit perform better	1	2	3	4	5
I improved the way my work unit does things	1	2	3	4	5

Organisation member performance

I presented a positive image of the organisation to other people (e.g. clients)	1	2	3	4	5
I defended the organisation if others criticized it	1	2	3	4	5
I talked about the organisation in positive ways	1	2	3	4	5
I responded flexibly to overall changes in the organisation (e.g. changes in management)	1	2	3	4	5
I coped with changes in the way the organisation operates	1	2	3	4	5
I learnt skills or acquired information that helped me adjust to overall changes in the organisation	1	2	3	4	5
I made suggestions to improve the overall effectiveness of the organisation (e.g. by suggesting changes to administrative procedures)	1	2	3	4	5
I involved myself in changes that are helping to improve the overall effectiveness of the organisation	1	2	3	4	5

I came up with ways of increasing efficiency within the organisation

1 2 3 4 5

The following statements refer to your learning orientation. Please indicate your level of agreement for each statement.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Do not know	Refuse to answer
I am willing to select a challenging work assignment that I can learn a lot from	1	2	3	4	5		
I often look for opportunities to develop new skills and knowledge	1	2	3	4	5		
I enjoy challenging and difficult tasks at work where I will learn new skills	1	2	3	4	5		
For me, development of my work ability is important enough to take risks	1	2	3	4	5		

I prefer to work in situations that require a high level of ability and talent

1

2

3

4

5

The following question will give you an opportunity to tell us more about your experience as an apprentice. Please respond openly and truthfully.

Appendix 2: Sample of qualitative data extracts

Formal learning: quality and relevance

‘The quality of the training at college was excellent. Experienced and knowledgeable lecturers were used, however some content maybe was not as relevant to the job as it could.’

‘In regards to the degree, it is very theoretical, and I do not think it can be applied fully in the way that this questionnaire intended (i.e. vocationally); but this is not to say it has not been useful. It was done a lot to understand things contextually and improve the quality and awareness of my work.’

‘The training completed through college is unorganised, irrelevant and difficult to apply to the tasks I complete at work.’

‘The only issue I have had is with the formal training provided – it is often delivered by a college at a very low standard in comparison to all other elements of the apprenticeship’.

‘The training school does not reflect what the business is truly like.’

‘There is an enormous difference between the training received at the company academy and that of the local college. The academy training was first rate and I learnt a lot from people that were current in their skills. The college training was awful! The tutors often did not have recent or relevant experience and the subjects we learnt were often irrelevant. College was a giant box ticking exercise that was rushed through to get ‘bums on seats’. The tutors were often very against the way we were being taught and had little to no power to change it. Waste of my time and the company’s money!’

‘The training provided related to my job and developed the skills that I need to do my job. It has also allowed me to transition into my second substantive role now using the skills that I developed.’

‘Generally the training I have received during my apprenticeship has been very good and helped me carry out my job role effectively while on business placements. However I do feel that some of the courses which we are required to attend do not add value to the apprenticeship and take up lot of time.’

‘I was taught the core skills needed for the second year in which I have expanded those skills in real life situations.’

Formal learning: quality and relevance (continued)

‘Off-the-job training is enjoyable but often not directly applicable to the job I am doing in work. As a fitter, great emphasis was placed on machining at the initial stages of the training, whereas I think it would have been a better use of time to be learning practical fitting skills and less machining. I have heard of sites which have their own training academy, and I think having more job specific training would be of great benefit although it could be difficult to implement. Job related courses such as manual handling, gas turbine, etc. personal integrity have all proved to be useful’.

‘University provides broad knowledge that at present does not impact how I perform at work, however I can see the benefit long term as I progress through the organisation.’

Informal learning: learning environment

‘Working with people on the shop floor i.e. machinists, fitters, beam weld operators etc. has been the best experience for me as it has been on the job training where I have worked with a team of people that have had a major influence in me in a positive way.’

‘Well received on each placement and help always there when needed.’

‘My experience as an apprentice has been very good, I have managed to gain a lot of knowledge from the people surrounding me as well as undertaking knowledge in my own time to make me more available for the tasks I may have to accomplish in the future.’

‘When learning the procedures alongside the more experienced and knowledgeable colleagues I am able to develop my personal learning faster’.

‘Really enjoyed my experience as an apprentice so far learning from those more experience than myself.’

‘I get lots of support and help from everybody I interact with through the business.’

‘The support from both training and areas of the business is outstanding.’

‘I have enjoyed being an apprentice so far – the people I work with are lovely, and I feel well looked after.’

‘Tradespersons on the shop floor are superstars at showing you how to do the job and being patient with you during your training.’

‘As an apprentice you are treated with respect and people are willing to help you out and lend you their knowledge. It was difficult coming out of the training school and straight into the business but people are always willing to help you out and support you.’

‘Managers taking on placements have become more accommodating and employees have been extremely good at providing insight into their roles, helping my training and mentoring me through what things are needed for the job.’

‘Some days are great when you have people who enjoy to teach you their knowledge. However, you will occasionally find people who make themselves very difficult to approach for knowledge and guidance. This makes them appear hostile and unapproachable in terms of being concerned to ask them questions which they may either think you should know the answer to or feel they have already told you, making it very difficult to progress past that point.’

Informal learning: learning environment (continued)

‘Being an apprentice can bring very mixed responses to you within the organisation. Some people recognise your ability and help you to develop, others automatically assume that you don’t know what you are doing.’

