



What Motivates Adults to Learn?

A rapid evidence review
of what drives learning new
skills in the workplace

DIGITALFRONTRUNNERS



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Executive Summary

Societies everywhere are undergoing deep transformation, and this calls for new understanding of what enables and drives adults in work to learn new skills. Longer lifespans, 'Industry 4.0' disruption and the need for higher-skilled workforces each point towards substantial career changes taking place during people's working lives. There is an urgent requirement to foster individuals' capabilities and competencies that societies and economies need. Many more workers will find that their roles (and skill sets) have to be adapted to working alongside increasingly capable machines. This means shifting focus from literacy and numeracy skills to work environments and on new approaches to learning for economic prosperity, social equity and societal wellbeing.

Emerging technologies are widely expected to have disruptive consequences for workers and workplaces. The estimates of jobs under immediate threat from automation vary considerably from a lower end of nine per cent to a higher end of 12 per cent (Arntz et al, 2016). Even though many jobs contain tasks that will become automated, it does not follow that those entire jobs will disappear (OECD 2019a; 2019b). Demand for the job (and, therefore, the worker) may continue but with a modified set of task responsibilities, reflecting the higher importance of automated processes augmenting human activities in the role (and vice versa). While a lot of predictions are about the negative impact of automation on jobs, it is important to remember that people with digital skills will be crucial to ensuring the transformation of organisations so that the digital revolution can happen at all. Strack et al (2017) write that *"talented employees who are able to use existing digital technologies and adapt to evolving methods and new approaches [will be important]. Without these employees, companies will struggle to benefit as they*

should from the latest advances — everything from Industry 4.0 and robots to artificial intelligence, data science, virtual reality and new digital business models." In an increasingly complex digital world, policymakers need to consider how best to help people upskill in a technical, ethical and social sense.

Approach

To address Nesta's research questions within the project parameters, we have adopted a rapid evidence assessment (REA) method of literature analysis. The REA uses stringent search criteria and screening methods to reduce the volume of material for analysis and speed up the process compared to other systematic review methods (Thomas, Newman & Oliver, 2013). Therefore, an REA involves some trade-off between available resources and the level of rigour (Speirs, Gross & Heptonstall, 2015). In this REA, we conducted around 1,000 searches, resulting in a shortlist of 282 sources of evidence that were reviewed in full, of which 65 were selected for inclusion in this report.

Key Findings

Our review focuses on two main lines of enquiry. The first identifies conceptual factors that impact on adult workers' motivation to learn generally, and in relation to learning digital skills. The second explores the strength of the evidence base of approaches and policy interventions that have demonstrated impact.

Key learnings

There is a significant evidence gap relating to motivations to learn in relation to the development of digital skills and digital competencies among adult workers. Experimental evidence is rare.

This review reinforces the importance of the link between individuals' motivation to learn and their psychological readiness (career adaptability resources) when considering positive career outcomes. Such career adaptability resources play an important linking role between career outcomes and motivation. Motivations to learn can be intrinsic (driven by internal personal goals) and extrinsic (subject to social/contextual influences such as expectations of reward or consequence).

Careers information, advice and guidance should ideally vary across the learner journey (from consideration to take-up and completion). For example, in the early stages of decision-making (pre-contemplation), careers support should focus on encouraging self-reflection. As adults become more engaged with the idea of learning, more specific, detailed information becomes valuable.

The behavioural framework is a useful way of framing motivation in this context. For this study, we use Michie et al's COM-B model (2011, 2014). The COM-B acronym considers the role of capability, opportunity and motivation in relation to behaviour. Most strategies identified relate to opportunity, though several strategies also focus on motivation. Few approaches have sought to address capability domains.



Part 1: Factors influencing adult workers' motivation to learn for work

Motivation to learn is driven by personal and external factors

Intrinsic motivations (driven by internalised goals) and extrinsic motivations (subject to social/contextual influences, such as expectations of reward or consequence) have both been shown to impact on adult workers' learning behaviour. The evidence suggests that while extrinsic motivations can be influenced (for example, by encouraging employers to support and invest in employee learning), it needs to be matched by a degree of intrinsic motivation to drive learner behaviour.

Individuals' psychological readiness to learn is important

'Career adaptability' describes an individual's resources for coping with current and anticipated tasks and transitions within the workplace. These resources are positively correlated to goal pursuit, with relevance for workers' motivations to learn. The literature identifies five key adaptability resources: concern (extent of future planning); curiosity (exploration of possible selves, understanding of fit between self, occupational roles and opportunities); control (sense of personal responsibility); confidence (self-belief in ability to implement choices and achieve set goals) and commitment (opportunities provided to engage in meaningful projects).

The evidence relating motivation to learning digital skills is scarce

The occupational risks and opportunities presented by the rate of technological development and change are well documented. However, this rapid evidence review has identified a significant evidence gap relating to motivations to learn, specifically in relation to the development of digital skills and digital competencies among adult workers.

The external factors that impact on adult workers' participation and progression in learning are numerous

External factors have been shown to impact on motivations to learn, including:

- **Opportunity** (e.g. the extent to which learning is supported/encouraged by employers)
- **Access** (e.g. flexibility of learning provision)
- **Quality of training** (e.g. the effect of positive or negative learning experiences on future intentions)
- **Career motivation and engagement** (e.g. commitment to current employer)
- **Social contexts** (e.g. level of peer support and encouragement for learning).

External factors influence learning behaviours directly (in the extent to which they present situational barriers), and through the influence they have on motivation (i.e. the extent to which they contribute to dispositional barriers).

But internal and external influences are strongly intertwined

Behavioural analysis illustrates how intrinsic and extrinsic motivations interact with external or situational factors to determine learning behaviour. Such models are useful in identifying the implications for policymakers, practitioners and researchers concerned with increasing participation rates in adult learning, highlighting potential behavioural levers and barriers.

Part 2: How effective are specific strategies and techniques (including digital approaches) in increasing learning motivation and career adaptability of adult workers?

Evidence from randomised control trials and quasi-experimental methods is very limited

This rapid review has identified very little experimental evidence for the impact of specific strategies to increase the motivation of adult workers relating to career adaptability skills, and none relating to digital or digital complementary skills.

Correlational studies (level 2 evidence²) indicate that career guidance/coaching/counselling techniques, particularly those that encourage self-reflection, show emerging promise in the development of career adaptability skills. One quasi-experimental study (level 3, albeit based on a small sample size) reported similar conclusions for an online intervention. In this case, ePortfolios (allowing participants to reflect on development and demonstrate competencies and skills) were shown to positively impact on career adaptive responses (Horst and Klehe, 2018).

Individual learning accounts are growing in popularity, but impact has not yet been demonstrated

Individual learning accounts (ILAs) have been introduced in several countries, providing individuals with resources they can use to take up further digital (and non-digital) training on their own initiative. By linking training rights to individuals rather than to specific jobs, ILAs are intended to be used throughout an individual's career, with potential to improve career adaptive responses (e.g. control). However, we found no research evidence of impact within the review.

This review also identified examples of strategies in place to improve adult workers' participation in lifelong learning (and development of digital/digital complementary skills), although there is no evidence of impact. Approaches focus on:

- Skills forecasting
- Provision of training programmes
- Support for workers to reskill (particularly targeting those at greatest risk of automation).

Reportedly successful policies target several aspects of learning for work

Drawing on recommendations from Beadle (2015), prepared for the European Council, this review outlines several success factors for adult learning policy:

- **Improving learners' disposition towards learning:** raising awareness of benefits, providing targeted guidance, engaging social partners and providing introductory learning experiences.
- **Increasing employers' investment in learning:** funding to assist employers to upskill workforce, promotion of externally accredited qualifications and work-based learning.
- **Improving equality of access for all:** funding and targeted IAG for under-represented groups, schemes to recognise formal and informal prior learning, outreach via intermediary organisations, basic skills development in all adult learning.
- **Provision of relevant and high-quality learning:** skills forecasting, understanding learners' needs and motivations, promoting flexibility and innovation in learning provision; clear progression pathways for learners; monitoring, evaluating and quality assuring adult learning provision.
- **Coordinating effective life-long learning policy:** align with other national/regional policy and build the knowledge base for what works in adult learning.

Evidence from healthcare settings also recommends success factors specifically relating to the development of digital skills and digital competencies, including:

- Establishing digital champions
- Effective leadership to embed skills development in strategy and remove barriers
- An organisational culture that values learning and development
- Access (e.g. protected learning time).

Inclusive strategies appear to be effective

Contextual variations in motivations to learn have for the most part focused on inclusivity, particularly concerning low-skilled workers. A targeted review would be required to clarify whether this is indeed the case across the wider literature. Targeted measures discussed in this review include:

- Raising awareness and promoting the benefits of training, particularly for low-skilled workers (i.e. potential for positive economic returns and career progression)
- Incentivising or funding training for workers employed in non-traditional forms of work, who are more likely to face barriers to learning (e.g. casual contracts, fixed-term contracts and the self-employed)
- Offering flexible provision to address barriers to participation, or ensuring time is protected to enable workers to engage in learning.

Emerging evidence shows that information and advice should vary across the learner journey

There is some emerging qualitative evidence on the impact of policy on different stages of the learning journey (including learners and non-learners, but not limited to workers, Kantar, 2018). This research describes the implications for those seeking to encourage participation in learning at the pre-contemplation,

contemplation, commitment and maintenance stages of adult learners' decision-making. The findings suggest that careers information, advice and guidance needs vary across the learner journey (from consideration to take-up and completion). For example, in the early stages of decision-making (pre-contemplation), careers support should focus primarily on encouraging self-reflection. As adults become more engaged with the idea of learning, information needs become more specific. Potential learners require information and careers guidance/coaching/counselling which provides tangible solutions for situational barriers to encourage uptake; while for those already engaged with learning, communication and support should focus on embedding the value of learning, to ensure completion and ongoing commitment.

Behavioural analysis suggests most interventions focus on the available opportunities to learn

There is no shared methodological approach to measure the impact of interventions. This makes it challenging to rank approaches and techniques for driving motivation to learn in terms of the strength of evidence for their effectiveness. To assess where the greatest effectiveness has been observed, strategies identified by this review have been mapped against the Theoretical Domains Framework, a behavioural change tool aligned to the COM-B model.

Strategies were identified relating to almost all the theoretical domains aligned to capability, opportunity and motivation, albeit with variation in the strength and breadth of evidence cited.

The majority of approaches relate to opportunity, using communications and modelling to target social influences, and targeting enablers and removing barriers in the environmental context (through guidelines, fiscal measures, regulation and/or service provision). A number of strategies are also identified to improve motivation, through education, persuasion, service provision, enablement, social/environmental planning or providing incentives. Few approaches seek to address capability. Those identified are typically concerned with improving inclusivity and targeting disadvantage.

Conclusions and implications for policy, research and practice

Key learnings

The available evidence suggests a stronger policy focus on flexible career learning could realise benefits. Career learning is defined as a process of self-reflection, supported within a dialogical learning environment, which enables individuals to actively shape and develop their career goals and actions on a lifelong basis (Hughes, 2019). Career learning needs to be inclusive and cover middle and lower-skilled roles as well as higher-skilled ones. New and innovative ways of reaching into workplaces have become an urgent imperative.

At a macro-policy level, this review identifies the importance of interventions and policy levers that enable learning. These levers cover enhanced service provision, fiscal measures, regulation and guidelines and/or legislation.

There is potential for a randomised control trial (RCT) to explore motivations to learn digital skills for the workplace. It may be worth considering the following themes:

- Careers IAG strategies across the learner journey
- Strategies that fall into the 'capability' strand of the COM-B model which are under-evidenced

Focus on one or more 'tipping points' – the trigger at which personal benefits outweigh personal costs.

Adult training tends to be taken up by those developing existing skills

Many policymakers have responded to changing skill requirements by emphasising lifelong learning. This has been recognised as an important goal in the United Nation's Sustainable Development Goals and has been assigned high priority by the G20 (Bode and Gold, 2018). However, most adult training in OECD countries

is geared towards people who are already skilled and focused on developing skills that improve productivity now, rather than skills that are considered to be necessary for the future.

Existing use of career learning is limited, especially for less-skilled roles

Technological disruption is likely to require flexible career learning; this need should be elevated within the policy discourse concerning digital skills, adult learning and employability. Career learning is defined as a process of self-reflection, supported within a dialogical learning environment, which enables individuals to actively shape and develop their career goals and actions on a lifelong basis (Hughes, 2019). Career guidance/coaching/counselling practices are already in sporadic use today, particularly in higher-skilled roles; however, there is less evidence that such practices have been extended to middle and lower-skilled roles.

Intervention strategies to influence motivation should be personalised

The findings clearly illustrate that the strength of adults' motivation to learn varies significantly, and that the components of motivation vary between individuals. The trigger to participate in learning for each adult comes at a tipping point where personal benefits outweigh personal costs (Kantar Public and Learning and Work Institute, 2018). Strategies discussed in relation to motivation typically involve:

- **Education and persuasion** (e.g. communications and marketing, role models, partnerships)
- **Service provision** (e.g. career guidance/counselling)
- **Enablement** (e.g. a legislative entitlement to a careers interview, individual learning accounts and career progression pathways)
- **Environmental/social restructuring** (e.g. skills forecasting and aligned provision)
- **Providing incentives** (e.g. rewarding learning behaviours).

Solutions that place training in the workplace are required

New and innovative ways of reaching into workplaces have become an urgent imperative, particularly given the serious decline in participation in formal learning in the UK over the last decade (Axa, 2018). Education cannot be divided up in a neat vocational/leisure divide. What individuals learn can become relevant in a host of unpredictable circumstances. Advances in digital developments afford new opportunities aimed at improving the capacity of adults in work to acquire new knowledge and to upgrade their skills in an evolving economy.

Numerous external influences can enable learning

Our review has found that providing greater opportunity and access to provision is an important external factor that influences training take-up at a macro-policy level. Therefore, the following range of intervention types and policy levers that target enablement should be considered through:

- **Enhanced service provision** (physical capability)
- **Fiscal measures** (physical capability; automatic motivation)
- **Regulation and guidelines** (physical opportunity); and/or
- **Legislation** (physical opportunity; reflective motivation).

Enhanced service provision through national infrastructure projects

Strengthening national careers and employability services to target, more specifically, adults in the workplace, particularly those who face redundancy, is important. Physical capability is a relevant behaviour category here. Beadle et al (2015) suggest that embedding skills development in adult learning programmes

to improve equality of access for all is key. In Mexico, the Secretariat of Labour and Social Welfare (STPS) runs the Remote Training Program for Workers (PROCADIST), which provides free online courses for workers across the country. Since 2015, the virtual training environment can be accessed via mobile devices in addition to computers. The United States Department of Labour has helped community colleges to develop and expand online, accelerated-learning strategies for adults. Belgium offers organised distance training and a major training agency facilitates access to Massive Open Online Courses (MOOCs) offered by partners. Awareness-raising is key – and this is recognised by academics and policymakers alike (OECD, 2019; Beadle, 2015). Awareness-raising campaigns should be implemented to promote the need for lifelong learning, career adaptability and digital skills. These could involve intermediate groups such as trade unions and digital champions (social opportunity). These should stimulate interest in increasing adults' access to education and training through improved information on education and training pathways. To be most impactful, campaigns should take account of the different stages of the learner journey as described by Kantar (2018).

National fiscal measures can target infrastructure or learners

Ensuring that programmes are funded (physical capability) is important. In England, the forthcoming National Retraining Scheme aimed at 'adults in work' brings a pledged investment from the Treasury of £100m. Evidence from 'cost and outreach pilots' clearly demonstrates that robust local leadership and coordination is vital in ensuring effective delivery. A key challenge is to develop a coherent national framework and lifelong learning activities that can be shaped and implemented locally to meet the needs of local people and businesses.

It is also important to reward learning (automatic motivation). Paying low-skilled staff to attend or offering other financial incentives can improve the take-up of opportunities (Bode and Gold, 2018; UKCES, 2012). This includes an exploration

of incentives for adults to learn in the workplace, ranging from in-house company incentives to employer and government-funded accessible training and development for adults in work. Any national framework should include the use of such skills for providing a decent life within society and to equip individuals with the skills and understanding of the appropriate use of technology within their social relations and their life course. There is scope for greater attention to be given to the 'returns on investment' for adults participating in learning, i.e. the economic, social and cultural benefits.

Regulation and/or guidelines may benefit by channelling through employer bodies

Career motivation and progression pathways (largely extrinsic factors as seen in 'reflective motivation') are influential factors in the decision to undertake workplace learning. Industry-led and professional bodies such as national and regional digital partnerships, the CIPD (professional body for HR and people development), and the UK Career Development Institute, among others, have a key role to play in this. They can articulate career progression pathways to adults and contribute to skills forecasting. However, much of this work is fragmented and requires a sharper focus and shared vision on strategies to engage with adults in the workplace introducing new and innovative approaches.

Legislation adds costs to employers for the benefit of workers

Organisational commitment impacts on motivation to learn ('reflective motivation') and providing opportunity structures helps sustain motivation to complete learning (physical opportunity – Cedefop, 2014). In France, all employees are entitled to a 'career interview' at least every two years. It allows employees to consider their career development in terms of qualifications and jobs. Every six years, the employer has to produce a written appraisal of all employees' careers and,

in enterprises with 50 or more employees, this document will be used to check whether the employee has benefited from sufficient training. The document is sent to the bipartite body in charge of managing the professional training at sectoral level (OPCA); if not, a bonus of 100 hours (130 hours for part-time employees) will be automatically added by the OPCA to the individual training account. Interviews draw on training passports and Compte Personnel de Formation (free tuition on government-approved programmes with paid leave from work).

A lot of further research and evaluation is possible, but will need a distinct focus

Researchers should be encouraged to focus on further work in those areas requiring additional evidence to strengthen the case for investment, for example:

- More systematic data collection and monitoring of policy interventions, to evidence impacts and outcomes and identify best practice for motivating adult workers to participate in learning (Bode and Gold, 2018; Beadle, 2015). By building the evidence base in this way, policymakers, practitioners and researchers would be better able to rank strategies and techniques, with consideration of any contextual differences and to reflect priority outcomes.
- Effective strategies to extend career adaptability policies and practices, including career guidance/coaching/counselling to middle and lower-skilled roles (Chan & Mai, 2015; Johnston, Maggiori, & Rossier, 2016; Zacher, 2015; (cited in Johnston, 2018); Eisele et al, 2013).
- Innovative ways of incentivising and accrediting formal and informal learning in the workplace (UKCES, 2012; Bode and Gold, 2018).
- Randomised control trials (RCTs) examining adults' motivation to learn digital skills for the workplace. The factors that influence the decision to run an RCT and some design considerations are outlined in more detail in Appendix 6.