‘I do feel there are different challenges throughout and that we can cope due to the assistance from apprenticeship supervisors, tradesman on the shop floor and also our colleagues and trainers from college.’

Informal learning: development opportunities

‘So far this apprenticeship has pushed me to my limits but that’s only improved my performance and knowledge of a working life which is good for me and it has made me mature and strengthen my understanding of what needs to be done in order to do a good job.’

‘Being an apprentice can be challenging, but ultimately it is extremely rewarding and has allowed me to grow as a person as well as develop my skillset.’

‘I really enjoy a challenge and I think a little bit of pressure and difficulty keeps me interested and also helps me push myself to develop myself personally, technically and academically.’

‘The overall experience has been very good. There has been a large amount of opportunities to learn and do new things and the benefit of learning on the job quickly becomes apparent.’

‘There is opportunity to push and develop as an individual in a placement. I have not yet had the opportunity to do that on a wider scale in terms of the organisation as a whole.’

‘The apprenticeship has widened my knowledge and experience and allows me to experience new things which help me improve my work.’

‘I have a good indication of what my strengths and weaknesses are from the projects I have been tasked by ‘good’ placements managers and supervisors’.

‘Sometimes have to push for opportunities to develop as supervisors can underestimate abilities.’

Informal learning: development opportunities (continued)

‘Very good experience. Plenty of chances to expand knowledge, test and improve myself’

‘I enjoy my apprenticeship and the people I work with. I have had the opportunity to do many things so far that have taught me a lot.’

‘It has been interesting. Some managers treat you better than others in the type of work they give you and the opportunity to develop’.

‘I really enjoy work and am constantly challenged with new work/problems which I often have to work with others to solve (shop floor and office staff).’

‘Overall it is a prestigious, challenging and prosperous programme to be on.’

‘Changing job roles every 6 months maintains a fast pace and ensures that I am continuously challenged and always learning something new.’

‘The work given is challenging and very interesting.’

‘Overall being an apprentice within this organisation has given me some excellent opportunities and some challenging times, both of which I am grateful for.’

Informal learning: level of responsibility

‘I feel like I am treated fairly and given a range of responsibilities within my work.’

‘I feel I have been treated fairly and learnt a great deal. I enjoy that I have responsibility to carry out the tasks I am given.’

‘I find the experience both highly motivating in some placements due to the responsibilities and respect/achievement that we receive’.

‘Nothing is consistent across the business, one area will let you do something and in another it is completely disallowed.’

‘Amount of responsibility and therefore opportunity to develop varies placement by placement.’

Informal learning: level of responsibility (continued)

‘The further into my apprenticeship I get, the more tasks I am able to take on as well as an increase of responsibility.’

‘It has been more varied than expected and the responsibility I have been given has increased throughout my apprenticeship which means I am always engaged.’

‘I have been given enormous scope to work how I want, to do things differently, to create new ways of doing things as an organisation, and to work at my own pace’.

Feeling valued

‘I have really enjoyed my first year of my apprenticeship. I’ve always felt like a valued, significant member of the team and the company.’

‘As an apprentice in the training school you are treated like a child more than a working individual. However, when entering the business you are treated from day one like a member of the team and you are accepted, and given proper meaningful jobs whether they be individual or team jobs.’

‘As an apprentice at this company I have felt valued at the company within my placements.’

‘I find the experience both highly motivating in some placements due to the responsibilities and respect/achievement that we receive.’

‘The opportunities the company provides are brilliant, and being an apprentice usually does not get in the way of this. I have never felt disadvantaged or overlooked by my colleagues as an apprentice, and my opinions and inputs are always listened to and considered.’

‘I feel like I am treated fairly, and given a range of responsibilities within my work.’

‘I feel I have been treated fairly and learnt a great deal. I enjoy that I have the responsibility to carry out the tasks I am given.’

‘I am treated as part of a team, with my opinion valued.’

End-state competencies

‘Overall the apprenticeship has been a positive and rewarding opportunity with lots of benefits towards my knowledge, skills and experience. I have picked up skills in a number of areas and not just the area that I am working in (project management), which is useful in having a good breadth of understanding.’

‘The apprenticeship was well tailored towards Project Management roles and provided key domain knowledge. After finishing the apprenticeship scheme and moving into my first role, I can see how the information, knowledge and skills I acquired during the three years have helped me to adapt and cope with the role’.

‘As an apprentice I have learnt new skills and techniques to develop myself to further my career. I have learnt hands on manual skills on machinery and expanded my knowledge through my college course and workshop work.’

‘The apprenticeship is good for teaching you many different skills and developing yourself personally.’

‘I feel although it initially got off to a slow start the apprenticeship has built up my character, confidence and skills to make me a well suited employee for the business.’

‘Being an apprentice is fantastic. I have been able to develop my knowledge, skills and overall confidence by receiving a range of opportunities from training and placements, to opportunities like presenting career opportunities externally.’

‘Being an apprentice can be challenging, but ultimately it is extremely rewarding and has allowed me to grow as a person as well as develop my skillset.’

HRM: Career development

‘As an apprentice I feel that more could have been done to push and challenge me – more could have been done to identify areas of strength and talent, and then to channel said areas into specific roles that would benefit the individual and the organisation. The company I work for has done a good job of putting talented individuals into roles that are too easy/administrative.’

‘Unorganised, poor planning towards our futures.’

‘The fact that my career direction has been decided – without me being able to have an input, or anyone listening to my concerns – has led me to look for another career at the earliest opportunity.’

‘The communication between apprentice staff and apprentices themselves has been very poor at times, and some are left in limbo in terms of being given a job because of this.’

‘Negative responses are due to recent issues with career direction; the direction my career is moving in is not what I wished when I joined the company. The allocation of the business department is not made with any input from apprentices, which goes against the grain of the often repeated ‘it is your career to manage’.

‘I don’t like the uncertainty of jobs in my work area especially after having given so much of my time and effort.’

‘In my experience very little care has been taken towards my development during and or after my apprenticeship, which has been extremely frustrating as myself and my employer have different ideas about where my career is going.’

HRM: Performance management

‘Apprentices performing above expectations are rarely rewarded for their efforts, and those that coast or fail to meet the standard are not taken to task on the issue. This depletes morale and motivation, and such a style of working quickly becomes contagious (everyone is on the same pay band, for others to put in more work and effort, without due reward, feels distinctly unfair and hence people stop putting in that extra effort.’

‘Some apprentices ‘hide’ behind the tile of apprentices, taking the view that they are there to observe and not to be accountable for tasks or take on responsibility. This is frustrating as there is a spectrum of performance amongst people on the same scheme yet management do not appear to be: 1. Noticing the high performing individuals and praising them. 2. Exerting pressure on the lower performing apprentices to encourage more learning.’

‘Little emphasis is made on personal performance which often leads to little recognition and reward to those who achieve which I find reduced motivation to go the extra mile.’

‘I feel that rewards/pay should be more closely linked to performance, rather than being a ‘9 months after you start you get this’ kind of structure. The current system encourages mediocrity, doing the minimum required to pass, etc.’

HRM: knowledge of HR

‘As a planning and control apprentice I know very little about HR. I am not sure (apart from recruitment, redundancy, performance ratings) what they are responsible for. We have not really been informed of what the function does’

‘I have had no contact with my HR department that I know of, I do not know who the HR representative is for me and nor do any of the other apprentices who are based on the same site as me. This was highlighted at a recent apprentice forum.’

‘As an apprentice, some of the questions, I think become more applicable the further I go in my career – I struggle to give an opinion on something, I know very little about the HR function and the opinions of others.’

‘I do not have a lot of knowledge on the HR department and it is a reflection of my role and the company as whole.’

Appendix 3:

Outputs arising from the thesis

1. Pirrioni, S., Shipton, H. and Wu, N. 2016. 'On-the-job learning,' in A. Wilkinson & S. Johnstone (eds), *The Encyclopedia of Human Resource Management*, Edward Elgar Publishing Ltd, Cheltenham.

On-the-job learning

On-the-job learning has gained relevance in the postmodern society where globalized markets and technological advancements require individuals and organizations to continuously learn and adapt to constantly changing environments. While traditional education and vocational training continue to play an important role equipping individuals with core knowledge and skills, the workplace has been recognized as a prolific site for learning (Illeris, 2011).

As learning and working are interdependent (Billett, 2001), on-the-job learning is embedded in the processes, tasks and social relations of the workplace. As such, learning in the workplace is situated, occurring as participation in social practices (Lave and Wenger, 1991), and is strongly dependent on access and exposure to sources of knowledge in the form of social partners and artefacts (Billett, 2004).

Given the participatory nature of on-the-job learning, high-impact learning activities include work shadowing, allowing observation of more experienced workers providing insight into new practices and perspectives (Eraut, 2007), and challenging tasks, such as roles involving processes of decision-making, problem-solving, supervisory and managerial responsibilities (Brown, 2009), stretching individuals' practical, cognitive, emotional and relational capabilities.

On-the-job learning is highly dependent on the qualities of the workplace as a supportive learning environment. Job design, in terms of the allocation and structuring of work, is a central contextual factor influencing the extent to which the job presents challenging features, the degree of individuality or collaboration, and the opportunities to work in contact with other actors (Eraut, 2007). The configuration of work is thus central for providing individuals with opportunities to stretch their capabilities in a variety of tasks presenting novel challenges, and to secure access to a support network of experts and peers for interaction and regular feedback.

Despite the centrality of the qualities of the workplace as an environment conducive to learning, it has been argued that learning is an inter-psychological process, entailing a dual and reciprocal relationship between the individual and the social sources of knowledge (Billett, 2004). As such, the quality of learning experiences is mediated by both workplace affordances, in the form of opportunities for participation and interaction, and the level of guidance provided, and by an individual's agency and intention to engage in such activities and interactions (Billett, 2004). This assumption represents a shift towards the learner's ownership of the process, as individuals act as autonomous and self-directed agents, who engage in learning when this is perceived as relevant for their job and of value when the required support and guidance are in place and, consequently, organizations are thus able to enhance informal learning as a resource for their human capital and their competitive advantage.

References and selected further readings

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2. Shipton, H., Pirrioni, S. and Wu, N., 2016. Developing talent through apprenticeships. HR Review, 19th September 2016. Available at <http://www.hrreview.co.uk/hr-news/strategy-news/helen-shipton-developing-talent-apprenticeships/101114>

Long gone are the days when an apprenticeship meant a fresh-faced 16 year old on a building site. A changing economy means that apprenticeships in England are undergoing reform, and more businesses across a variety of sectors will be developing their workforce through these programmes.