- Use of artificial intelligence (AI) and data management systems that can capture adult learning trajectories such as: chatbots and labour market intelligence/information (LMI) online systems.
- Returns on investment (ROI) for adults participating in learning, i.e. the economic, social and cultural benefits and ways in which this can be communicated effectively.

At a practice level, there is scope for:

- Adults' increased access to bite-sized modules of learning, open educational resources and synchronous online sessions, using video streaming, either as part of blended learning courses or in the form of 'webinars'.
- The coming together of industry-led and professional bodies to co-create and communicate 21st century career-switching and progression routes aimed at adults in the workplace.
- National careers and employability support systems to be strengthened through a greater focus on careers information, advice and guidance in the workplace and local communities.

Finally, reaching local communities with a compelling narrative to increase adults' participation in formal and informal learning is essential. The art of persuasion and education (investment in communications, advertising and marketing) in the form of awareness-raising through a major campaign and/or multiple media campaigns is one way forward.



01.

Introduction and context

Societies everywhere are undergoing deep transformation, and this calls for new understanding of what enables and drives adults in work to learn new skills. Longer lifespans, Industry 4.0 disruption and the need for a higher-skilled workforce each point towards substantial career changes taking place during people's working lives.

There is an urgent requirement to foster individuals' capabilities and competencies that societies and economies need. Many more workers will find that their roles (and skill sets) have to be adapted to working alongside increasingly capable machines. This means moving beyond literacy and numeracy skills to focus on work environments and on new approaches to learning for economic prosperity and societal wellbeing.

Emerging technologies are widely expected to have disruptive consequences for workers and workplaces (Healy et al, 2017). At the other end of the spectrum, an important OECD study (Arntz et al, 2016) concluded that a much smaller share of jobs (9%) was under immediate threat from automation. This study highlights that even though many jobs contain tasks that will become 'automatable', it does not follow that those jobs will disappear (OECD, 2019a; 2019b). Demand for the job (and, therefore, the worker) may continue, but with a modified set of

task responsibilities, reflecting the higher importance of automated processes augmenting human activities in the role and vice versa.

A critical element is people (Strack et al, 2017): *"the talented employees who are able to use existing digital technologies and adapt to evolving methods and new approaches. Without these employees, companies will struggle to benefit as they should from the latest advances — everything from Industry 4.0 and robots to artificial intelligence, data science, virtual reality and new digital business models."* In particular, technological changes will modify the skills required of workers, meaning that potentially very large numbers of workers will need to upskill. Thus, more focus needs to be put on lifelong learning. In this context, educators should better prepare individuals to deal not only with existing digital technologies (and those yet to be invented) but also the ethical and social dimensions associated with this.

In December 2018, the European Commission highlighted within its Coordinated Plan for Artificial Intelligence (AI)³ that:

Workers fear they will lose their job because of automation, consumers wonder who is responsible in case a wrong decision is taken by an AI-based system, small companies do not know how to apply AI to their business, AI start-ups do not find the resources and talent they need in Europe, and international competition is fiercer than ever with massive investments in the US and China.

A report from the EU Joint Research Council (2018⁴ highlights: *"in the next years, AI will change learning, teaching and education. The speed of technological change will be very fast, and it will create high pressure to transform educational practices, institutions and policies."*

An earlier study on 'ICT for work: Digital skills in the workplace' (EC, 2017), launched by the European Commission: DG CONNECT, examined the transformation of jobs in the digital economy in the European Union. The study investigated the penetration of digital technologies into workplaces, the digital skills required by employers and the digital skills currently available in workplaces. It concluded that digital skills are currently mostly required for high-skilled and, to a lesser extent, medium-skilled employees to perform their job tasks; digital skills are less important or not required for low-skilled or unskilled employees. This dichotomy risks widening the digital divide, leaving a proportion of workers lagging behind and at risk of digital exclusion, who would hence benefit from specific attention.

Results from the EC study also show that even if workplaces report a proportion of their workforce lack proficiency in carrying out tasks involving the use of digital technologies, they often do not feel that these skills gaps impact on workplace performance and hence often do not take action to deal with the issue. In this context, it is important to underline that micro-sized workplaces⁵ represent more than 80% of the workplaces in the European Union. In the UK, in March 2017, micro-sized businesses totalled 89.4% of the nation's workplaces, encompassing 15.8% of the total number of employers (ONS, 2018).

In August 2018, a study by AXA Insurance, Britain's leading insurer of start-up businesses,⁶ stated that *"two thirds of UK adults say they plan to switch occupation, and most of them (46 per cent) will need to re-qualify to do so."*

Assuming the survey is representative of all UK adults, this would equate to 24 million people. However, seven in ten (circa 18 million people) said the course they needed would be too expensive. People in their 20s and 30s showed the biggest appetite for further education: 72 per cent said they would need to re-qualify or update their qualifications in the next decade. Another peak is seen among stay-at-home mums and dads, women on maternity leave and unemployed people – where six in ten want to study.

Nesta commissioned this REA to advance understanding of adult workers' motivation to learn and, in particular, individuals' capacity to develop career adaptability, digital and digital-complementary skills. This review has the following objectives:

- Identify factors that enable or prevent the uptake of training by workers with a focus on motivation.
- Identify the strength of the evidence for strategies and techniques that have increased the effectiveness of that training.

Summary of approach

CFE conducted systematic searches based on two primary research questions and five secondary questions:

RQ1: What are the factors that impact on adult workers' motivation to learn and develop skills for career adaptability, including digital and digital-complementary skills?

RQ2: What experimental evidence exists for the effectiveness of specific strategies and techniques (including digital approaches) to increase the motivation of adult workers to learn and develop career adaptability skills?

Secondary questions

RQ3: To the extent that it is possible to rank factors/interventions based on the evidence identified within this review, which of them have demonstrated the strongest evidence of impact?

RQ4: What are the active ingredients of policies and interventions which have had an impact on the motivation of adult workers to learn and develop career adaptability skills?

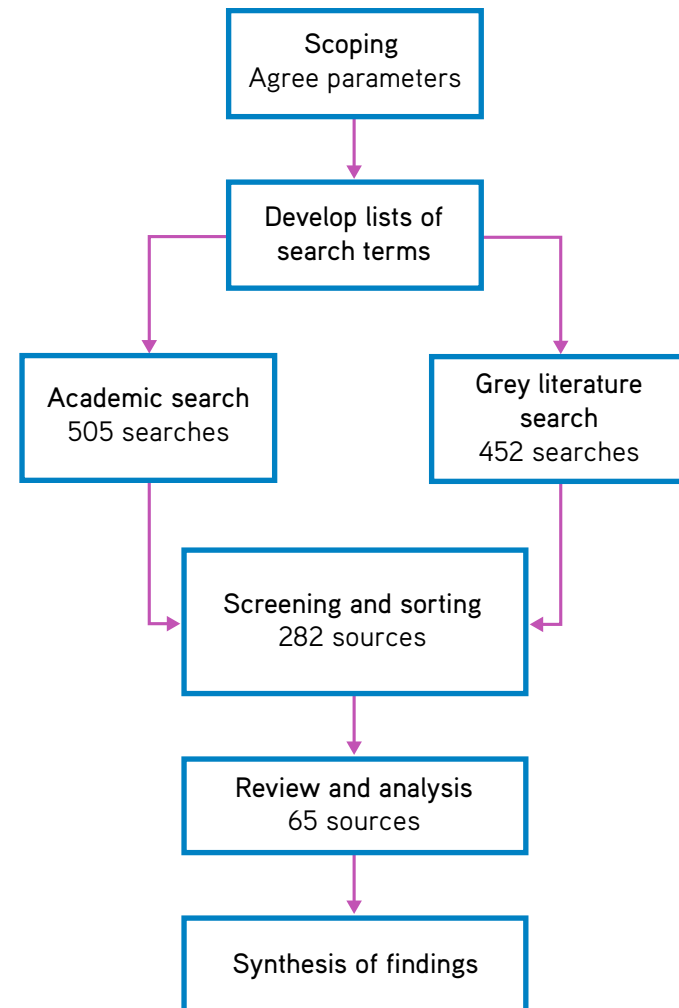
RQ5: How does the impact of different strategies for encouraging and sustaining continuous learning differ by a worker's contextual background, including profession or sector, level of education, skill level, household income, life-stage or household profile?

RQ6: What is the effect of different policy interventions relating to the development of career adaptability skills at each stage of the worker-learner journey?

RQ7: What are the key enablers and barriers that impact on adult workers' participation and progression in lifelong learning and career adaptability?

The REA process we followed is summarised below in Figure 1. A detailed explanation of our methodological approach can be found in Appendix 1. Search terms were applied to academic databases and open source material (grey literature), identifying a total of 282 documents for consideration (153 academic articles, 129 sources from grey literature). Based on an initial review (of abstract/summary and methodology), sources were assigned scores for relevance, transparency, method and execution to establish a hierarchy of evidence, with the highest-scoring articles selected for full review. On further consideration of the bibliography, six sources were added (and one removed). The final selection of 65 articles was reviewed in full, with evidence coded against the primary and secondary research questions. Additional articles were subsequently included as identified and included in the full bibliography found in the References section.

Figure 1: Summary of methodological approach



02.

Findings

Part 1: Factors that impact on adult workers' motivation to learn

In considering what influences the motivation of adult workers to learn, this section explores both intrinsic and extrinsic factors implicated in motivation, and the extent to which these may enable or hinder engagement in lifelong learning.

Overview of Part 1: factors that impact adult workers' motivation to learn

Behavioural models outline the ways in which these factors interact to enable or hinder learning participation of adult workers, to advance understanding of what drives motivations to learn. The link between individuals' motivation to learn and their psychological readiness (career adaptability resources) is explained, and finally motivations to learn, specifically in relation to digital skills development, are considered.