The Government has confirmed its commitment to apprenticeships by setting a target of three million new starts by 2020, and will double spending in comparison to 2010-11 – raising £3 billion in the UK with the newly introduced levy. The reform aims to ensure apprenticeships are high quality, placing employers in charge of the design and delivery, and positioning the relationship between the apprentice and the employer at the core. Replacing the current standards will be levels of skills, knowledge and competency required in an occupation, which have been identified by the 140 employer-led groups known as ‘trailblazers’. As part of these changes, an increasing number of Higher Apprenticeships have been launched in a range of career areas, such as aerospace engineering, nuclear, construction, accounting and management.

This growth means that more businesses will be thinking about how they can use apprenticeships to develop the talent they need in their organisations, including the up-skilling of existing employees. But for these schemes to be properly effective for businesses, the apprentice must get the best learning experience possible in the workplace.

To explore this issue, we recently surveyed 250 Advanced and Higher apprentices to provide insight into how they are managed in the workplace and what this means for their learning, performance, underlying job competence and core skills. When looking at the findings, it became apparent that a challenging, supportive and empowering work environment is a crucial element of apprentices’ learning and one factor influenced their experience more than others – the role of their line manager.

Supervisor support was considered essential when it came to transferring the theoretical knowledge learned at university or college to formal training in the workplace. As key figures in presenting apprentices with a positive learning environment, it is important that line managers are involved in the planning and delivery of the apprenticeship. This not only

fosters a commitment to the programme, but their close involvement also helps organisations to secure the best results possible and develop talent aligned with the business strategy.

Affirming the advice of the CIPD's 2014 Apprenticeships That Work report, the role of the line manager should include giving the apprentices work which will stretch their abilities and in turn identify potential skills which align with business needs. Similarly, providing apprentices with the right level of responsibility and independence can support them in developing their skills and grow into competent professionals.

When it comes to new or inexperienced employees joining the organisation as apprentices, the findings showed that support from other colleagues is also an exceptionally important factor in contributing to their performance. This includes sharing experiences and recognition of what the apprentice was expected to contribute to the team. There is also a positive association between support and challenges. In a supportive environment, apprentices are more likely to perceive challenging tasks involving problem solving and experimenting as positive developmental opportunities.

The availability of feedback and good levels of communication are also important to the apprentices we questioned. They value the opportunity to ask questions and receive constructive feedback on a regular basis as part of their learning and development. Investment in this type of formal training can be a considerable amount, particularly when it comes to Higher Apprenticeships where university tuition fees need to be covered, so it's imperative that apprenticeships work for the business.

With the current reform placing employers in the driving seat of the design of apprenticeship standards to guarantee that training is responsive to business needs, organisations must address front line management involvement to maximise apprentices' learning in the workplace. The most telling – and we would argue, crucial – implications of our work are as follows:

- The senior team needs to involve line managers in the planning and delivery of apprenticeship programmes
- Line managers and more experienced colleagues should offer plenty of opportunities for apprentices to ask for and receive constructive feedback
- The management team has to craft each apprentice's workload to ensure the right level of challenge, responsibility and autonomy

- Help apprentices to understand the values and goals of the organization as a whole, to allow them to align their skills with business needs

3. Pirrioni, S, Shipton, H and Wu, N. 2018. Developing emergent professionals' work role performance: the combined influence of the work environment and performance appraisal. Accepted as paper presentation at the HRIC conference 2019, Human Resource Division of the Academy of Management.

This study investigates how organisations can foster apprentices' professional development considering the joint effects of the work environment (problem solving and feedback) and performance appraisal on a range of work role behaviours. A study on a sample of 172 apprentices operating in the engineering sector in England demonstrates that problem solving and regular feedback from colleagues and supervisors are positively associated with performance, whilst appraisal's satisfaction positively moderates these relationships. The findings underscore the importance of appraisal's satisfaction for professional development in fostering engagement in informal learning. Additionally, conceptualising performance in work role behaviours that contribute to team and organisational effectiveness, this study identifies performance appraisal as potential factor for facilitating a cross-level transfer of benefits so that individual learning contributes to better functioning of the team and the organisation. The findings are innovative in integrating the apprenticeship and the HRM literature and present insightful implications for both communities.

Introduction

In rapidly changing work contexts characterised by advances in technology, globalisation and new work roles, learning and development are essential for both individuals and organisations (Sonntag, Niessen & Ohly, 2004). Whilst research has largely focused on professionals, a paucity of studies has considered how emergent professionals such as apprentices can be supported in learning their job and in engaging with professional development throughout their career (Messman & Mulder, 2015). In light of growing consensus that learning in the workplace contributes to professional development (Eraut, 2007) and informal learning activities are associated with performance (Enos, Kehrhaan & Bell, 2003), it is important to understand how the work environment can enhance competence development and resultant performance. Building on the work of Messman and Mulder (2015) who demonstrated how work environments providing an optimal balance of challenges, autonomy and support foster apprentices' engagement with informal learning, we investigate the association between problem solving and feedback as drivers of informal

learning and apprentices' performance. In so doing, we extend research by empirically examining the impact of the work environment on apprentices' performance addressing the limitations of studies that only considered learning as outcome of interest (i.e. Messman & Mulder, 2015). This is an important consideration in light of extensive investments in apprenticeships on an international scale (Fuller & Unwin, 2011) providing further evidence on the learning potential of the work environment as driver of professional development.

Additionally, although extensive research has documented the factors contributing to successful apprenticeships (i.e. Fuller & Unwin, 2003), little is known about the role of the human resource management (HRM) system in supporting apprentices' development. With commentators arguing that the benefits of successful apprenticeships may be dependent upon high performance work practices in place in organisations (Hogarth, Gambin & Hasluck, 2012), we present an original insight considering the influence of performance appraisal (PA) on apprentices' professional development. In light of compelling evidence that high-quality PA promotes increased participation in informal learning activities such as reflection, knowledge sharing and innovative behaviour over time (Bednall, Sanders & Runhaar, 2014), PA is here deemed critical for explaining apprentices' engagement with the work environment and resultant variation in performance. In so doing, we provide empirical evidence for the influence of HRM on apprenticeships and in integrating these two areas of study we present novel theoretical and practical implications for both communities.

Furthermore, with research indicating that learning contributes to individual, team and organisational performance, Aguinis and Kraiger (2009) have called for studies that foster the understanding of how individual learning results in better functioning of the team and the organisation. In considering this cross-level transfer of benefits, this study investigates the joint effects of the work environment, by means of problem solving and feedback, and PA on a classification of work role behaviours contributing to the team and the organisation effectiveness (Griffin, Neal & Parker, 2007). In light of the multidimensionality of the construct of performance (Campbell, 1990) we consider formalised and emergent work role behaviours relevant for team and organisational level outcomes. In so doing, we provide preliminary evidence of how distinctive performance behaviours can be facilitated, shedding light on PA as mechanism for transferring individual learning to benefit the team and the organisation.

Informal learning drivers and work role performance in uncertain and interdependent contexts

Performance refers to behaviours that contribute to organisational goal achievement (Borman & Motowidlo, 1993). Whilst several conceptualisations of performance exist (Campbell, 1990; Podsakoff, Mackenzie, Paine & Bachrach, 2000; Pulakos, Arad, Donovan & Plamondon 2000), all tend to convene on the multidimensionality of the construct. In light of increasingly dynamic and interrelated work contexts (Han & Williams, 2008) situational features of uncertainty and interdependence shape and determine the valued performance behaviours (Griffin, Neal & Parker, 2007). Interdependence is pervasive to organisations and in determining the extent to which work roles are embedded in social systems it defines whether individuals need to support the broader social context of the organisation (Griffin, Neal & Parker, 2007). Following Borman and Motowidlo's (1993) concept of contextual performance, we consider work role behaviours that contribute to the effectiveness of the team and the organisation. In so doing, rather than focusing on task performance as in behaviours prescribed by role requirements and contributing to individual effectiveness, we consider a range of behaviours contributing to effectiveness at higher levels, namely team and organisational. With organisations increasingly adopting team-based structures (Han & Williams, 2008), it is important that emergent professionals learn how to operate as effective team members. Following Griffin and colleagues (2007), *team member proficiency* is here considered as in behaviours required when working in a group context, encompassing helping colleagues (Podsakoff et al., 2000) and cooperating with others. *Organisation member proficiency* refers to behaviours that contribute to the organisational effectiveness including supporting and defending organisational objectives (Borman & Motowidlo, 1993) and promoting the organisational image (Podsakoff et al., 2000). Although the citizenship literature (Podsakoff et al., 2000) presents these behaviours as discretionary, Griffin, Neal and Parker (2007) identify team member and organisation member proficiency as formalised behaviours expected in interdependent work systems.

Whilst proficiency behaviours can be anticipated and thus formalised, Griffin, Neal and Parker (2007) argue that uncertainty is pervasive in increasingly dynamic and changing contexts, causing work role behaviours to emerge requiring certain levels of flexibility. The scholars identify adaptivity as emergent work role behaviour taking prominence in contexts of uncertainty where individuals need to respond to changes. Adaptivity represents how individuals cope with, respond to and support changes affecting the tasks, the team and the

organisation. As discussed by Shoss, Witt and Vera (2012), adaptive performance manifests a response to an externally initiated change and involves competency acquisition in reflecting efforts to develop new competencies in order to respond to change. In light of the dynamic environments in which organisations operate, we consider how individuals respond to and support changes affecting their role as team members (*team member adaptivity*) and as organisation members (*organisation member adaptivity*) (Griffin, Neal & Parker, 2007). In so doing, we account for adaptive work role behaviours that contribute to team and organisational effectiveness.

Whilst research on performance antecedents in Organisational Psychology has generally focused on cognitive ability and personality traits (Motowidlo & Kell, 2003) and research on adaptability has largely investigated individual difference factors overlooking how contextual factors may affect adaptive performance (Baard, Rench & Koxlowski, 2013), here we turn the spotlight onto problem solving and feedback as drivers of informal learning. Preliminary evidence on the importance of situational variables for adaptive performance was presented by Griffin and Hesketh (2006), whose findings demonstrated how those employees who rated the work environment as challenging and supportive were rated by their supervisors as displaying high levels of adaptive performance. Additionally, studies on professional development have found challenging and supportive work environments in association with participation in informal learning activities as reflection (Messmann & Mulder, 2015) and with the development of critical end-state competencies (Dragoni, Tesluk & Russell 2009). Accordingly, problem solving is here considered as important component of challenging work experiences that in presenting novel and complex situations activates a learning response (Doornbos, Bolhuis & Simons 2004). Problem solving has indeed been recognised as working activity with learning as a by-product (Eraut, 2007) and studies present evidence of an association between problem solving and increased performance and expertise (Brockman & Dirks, 2006). In light of this evidence, we test the association between problem solving with formalised and emergent work role behaviours and hypothesise the following:

Hypothesis 1: Problem solving is positively related to a) team member proficiency; b) organisation member proficiency; c) team member adaptivity; d) organisation member adaptivity

When considering facets of supportive work environments, research indicates that day-to-day and regular feedback is particularly valuable in supporting competence development (Eraut, 2007) and in enhancing engagement in informal learning activities (Mulder, 2013). Additionally, regular feedback from colleagues and supervisors has been found to support employees in developmental assignments, counterbalancing the levels of uncertainty associated with challenging tasks (DeRue and Wellman, 2009), and is increasingly viewed as critical factor for performance enhancement (Mulder, 2013). Accordingly, this study hypothesises the following:

Hypothesis 2: Feedback is positively related to a) team member proficiency; b) organisation member proficiency; c) team member adaptivity; d) organisation member adaptivity

Performance appraisal satisfaction

PA is here considered as formal and particular event, part of a broader performance management system striving to improve organisational performance (DeNisi & Sonesh, 2011). Central to PA is the evaluation and communication of individual performance feedback, usually in face-to—face meetings between the employee and the supervisor (Elicker, Levy & Hall 2006). As reported by Bednall and colleagues (2014), PA allows supervisors to provide employees with valuable feedback, supporting them to approach mistakes as learning opportunities and more generally encouraging knowledge-sharing among team members. Whilst employees are expected to receive regular informal feedback from colleagues and supervisors, PA is deemed crucial for delivering normative feedback on performance and evaluating whether organisational expectations have been met (DeNisi and Sonesh, 2010).

PA satisfaction is an important predictor of employees' attitudes and behaviours (Kuvaas, 2006). Research indicates that perceptions of PA's use relate to employees' satisfaction suggesting that developmental PA, focused on identifying individual training needs, strengths and weaknesses along with providing performance feedback, is consistent with communicating to employees their value and future in the organisation (Boswell & Boudreau, 2000). Similarly, Kuvaas (2006) presents compelling evidence that PA satisfaction is directly associated with affective commitment and turnover intentions, revealing that developmental PA contributes to employees' perceptions of the organisation's investments in their development.

In presenting PA as a mechanism for developing and motivating employees, we posit that apprentices may react differently to the work environment depending on PA satisfaction. It follows that apprentices' PA satisfaction may explain why some apprentices gain more from engaging with the learning opportunities provided by the immediate work environment resulting in higher resultant performance. This can be explained considering that employees' perceptions of the organisation's commitment in conducting developmental PA are associated with employees' feeling valued (i.e. Boswell & Boudreau, 2000). As discussed by Kuvaas (2006), perceptions of developmental PA are related to the organisation's perceived investments in employees development in providing the knowledge and skills required for career progression. Similarly, research indicates that employees' attributions that HR practices are motivated by the organisation's concern for their development and wellbeing are reflected in high quality exchange relationships (Nishii, Lepak & Schneider, 2008). The latter is particularly important given that high quality employee-organisational relationships reflecting social exchanges (Blau, 1964) are critical for the effectiveness of developmental programmes (Kuvaas, 2008).

According to the principles of social exchange (Blau, 1964) as organisations invest in employees' development such inducements in turn foster employees' reciprocation with positive attitudes and behaviours. It follows that apprentices experiencing organisational support are likely to feel an obligation to repay the organisation for its investments in their development by making greater use of the developmental opportunities provided by the immediate work environment. Consequently, apprentices experiencing PA satisfaction are expected to engage in problem solving activities as means to competence development. Similarly, PA satisfaction is expected to increase the effects of informal day-to-day feedback from colleagues and supervisors as this provides apprentices with developmental opportunities.

Additionally, given that PA entails the communication of organisational strategies, goals and visions (Kuvaas, 2006), it has the potential to elucidate how the work of the individual is related to team and organisational goals (Kuvaas, 2011). This is deemed particularly important for emergent professionals in fostering the understanding of superordinate goals and in aligning individual and organisational goals (DeNisi & Sonesh, 2011). Accordingly, in upholding the identification with the organisation and the team (Levy & Williams, 2004), PA is predicated to enable emergent professionals to understand how their role contributes to higher team and organisational level outcomes. Given that performance is a cross-level

construct in that individual performance influences the performance of the team and the organisation (Den Hartog, Boselie & Paauwe, 2004), PA can heighten emergent professionals' understanding of the interdependency of their job role within the organisation, so facilitating the understanding of how their role supports the broader social context (i.e. Griffin, Neal & Parker, 2007).

In finding the relationship between PA satisfaction and performance as mediated by intrinsic motivation, Kuvaas (2006) argues that task performance is more likely to be influenced by skills and abilities, rather than PA satisfaction. In so doing, Kuvaas calls for research on the impact of PA on different levels of performance maintaining that the HR practice may be more relevant for influencing contextual performance as in behaviours that support the broader organisational environment. In answering this call, the current study considers the influence of PA on formalised and emergent work role behaviours relevant for team and organisational effectiveness and hypothesises the following:

Hypothesis 3: PA satisfaction moderates the relationships between a) problem solving and team member proficiency; organisation member proficiency; team member adaptivity; organisation member adaptivity; and b) feedback and team member proficiency; organisation member proficiency; team member adaptivity; organisation member adaptivity.

Method

In order to test the advanced hypotheses a cross-sectional study with 172 apprentices operating in two engineering organisations in England was conducted. Existing scales with proven reliability were selected for measuring the constructs of interest. Unless otherwise stated, response options ranged from (1) 'strongly disagree' to (5) 'strongly agree'.