Reflecting on the evidence base

This section draws on literature from a broad range of fields, including work and organisational psychology, sociology, skills and employment research and policy, and behavioural insights. There is extensive evidence (Nesta levels 1 and 2⁷) exploring factors which impact adult workers' motivations to learn (including intrinsic and extrinsic drivers and the impact that external factors can have). Career adaptability has been the focus for much of the literature reflected in this report.

Key learnings

- Both intrinsic (driven by internalised goals) and extrinsic motivations (subject to social/contextual influences, such as expectations of reward or consequence) have been shown to impact on adult workers' learning behaviour.
- External influences include opportunity, access, quality of training, career motivation and engagement, and social context.
- The Capability Opportunity Motivation Behaviour (COM-B) model demonstrates how intrinsic and extrinsic motivations interact with external or situational factors to determine learning behaviour, with implications for strategies to increase it.
- Career adaptability resources (concern, curiosity, control and confidence) are positively correlated to goal pursuit and are important to increase motivations to learn. This rapid evidence review has identified a significant evidence gap relating specifically to motivations to develop digital skills among adult workers.

What makes adults want to learn (or not)?

The Department for Education's (DfE) UK Adult Learners' Participation Survey (Learning & Work Institute, 2018) provides some evidence for what makes adults want to learn. This annual quantitative study seeks to understand adults' experiences of, and decisions about, learning and is indicative of the range and interaction between factors that influence motivations to learn. The study found that:

- Most adults (**75%**) took up their main learning activity for work or career-related reasons (compared to **24%** for leisure or personal reasons).
- However, motivations for doing so were nuanced and a range of reasons was given by respondents:
 - » **27%** were motivated to develop themselves as a person
 - » **27%** to help improve in their job
 - » **26%** had an interest in the subject
 - » **24%** were motivated to get a recognised qualification
 - » **22%** took up learning because they enjoyed it
 - » **13%** were motivated to learn to increase their job security.
- Just one-sixth (**16%**) took up their main learning because the training was mandated (either by employer or a professional body), or for another reason not of their choosing.
- Almost two-fifths (**38%**) reported that there were no barriers preventing them from learning.

Kantar Public and The Learning and Work Institute note that for every learner, there is a complex and unique relationship between perceptions of the personal benefits and personal costs of learning. Here we explore the extent to which general principles of learning theory - and evidence relating to different types of motivation - explain different learning behaviours among adult workers.

General principles of learning theory

Cognitive learning theory assumes that motivation to learn is largely intrinsic (Kispeter, 2018). This theory is also supported by Perry (1999, cited in Berkeley GSI Teaching and Resource Centre, 2019), who argues that successful learning reflects a major personal investment on the part of the learner, because it requires significant restructuring of existing cognitive structures. Learners must face up to the limitations of their existing knowledge and accept the need to modify or abandon existing beliefs. Without some kind of internal drive on the part of the learner to do so, external rewards and punishments such as grades and feedback are unlikely to be sufficient motivators.

Social constructivism is a variety of cognitive constructivism that emphasises the collaborative nature of learning. In contrast to cognitive learning theory, social constructivists see motivation as both extrinsic and intrinsic. Because learning is essentially a social phenomenon, learners are partially motivated by rewards provided by the knowledge community. However, because knowledge is actively constructed by the learner, learning also depends on the learner's internal drive to understand and promote the learning process (Berkeley GSI Teaching and Resource Centre, 2019).

Self-determination theory (SDT) (proposed by Bauer et al, 2016, and Johnston, 2018) suggests that intrinsically motivated behaviours are undertaken to satisfy three needs: competence, relatedness and self-determining, and that motivation is highest when individuals engage in behaviours that fulfil those needs, leading to feelings of enjoyment and satisfaction. On this basis, intrinsically motivated learners engage in activities they enjoy because they have a 'need to feel competent, socially related and autonomous' (see, for example, Bauer et al, 2016).

These theories differ primarily in the importance they place on intrinsic versus extrinsic motivations, explored more fully in the following section. Bauer et al (2016) suggest that a single motivating factor may not be sufficient when multiple training outcomes are of interest, and so the interactions between types of motivation are also likely to be important.

Types of motivation

The concepts of intrinsic and extrinsic factors are explored extensively in the literature relating to motivations to learn, although terminology and definitions are inconsistent. Table 1 provides an overview of the general distinction between these two types of motivation.

Table 1: Types of motivation - an overview of intrinsic and extrinsic motivation⁸

	Motivation	Goals
Intrinsic	Individual undertakes activity because it is internally rewarding	Goals are internalised, the outcomes anticipated to satisfy basic psychological needs for autonomy, competence and relatedness
Extrinsic	Individual undertakes the activity in order to get an external 'reward' in return	Goals are focused on external outcomes, rather than the satisfaction of an individual's basic psychological needs. Goals may involve external gains, such as money, fame, avoiding consequence

Intrinsic motivation

Intrinsic motivation is defined as doing an activity for its own sake rather than for some external effects. In relation to motivation to learn, Deci and Ryan (2000, as cited in Mielniczuk & Laguna, 2017) argue for three types of intrinsic motivation:

- **Intrinsic motivation towards knowledge** – where an activity is undertaken for the pleasure of learning something new (this may also be described as a cognitive interest in learning, see Johnston, 2018).

- **Intrinsic motivation towards accomplishment** – an activity undertaken for the pleasure of achieving something.
- **Intrinsic motivation towards stimulation** – an activity undertaken in order to obtain stimulating experiences.

Based on a systematic review of the evidence relating to learning, Johnston (2018) considers motivation towards stimulation more broadly, writing:

Learning in itself is an opportunity for individuals to break free from any rut they might have found themselves in. Some people can become bored with their current routine and learning will often be the kick-start needed to motivate oneself again. It can also offer an 'escape' from the daily humdrum which individuals might be experiencing.

Johnston, 2018 (p.4)

Extrinsic motivation

Self-determination theory describes extrinsic factors (also referred to as controlled motivation) as behaviour initiated to achieve an exact result, driven by external demands, encouragements or rewards (Mielniczuk & Laguna, 2017).

Some authors describe a 'continuum of behavioural regulations', which demonstrates how extrinsic motivations vary in the extent to which they are internalised by the individual. Mielniczuk & Laguna (2017) differentiate between:

- **External regulation** (motivation to avoid punishment or gain reward)
- **Introjection** (motivation to seek approval or avoid guilt or anxiety)
- **Identification** (motivation to achieve a relevant personal goal)
- **Integration** (motivation to reflect an aspect of the self).

External regulation and introjection are described as externally determined, while identification and integration are more self-determined and autonomous and, therefore, more closely aligned to intrinsic motivation (see also Johnston, 2018, and Anvari et al, 2011).

Intrinsic and extrinsic motivation as initiators of learning

Johnston (2018; inter alia: Anvari, 2011; Mielniczuk & Laguna, 2017) suggests that there is a positive correlation between training initiation and intrinsic and external motivation. There is some evidence that intrinsic motivation is more powerful than extrinsic in predicting intention to undertake training. In their study of SME businesses in Poland, Mielniczuk & Laguna (2017) found that in comparison to other types of motivation, intrinsically motivated people were the most determined to reach their goals. They argued that those driven only by extrinsic motivations lacked the perseverance required to create exact plans concerning how to attain a desired training goal.

There is substantial evidence that extrinsic motivation influences take-up and engagement with learning directly (in terms of material and social enablers and barriers), and indirectly through interaction with intrinsic motivations (see for example Anvari et al, 2011; UKCES, 2012; Mielniczuk & Laguna, 2017; Johnston, 2018). In their study on the use of personal development plans to support training of workers in Holland, Eisle et al (2013) found that the effectiveness of the plans was dependent both on the organisation's support towards the individual and the individual's motivation.

Intrinsic and extrinsic motivation as barriers to learning

The concept of 'amotivation' is used to describe a state where neither intrinsic nor extrinsic motivation are strong enough to drive engagement in a given activity. It is characterised by a perceived lack of competence and/or a failure to value the activity itself or the likely outcomes of the activity (Mielniczuk & Laguna, 2017).

The 2017 Adult Participation in Learning Survey distinguishes between institutional, dispositional and situational barriers to learning (The Learning and Work Institute, 2018). The Institute goes on to note that situational barriers relating to external factors (such as personal or family situation) were the main barrier for 27% of non-learners. These findings are discussed more fully in the next section. Institutional barriers (i.e. the perception that the training available was inadequate) were cited by 2% of adults not engaged with learning. Such barriers are synonymous with the extrinsic factors of external regulation and introspection. In contrast, dispositional barriers (such as perceptions of one's own ability/suitability to train) were cited by 37% of non-learners, and could be associated with the extrinsic factors of identification and integration. On this basis, both institutional and dispositional barriers contribute overall to 'amotivation'.

External factors

This review identified a range of external factors that can impact on adult workers' motivation (or lack of motivation) to learn and develop skills, as outlined within this section.

Opportunity and access

Opportunity and access are frequently cited as external factors that impact on take-up of learning (inter alia: Bimrose et al, 2012; Cedefop, 2014; Lloyd et al, 2014; Beadle, 2015; Bashshar, 2015; Kantar, 2018). The literature suggests that the provision of learning opportunities is often associated with more supportive workplace environments, and increased commitment to development from employers:

- Meyere and Allan (2001, as cited in Anvari et al, 2010) found that employees exposed to more training opportunities are likely to exhibit higher levels of commitment to training.