Problem solving was measured with a 4-item scale developed by Morgeson and Humphrey (2006) measuring problems solving as in the generation of ideas and innovative solutions to problems as function of job requirements; the scale reliability was $\alpha = .81$. *Feedback* was measured with a 3-item scale developed by Morgeson and Humphrey (2006) measuring the extent to which colleagues and supervisors provide ongoing feedback on performance; the scale reliability was $\alpha = .83$. *PA* was measured with a 6-item scale developed by Kuvaas (2006) to measure employees' satisfaction with PA activities, the adequacy of feedback provided and the organisation's commitment to conduct developmental PA; the scale reliability was $\alpha = .86$. Finally, *work role performance* was measured with a 12-item scale

developed by Griffin, Neal and Parker (2007) which differentiates between work role behaviours of proficiency and adaptivity at team and organisational level. All items were measured using a 5-point Likert scale asking respondents to rate the frequency of the behaviour over the last 12 months (1= not much; 2= little; 3= somewhat; 4= much; 5= a great deal). All performance measures presented adequate reliability. Additionally, we controlled for tenure (0= less than 1 year; 1= more than 1 year), level of apprenticeship (0= level 3; 1= level 4 and above), age (0= younger than 20; 1= older than 20).

Findings

Regression analysis was used to test the hypotheses. To test the direct effects (Hypotheses 1 and 2) the dependent variables were first regressed onto the control variables (Model 1). In a second step, the investigated predictor and PA were entered (Model 2). To test for moderation (Hypothesis 3), the interaction term between PA and the considered predictor was included in a third step (Model 3).

Based on Model 1, all control variables failed to predict the performance outcomes. Based on Model 2, problem solving was positively and significantly associated with team member proficiency ($\beta = .24, p < .01$); organisation member proficiency ($\beta = .16, p < .05$) and team member adaptivity ($\beta = .22, p < .01$). Feedback was positively and significantly associated with team member proficiency ($\beta = .32, p < .01$); organisation member proficiency ($\beta = .31, p < .05$); team member adaptivity ($\beta = .23, p < .05$) and organisation member adaptivity ($\beta = .19, p < .05$). Model 3 revealed that PA positively and significantly moderated the relationship between problem solving and team member proficiency ($\beta = .21, p < .01$); problem solving and organisation member proficiency ($\beta = .25, p < .05$); problem solving and organisation member adaptivity ($\beta = .18, p < .05$). Notably, the effects of problem solving on organisation member adaptivity are dependent upon adequate levels of PA satisfaction. Additionally, PA moderated the relationship between feedback and team member proficiency ($\beta = .16, p < .01$) and feedback and organisation member adaptivity ($\beta = .16, p < .01$). For these performance outcomes, the positive effects of problem solving and feedback were stronger when PA satisfaction was high. The significant interaction effects are shown in Figures 1-5.

Discussion

Organisations investing in apprenticeships as strategy to develop their talent need to better understand how to sustain professional development considering the substantial learning

potential of the work environment. Moreover, increasingly dynamic and interdependent work contexts necessitate the development of competencies beyond formalised job specific skills. This study expands research on work environment factors supporting the development of competencies required to operate as effective team and organisational members and to adapt in face of changes affecting the organisational social context. The findings suggest that problem solving and regular feedback from colleagues and supervisors play a crucial role in supporting the development of competencies contributing to the effectiveness of the team and the organisation. More so, the relationships between these factors and the considered work role behaviours are strengthened when PA satisfaction is high. Whilst PA is not always directly associated with team and organisational work role behaviours, it plays a critical role in enhancing the effects of problem solving and feedback on resultant performance.

By determining a positive relationship between problem solving and the considered work role behaviours, this study identifies a job characteristic conducive to professional development that is more specific than the previously research constructs of challenging work (i.e. Messman & Mulder, 2015). Our findings are consistent with meta-analysis results presented by Podsakoff and colleagues (2000) which identified task variables as strongly related to organisation citizenship behaviours, and expand knowledge on the behaviours potentially stimulated by problem solving. When considering the relationships between problem solving and team and organisation member proficiency, these can be interpreted through an indirect effect on employees' psychological state of perceived responsibility. As discussed by Pearce and Gregersen (1991), when individuals feel responsibility towards the organisation and their colleagues, they are more likely to engage in extra role behaviours as helping others. Whilst research has linked task autonomy and task interdependence with felt responsibility (Hackman & Oldham, 1975; Pearce and Gregersen, 1991), problem solving in requiring unique ideas and solutions to complex situations may also lead to felt responsibility for work outcomes.

The positive relationship between problem solving and team member and organisation member adaptivity is consistent with studies that explore the influence of challenging job demands on employees' creativity. Specifically, Zhou, Hirst and Shipton (2012) found problem-solving demand in positive association with employees' creative performance revealing that the cognitive requirements of the job stimulate skills development and new solution to problems. By experiencing novel and unexpected events, apprentices experience challenging situations that foster learning in the workplace (Doornbos et al., 2004). As

discussed by van Rijn, Yang and Sanders (2013), workplace learning leads to the development of knowledge, skills and abilities required to deal with the constant changes affecting the work contexts. Our findings thus underscore the importance of engaging emergent professionals in challenging work to stimulate the ability to adapt to changes affecting their role as team and organisational members.