- Cedefop (2014) reports that ‘opportunity structures’ (for example, availability of financial support) can provide the necessary support to sustain individuals’ motivation to complete a learning experience.
- Lloyd et al (2014) found that offering ‘protected learning time’ was a key enabler of workplace learning, based on an Australian study of ten allied health professions. They concluded that providing a supportive environment may help to encourage allied health workplace learning.

The role of situational factors in determining learning engagement has been recognised at policy level. The OECD (2019b) reports that many countries, including Australia, Denmark, France and the United Kingdom, are implementing more accessible and flexible training arrangements in order to remove barriers, citing several examples:

- **UK:** the Government’s Flexible Learning Fund (launched in 2017) is an £11.7m programme designed to develop and test flexible and accessible training delivery methods.
- **Hungary:** the Government has introduced a more flexible approach to short courses (under 30 hours) by removing restrictions on the type of course that may be provided in such manner.
- **Flanders (Belgium):** the Flemish agency for Entrepreneurial Training is implementing innovative entrepreneurship programmes designed to provide flexible training options, including weekend and evening courses.
- **France:** the 2016 El Khomri law (or Loi Travail) requires platform work providers⁹ to pay workers’ contributions for training, cover expenses in recognition of prior learning, and provide a training indemnity for all platform workers earning above a certain amount.

Quality of training available

The experience of learning itself has an impact on an individual’s continued motivation to learn. Beadle (2015) analysed the effectiveness of adult learning policies in Europe for the European Commission, concluding that the quality of adult learning should be prioritised by Member States, particularly in the context of increased accountability for public investment and ET2020 objectives.¹⁰ Beadle argued that providing learning opportunities that respond to learners’ needs makes the prospect of participation in learning more attractive.

Exploring the definition of ‘quality’ in this context, there is broad consensus on the importance of prioritising the needs of the learner to improve learner outcomes and encourage uptake in future training (see, for example, Bauer, 2016; Johnston, 2016; and Kantar, 2018).

Current position and expectation of future roles

The literature describes a positive relationship between career motivation and engagement in informal learning activities. Van Rijn et al (2013) studied employees from Dutch vocational Education and Training schools, and found that when combined with positive individual self-construal (the extent to which the self is defined independently of others), career motivation related positively to engagement in informal learning activities. Johnston et al (2018) concurred, suggesting that a desire for personal advancement was the most common reason given for adults who expressed a desire to learn.

An individual’s organisational commitment (itself influenced by self-construal) can have an impact on motivation to learn in the workplace (see, for example, Federici et al, 2019; Von Truer et al, 2013). Organisational commitment relies on a range of factors including an individual’s expectations about career choice, occupational mobility and expectations about earnings – all of which will influence the extent of commitment to a current employer (inter alia: Anvari et al, 2011; Bimrose et al, 2012, Savickas et al 2012; Van Rijn et al, 2013; Von Truer et al, 2013; Federici et al, 2019; and Cedefop, 2014).

Johnston (2018) considered the importance of an individual's beliefs about the value of doing a task when examining factors that impact on motivation to learn, concluding that motivation reflects the 'additive value of interest' (in effect, reflecting perceptions of its usefulness, such as applicability to the job and relative importance). However, Bauer et al (2016) sound a cautionary note, suggesting that there is very limited evidence that demonstrates the impact that task value has in influencing motivations to learn.

Social context

Encouragement and informal/formal peer support are frequently cited as factors that affect take-up of, and completion of, training opportunities (inter alia: Anvari et al, 2011; Eisele et al, 2013, Lloyd et al, 2014; Garavan, 2018). Lloyd et al found that access to peers, expertise and learning networks were the strongest predictor of opportunities available to engage in workplace learning.

Using behavioural models to understand what makes adult workers learn

So far, this review has largely considered the factors that influence motivation to learn (i.e. intrinsic motivation, extrinsic motivation and external/situational factors) in isolation. Behavioural models have been applied to the issue of adult learning to explore how intrinsic and extrinsic motivations interact with external or situational factors to determine learning behaviours. The Capability Opportunity Motivation Behaviour (COM-B) model (Michie et al, 2011) is one such model, drawing together a range of automatic, non-conscious drivers of behaviour, rational drivers, social drivers and the external environmental factors which influence behaviour.

Capability comprises governance and provision of learning opportunities; again, primarily focusing on how external factors (i.e. those that can be influenced by policy) can contribute to desired outcomes. **Opportunity** reflects the external factors that enable or inhibit learning behaviours (such as access to peers and expertise, capacity for learning alongside existing workload, and access to

technology or funding). **Motivation** focuses primarily on extrinsic factors, such as career clinical pathways (reflecting external regulation) and supportive staff attitudes (reflecting introjection).

In a qualitative study of adult learners and non-learners, Kantar (2018) used the COM-B model to explore the decision-making of adult learners (including, but not limited to, workers). They identified a range of factors which influence adults' motivations, intentions and abilities to commit to learning. It is possible to broadly consider these in terms of intrinsic, extrinsic and external factors already discussed.

- **(Intrinsic)** Perceptions of psychological capability and control (i.e. the extent to which participants felt they had control over their life, and confidence in their ability to complete a course).
- **(External – social context)** Social and cultural norms (i.e. the extent to which participants felt that learning was enabled or inhibited by their immediate family, or broader social network).
- **(Intrinsic – motivation towards knowledge)** Previous experiences of education (i.e. in determining self-belief, extent to which participants identified as capable learners).
- **(External – opportunity and access)** Physical capability and a diverse set of practical and circumstantial issues (such as work commitments, money, childcare responsibilities and availability of practical support).
- **(Extrinsic – identification)** The desire for personal betterment (defined individually, typically either extrinsic relating to work and careers - e.g. pathways to promotion and progression --- or intrinsic goals relating to 'mental sharpness' or enjoyment of a subject).
- **(External – social context)** Encouragement from influential people (e.g. advice and experience shared by family, friends or acquaintances, perceived level of employer support or flexibility).

- **(External – current position and expectation of future roles)** Financial position (perceived ability to self-fund/access financial support and maintain financial quality of life, particularly for those in lower-income brackets).
- **(External – opportunity and access)** Flexibility of provision (availability of part-time, evening and weekend classes that can fit around other commitments).
- **(External – quality of training)** Quality of provision (access to reliable and trustworthy sources of information about learning to provide transparency on the quality of learning provision).
- **(Intrinsic motivation towards accomplishment)** Having clear goals for learning (i.e. the extent to which self-awareness and clarity of expectations were sufficiently motivating to drive participants to seek solutions for any practical challenges).

This model incorporates intrinsic and extrinsic motivations (such as the desire for personal betterment or having clear goals for learning) alongside external factors (such as physical capability, or the provision of quality/flexible learning opportunities) to give a holistic view of what drives learning behaviour.

Of particular relevance to the secondary research question, RQ6 (*What is the effect of different policy interventions relating to the development of career adaptability skills, at each stage of the worker-learner journey?*), the Kantar study provides evidence that the factor which has the most influence over a learner's behaviour varies as he or she progresses through the experience of discovering a learning opportunity, deciding to take part in it and completing it. Figure 2 (on the following page) describes the four stages of decision-making, summarising the key behavioural influences alongside the authors' recommendations for increasing adult learning at each stage.

The findings suggest that information, advice and guidance (IAG)¹¹ needs vary across the learner journey (from consideration to take-up and completion). Information requirements are quite general in the early stages of decision-

making (at which time IAG should focus primarily on encouraging self-reflection). However, as adults become more engaged with the idea of learning, information needs become more specific. At the point of uptake, IAG should focus on providing tangible solutions for situational barriers, while for those already engaged with learning, communication and support should focus on embedding the value of learning, to ensure completion and ongoing commitment.

Lloyd et al (2014) also applied the COM-B model to help interpret data emerging from their study into the factors that influence workplace learning for Allied Health Professionals. Figure 3 maps the enablers and barriers identified by the study against the behavioural model concepts of capability, motivation and opportunity. This model presents a theoretical pathway from the enablers and barriers that determine opportunity, motivation and capability, to the intended behaviour (workplace learning) and a desired set of outcomes (quality and safety of patient care, service delivery efficiency, and patient/staff satisfaction).



Figure 2: Behavioural influencers and implications for increasing learning across four stages of adult decision making (Kantar, 2018)

Pre-contemplation			
<p>Pre-contemplation <i>"Before actively contemplating learning, most adults are focused on sustaining their lives and do not see personal value in learning. (There is) an emphasis on sustaining an existing financial, emotional, social and/or professional situation."</i> (p.25)</p>			
Contemplation			
<p>Contemplation <i>"Adults have begun to buy into the value of learning and to view it as something that could benefit them now. They are, however, navigating a complex decision-making process through which they weigh up the pros and cons of their options."</i> (p.33)</p>			
Determination			
<p>Determination <i>"Once adults are invested in the unique value they have attributed to learning, they are less likely to view practical or physical challenges as barriers to learning, but rather as problems that need to be solved."</i> (p.42)</p>			
Maintenance			
<p>Maintenance <i>"The factors that influence adult engagement in learning once a course has been started, and how learning can be sustained and successfully completed once an adult has enrolled on a course."</i> (p.47)</p>			
Key behavioural influencers			
<p>Perceptions of psychological capability and control.</p> <p>Social and cultural norms.</p> <p>Previous experiences of education.</p> <p>Physical capability and a diverse set of practical and circumstantial issues.</p>	<p>Perceptions of psychological capability and control.</p> <p>A desire for personal betterment.</p> <p>Encouragement from influential people.</p> <p>Self-perception of capabilities for learning.</p> <p>Physical capability and a diverse set of practical and circumstantial issues.</p>	<p>Financial position.</p> <p>Perceptions of psychological capability and control.</p>	<p>Physical capability, practical and circumstantial issues.</p> <p>Flexibility and quality of provision.</p> <p>Perceptions of psychological capability and control.</p> <p>Having clear goals for learning.</p>
What works to improve uptake and commitment to learning – guiding principles			
<p>Moving adults out of this stage is a 'considerable challenge'. Approaches should focus on;</p> <p>Raising the profile of learning.</p> <p>Influencing national cultural norms around adult learning.</p> <p>Encouraging self-reflection.</p> <p>Availability of Information, Advice and Guidance (IAG) at key life events.</p>	<p>Approaches should focus on access to general support and guidance relating to costs and benefits, including;</p> <p>Course costs.</p> <p>Financial support available.</p> <p>Financial, personal and professional benefits of different courses</p> <p>Support that is available from wider services (e.g. mental health).</p> <p>Opportunities to try-out learning.</p>	<p>Potential learners need specific assurance from IAG that they will cope emotionally/practically with learning demands;</p> <p>Detailed understanding of costs, including the direct (course), travel, materials and forgone earnings.</p> <p>Differences in courses and learning formats (to determine best fit for circumstances).</p> <p>Confirmation of additional support (e.g. childcare, financial).</p> <p>Real life accounts of other learners, including how barriers were overcome.</p>	<p>Learners evaluate pros and cons. Approaches to support maintenance of learning include;</p> <p>Practical arrangements to support childcare, transport, finance and flexible working.</p> <p>Supportive learning contexts (tutors, peers and employers) to address mental health, pastoral needs or learning difficulty barriers.</p> <p>High quality IAG/career planning in learning institutions to embed value of learning.</p> <p>Centralised (government) tools to empower adults to access quality of courses/providers prior to enrolment.</p>

Figure 3: COM-B applied to workplace learning for Allied Health Professionals, Lloyd et al 2014 (p.10)

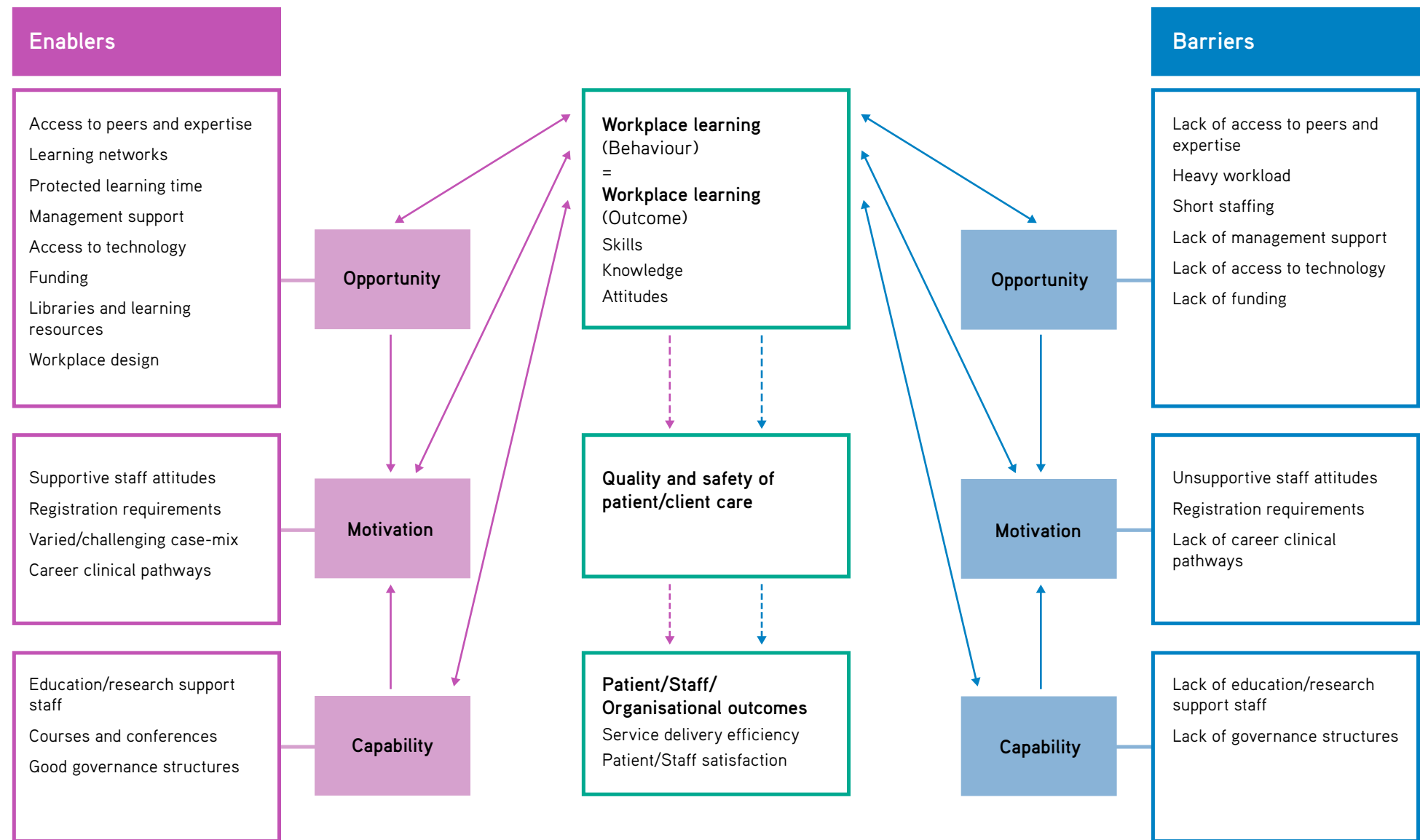


Figure 4: Gloster et al 2017, COM-B applied to training programme participation amongst benefit claimants

Finally, Gloster et al (2017) applied behavioural insights to examine the voluntary training behaviours of benefit claimants (see Figure 4, which demonstrates the relationship between capability, opportunity and motivation on behaviour). While the subject of this study (benefits claimants) is out of scope, it is interesting to note the application of the COM-B model to explore barriers to and enablers of training uptake of those who may be seeking to enter the labour market. Like the earlier model from Lloyd et al, this framework maps capability, opportunity and motivation to an intended behaviour (training) and desired outcome (employment) but places a greater focus on motivation. In this case, motivation incorporates automatic (e.g. norms, defaults, salience and priming), and reflective motivation (e.g. perceived benefits, relevance of work and personal goals, labour market conditions, past learning experiences and relationship with advisor). Capability also focuses primarily on personal characteristics, such as the individual's own level of education, skill set and health. Opportunity identifies (primarily) external factors that could be influenced to increase the likelihood of the desired behaviour and outcome, encompassing sources of support, awareness of provision and availability of childcare or transport, for example.