The positive association of feedback with the spectrum of work role behaviours is consistent with studies that found feedback to positively affect performance (Kluger and DeNisi, 1996). The findings support the proposition that feedback from managers and colleagues stimulates workplace learning (Doornbos et al., 2004) and underline the value of short-term regular feedback for early career professionals (Eraut, 2007). The association between feedback and work role performance can be explained in light of the evidence that feedback consistently leads to reflection (Bednall et al., 2014; Mulder, 2013), a component of critical reflective work behaviour aimed at optimising individual and collective practices (Van Woerkom & Croon, 2008). Accordingly, regular feedback from colleagues and supervisors enhances individual or collegial reflection that helps emergent professionals to understand how to better support the effectiveness of the team and the organisation.

The moderating effects of PA on the association between problem solving and feedback with both formalised and emergent work role behaviours illustrates that employees experiencing PA satisfaction engage more with problem solving and feedback, reporting higher performance results. Additionally, the results indicate that the association between problem solving and organisation member adaptivity is contingent upon adequate PA satisfaction, illustrating why apprentices may differently respond to challenging tasks. The findings support former research on early career professionals which identified the significance of long-term and strategic feedback on general progress (Eraut, 2007) explaining why this matter in relation to engagement with informal learning. Observing the combined effects of PA satisfaction and problem solving and feedback on work role performance, our study demonstrates that those experiencing PA satisfaction approach problem solving and feedback as learning opportunities. This can be explained as employees' experiencing developmental PA feel part of a relational employment relationship characterised by open-ended exchanges and long-term mutual investments (Lepak & Snell, 1999) in turn fostering their reciprocation by making greater use of informal learning opportunities. The findings pose important implications for practice in demonstrating that reactions to PA influence how individuals respond to the learning potential of the work environment, underscoring the

importance of positive appraisal reactions (Kuvaas, 2006). Additionally, the study provides preliminary evidence of the relevance of PA in supporting contextual performance, presenting it as potential factor in converting individual learning into better functioning of the team and the organisation. Organisations should thus focus on providing developmental PA that clearly communicates the organisation's vision and strategy, enabling emergent professionals to understand how their role contributes to the effectiveness of the team and the organisation.

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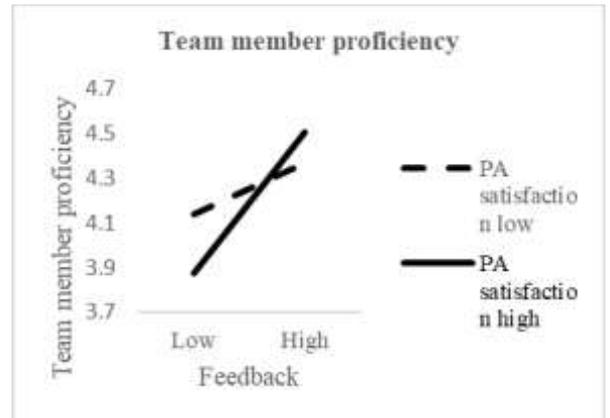
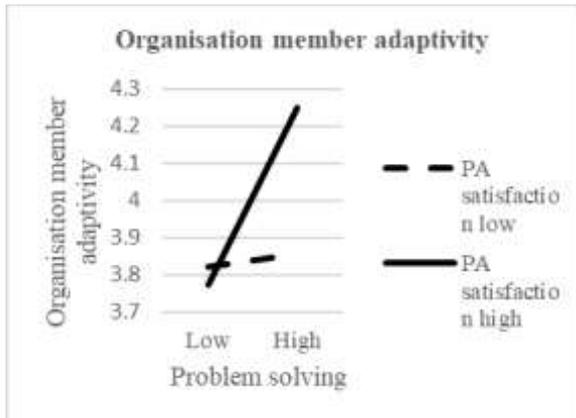
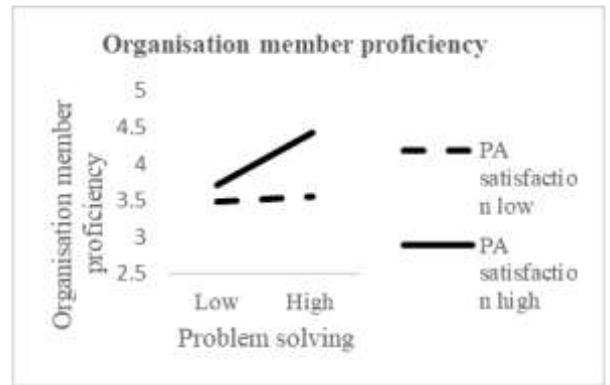
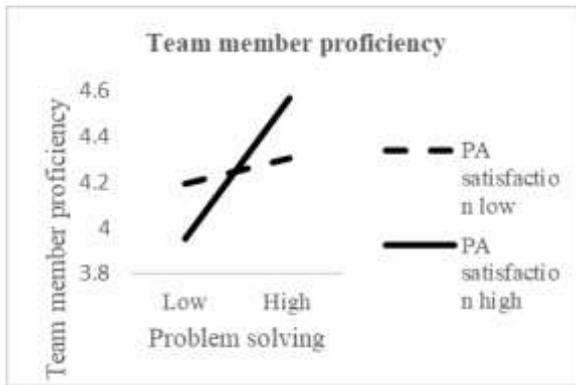


Fig. 1-5 Significant interaction effects of Problem solving and Feedback with PA satisfaction on team member- and organisation member- proficiency and adity.