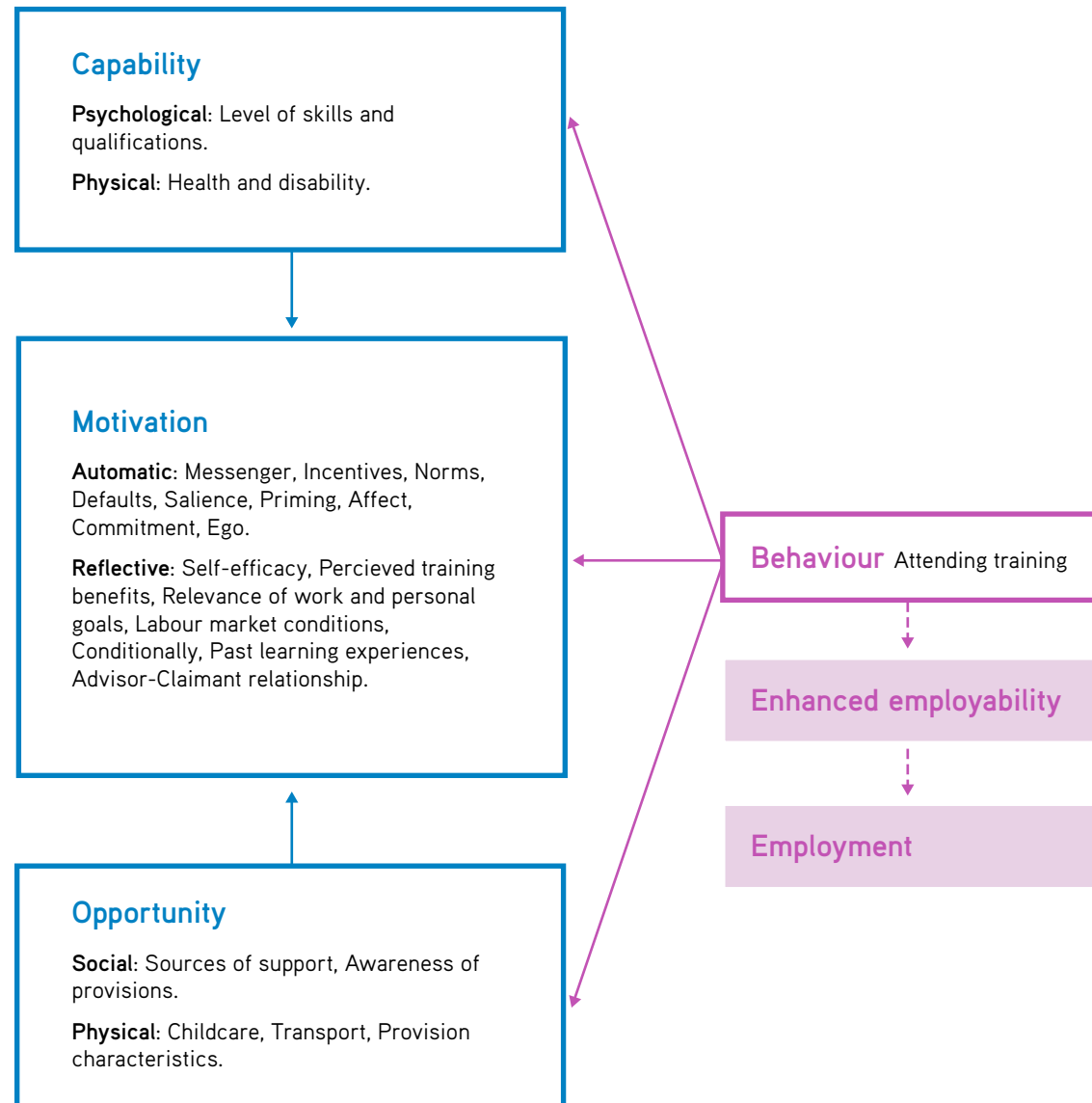
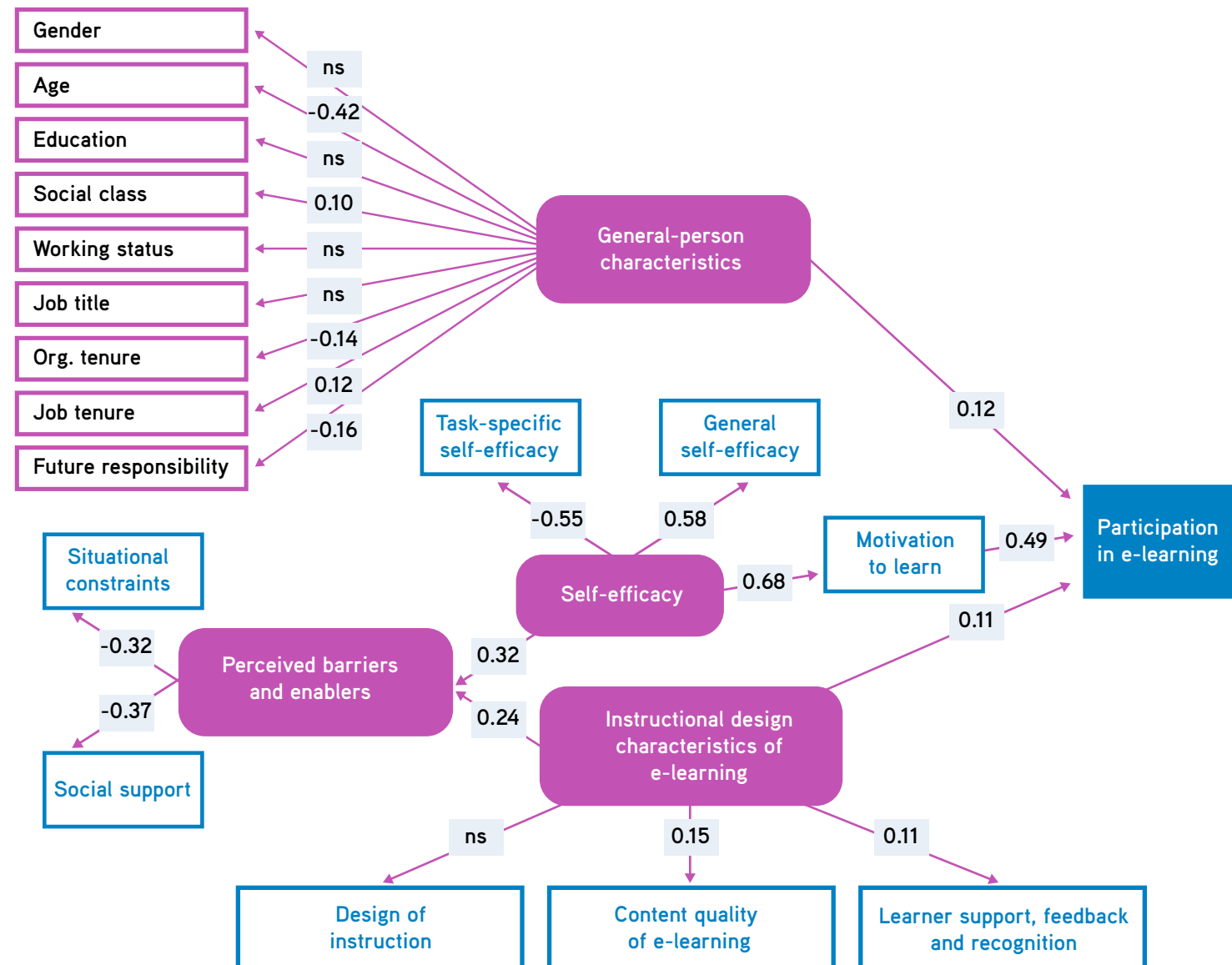


Figure 5: Model of participation in e-learning (Thomas et al 2018, p.164)

Another framework reviewed for this report considers the combination of intrinsic, extrinsic and external factors that influence learning behaviours, although it doesn't apply the COM-B model explicitly. Thomas et al, 2018 conducted a large-scale survey of employees participating in voluntary e-learning activities, exploring the factors that influenced participation. Figure 5 demonstrates the range and interactions of enablers and barriers that were identified, showing that motivation to learn is the dominant factor, equating to almost half (49%) of the decision to participate in e-learning. This is considerably higher when compared with the influence of general personal characteristics and instructional design characteristics.

Von Truer et al (2013) identified similar factors, suggesting that there is a direct relationship between affective organisational commitment, job involvement and utility perceptions with motivation to learn and motivation to transfer learning (Von Treuer et al, 2013).



Variation in motivations to learn by context and personal characteristics

There is some evidence to suggest that gender and age can affect engagement in voluntary learning. In figure 5 above, age is shown to have the strongest relationship from the ‘general person characteristics’.

Gender

Across OECD countries, women tend to participate slightly less in training than men, although there is a lack of evidence on intentions to train generally (OECD, 2019b).

Age

Kantar, 2018 (as well as others, for example Lido et al, 2016; Kocoian et al, 2017) reports that older workers were more likely to hold the view that there were limited opportunities for training. However, other evidence suggests that an exception to this trend is in low-skilled roles, where engagement with training is lower among young workers than for other age groups (UKCES, 2012). While age seems to impact on intentions to learn, it does not necessarily impact on the extent of learning undertaken. Lido et al, 2016 analysed an ongoing 1,500-person household survey in Glasgow, reporting that older workers who engage in learning activities do so with the same time commitment as younger learners. Zacher (2014b, as cited in Johnston, 2018) identified variables that predicted changes in career adaptability resources and found that age and the degree to which learners think about the future predicted positive changes in overall adaptability, with young adults more likely than their older counterparts to engage in voluntary learning.

Education levels

Low levels of education also have a negative impact on willingness to take part in work-related training. Fouarge, et al (2013) analysed three Dutch labour force surveys, concluding that this reflected different economic preferences

(e.g. preference for leisure time, perception of low financial returns for skills development) as well as personality traits (e.g. openness to experiences). Similarly, there is some evidence (see, for example OECD, 2019a, 2019b) that low and medium-skilled workers are least likely to receive training, despite being at the greatest risk of job loss. Across OECD countries, participation in adult learning is 23 percentage points lower for adults with low skill levels than for those with medium and higher skills (Clayton and MacDonald, 2013).

Despite the strength of evidence that demographic variables impact on training intentions, one study suggests that this impact may be considerably less than the intrinsic (and extrinsic) factors already described. Mielniczuk & Laguna (2017) conducted a cross-sectional study across employees of small and medium-sized companies from Poland. Their study found that demographic variables explained only seven per cent of variance in training intention compared with 32 per cent (extrinsic) and 25 per cent (intrinsic). This supports the evidence demonstrated in Figure 5 that found that motivation to learn had the most impact on participation in e-learning.

Motivation to develop career adaptability skills

So far, we have considered motivations to learn in general terms. This review is particularly concerned with the motivation of adult workers to engage in skills development which has relevance for the future labour market. In light of global, economic, social and technological changes, the capacity to adjust, to adapt or to display adaptability has become highly desirable. Popular career concepts such as protean¹² and boundary-less¹³ careers emphasise the individual responsibility for active career management and imply that adaptability is required to be successful (e.g. Sullivan & Baruch, 2009 as cited in Johnston, 2018). In recent years, the concept of career adaptability has been discussed by researchers as a key resource for successful career development, positively responding to a number of challenges in the domains of career and work, and well-being (see, for example Chan & Mai, 2015; Johnston, Maggiori, & Rossier, 2016; Zacher, 2015; all cited in Johnston, 2018).

Understanding career adaptability

Savickas defines career adaptability as “*a psychosocial construct¹⁴ that denotes an individual’s readiness and resources for coping with current and imminent vocational development tasks, occupational transitions and personal traumas*” (p. 51 Johnston, 2018). He proposed career adaptability as part of his career construction theory (CCT), a theoretical framework which describes four adaptive behaviours: adaptive readiness, adaptability resources, adapting responses and adaptation results (Savickas & Porfeli, 2012). Table 2 provides an overview of the constructs included in this model.

Table 2: Constructs Included in the Career Adaptability Research Mapped onto the Main Aspects of the Conceptual Framework, Johnston, 2018 p.5

Adaptive readiness	Adaptability resources	Adapting responses	Adaptation results
Tenacious goal pursuit	Concern	Career planning	Career satisfaction
Flexible goal adjustment	Control	Career decision-making	Promotability ¹⁵
Learning goal orientation	Curiosity	Career exploration	Entrepreneurial intentions
Proactive personality Career optimism Core self-evaluations	Confidence	Occupational self-efficacy Entrepreneurial self-efficacy Career decision-making self-efficacy	Organizational loyalty Turnover Academic satisfaction
Proactivity Hope Future work self		Proactive skill development Proactive networking behaviours	Employment status

Adaptive readiness refers to the personality trait of ‘flexibility of willingness to change’. Adaptability resources are resources that assist an individual to cope with current or future change. Adapting responses are those behaviours that help individuals to adjust to changing conditions, while adaptation results are, of course, the actual results of adapting.

The role of adaptability resources

Johnston (2018) cites a range of research (see, for example, Pouyaud et al, 2012; Van Vianen et al, 2012) which suggests that high levels of career adaptability resources are associated with strong motivation to act to achieve personal goals. Tladinyane & Van Der Merwe (2016) agree, with their study exploring the relationship between career adaptability and employee engagement in South Africa. It found that employees who were more concerned and/or confident in their ability to manage their careers were more engaged with their employer. In this context, adaptability resources¹⁶ fall into four categories: concern, control, curiosity and confidence.

Career concern

Career concern relates to the extent to which an individual plans for the future. Tladinyane & Van der Mewe (2016) defined concern as “*a tendency to consider life within a time perspective anchored in hope and optimism.*” Some findings suggest that employees who are more concerned about their careers are also more engaged. Zacher & Griffin (2015, as cited in Van Der Horst & Klehe, 2018) found career adaptability was positively related to job satisfaction, but that this relationship declined with age. There is some evidence that concern (and, to a lesser extent, curiosity) have an influence on impact when workers face a transition point in their career (see, for example, Van Der Horst & Klehe, (2018) who conducted a study of over 3,400 workers facing an imminent career transition, usually the loss of their jobs).

Career control

Career control enables an individual to become responsible for ‘shaping themselves and their environment to meet what comes next by using self-discipline, effort and persistence’ – in other words, taking responsibility for their actions. An increase in career control positively impacts on interventions designed to support employees in adapting to changing work circumstances. Van Der Horst & Klehe (2018) cite a range of studies (including De Lange et al, 2011, and Zacher & De Lange, 2011) which show that people’s goal orientation changes across the lifespan of a career, with a stronger orientation towards maintaining current position rather than seeking change with increasing age.

Career curiosity

Career curiosity is the exploration of possible selves and various roles to understand the fit between self, occupational roles and opportunities. There is a positive correlation with openness to experience, which links to motivations to engage in activities to improve knowledge. Those who are open to experience are more likely to consider ideas, scrutinise information and enjoy problem-solving (Hamtaux et al, 2013). Fouarge et al (2013) conducted a secondary analysis of three Dutch labour force surveys, and found that motivation for low-educated workers to train is influenced by ‘future orientation’ and openness to experience. Johnston et al (2018) agree and, summarising earlier sources (see, for example, Rossier et al, 2012; Rusu et al, 2015), suggests that there are positive associations between career adaptability resources and openness to experience (while also suggesting that there are negative associations with neuroticism). Van Der Horst et al (2016, citing Kashdan & Silvia, 2008) suggest that an individual’s underlying psychological predisposition to be open and curious is the best indicator of whether they will also be open and curious in their approach to understanding and planning their careers. Curiosity, which is also positively related to psychological well-being, is a core component of openness to experience and a desire to ‘explore novel, challenging, and uncertain events’.

Career confidence

Career confidence is an individual’s self-belief that they can implement choices and achieve their set goals. Tladinyane & Van Der Merwe (2015) found that confidence had the most significant impact on employee engagement (out of control, curiosity, concern and confidence). This is important in the context of evidence that positive employee engagement also has an impact on an individual’s motivation to learn.

Johnston (2018) draws on a range of studies (see, for example, Taber & Blankemeyer, 2015; Rusu et al, 2015; Van Vianen et al, 2012) that examine the impact of career adaptability resources and concludes that proactive skill development and future work is ‘fully mediated’ by career confidence. Secondly, that resources are also correlated to other factors, with a positive correlation between resources and confidence and self-esteem, and a negative correlation with anxiety. Considering how career confidence can impact on occupational transitions, Cedefop (2014) suggests that:

Individuals who see that their skills can be transferred to other contexts have a significant advantage in changing career direction over those who define themselves almost exclusively by their occupational and organisational attachment.

Cedefop, 2014 (p.8)

A fifth career adaptability resource: career commitment

Bimrose et al (2011a) conducted a qualitative study of adults in the Norwegian and UK labour markets, and suggested that commitment should be recognised as an additional competency which influences career adaptive responses to transitions.

Commitment stresses how individuals should experiment with new and different activities and projects, rather than being focused narrowly on getting into a particular job, so that new possibilities can be generated.

Bimrose et al., 2011a (p.36)

Bimrose et al suggest that learning through 'challenging work', defined as 'mastering the practical, cognitive and communicative demands linked with particular work roles and work processes', is a powerful learning and development pathway through which workers can acquire new skills (see p. 7). Where there are limited opportunities for challenging work (for example, to experiment with new workplace projects), this can negatively impact on employee commitment.

Validation and measures of career adaptability

Johnston (2018) identifies a range of different tools that have been used to measure career adaptability (see Figure 6). Those based around career adaptability theory (proposed by Savickas, 2005) include the Career Adapt-Abilities Scale. This (and its shortened form) have been validated across different countries/audiences and is considered to replicate well.

Figure 5: Model of participation in e-learning (Thomas et al 2018, p.164)

Name	Reference	Subdimensions
Career adapt-abilities scale	Savickas and Porfeli (2012)	Concern, Control, Curiosity, Confidence
Career adapt-abilities scale-short form	Maggiori, Rossier, and Savickas (2017)	Concern, Control, Curiosity, Confidence
Career and work adaptability questionnaire	Nota, Ginevra, and Soresi (2012)	Concern, Control, Curiosity, Confidence
Career maturity inventory-form C	Savickas and Porfeli (2011)	Career choice readiness, Concern, Curiosity, Confidence, Consultation
Career adaptability inventory	Ferreira and Coetzee (2013) and Ferreira, Coetzee, and Masenge (2013)	Concern, Control, Curiosity, Confidence, Cooperation
Student career construction inventory	Savickas (2009)	Concern, Control, Curiosity, Confidence, Cooperation
Career futures inventory	Rottinghaus et al. (2005)	Career adaptability, Career optimism, Perceived knowledge
I-Adapt scale	Ployhart and Bliese (2006)	Culture, Uncertainty, Physical, Interpersonal, Learning, Work stress, Creativity, Crisis

The first six tools displayed in Figure 6 are closely modelled on Savickas' career adaptability theory. The 'Career Futures Inventory' (CFI) and the 'I-Adapt Scale' have taken a different approach to measure career adaptability, utilising subscales from other career adaptability tools. The CFI, the most commonly cited tool of this type, contains three subscales: career adaptability, career optimism and perceived knowledge.

In the UK, the Institute of Chartered Accountants in England and Wales (ICAEW) has embedded career adaptability within the professional association and offers an online career adaptability tool designed to assess an individual's career adaptability levels.¹⁷

Impact of personality traits on career adaptability

There is no clear consensus as to which combinations of personality traits are most impactful on an individual's level of career adaptability. Johnston (2018) identifies a handful of longitudinal studies that confirm some individual personality factors as predictors of career adaptability resources. These include a learning goal orientation, proactive personality, career optimism (Tolentino, Garcia et al, 2014); higher self-esteem (Cai et al, 2015); career calling (Praskova, Hood, & Creed, 2014), and vocational commitment (Negru-Subtirica, Pop, & Crocetti, 2015). There is also some evidence to suggest that motivation and having a proactive personality is relevant when predicting career adaptability resources, although its positive effect appears to be through career decision-making self-efficacy, or greater awareness of opportunities (Hou, Wu, & Liu, 2014; Uy, 2014, both as cited by Johnston, 2018).

In contrast, Zacher (2014b, as cited in Johnston, 2018) analysed data from 1,700 employees in Australia to investigate the validity of the Career Adapt-Abilities Scale with regard to career success, and found that education, extraversion, openness to experience and core self-evaluations only predicted positive changes in some career adaptability dimensions.

Johnston's review also collates some (albeit limited) evidence for personality traits that have been shown to have a negative effect on career adaptability resources, such as neuroticism or self-doubt (and need for acceptance) or a prevention regulatory focus (inter alia: Van Vianen et al, 2012; Soresi et al, 2012; Stoltz et al,

2013). Zacher et al (2015) conducted a study of the relationship between career adaptability and career entrenchment across 400 employees in Brazil, and found a relationship between perceived inability and/or unwillingness to pursue other options and low levels of career adaptability resources. In the following extract, Johnston summarises relevant findings from a wide range of evidence:

Some researchers have tried to establish if certain individual characteristics or contextual factors can be considered predictors of career adaptability resources. First, the cross-sectional research shows that higher levels of emotional intelligence (Coetzee & Harry, 2014a), a sense of control (Duffy, 2010) a future work self (Guan et al, 2014), proactivity, core self-evaluations (Hirschi et al., 2015), hope and optimism (Wilkins et al, 2014), and a high sense of control and a low level of tolerance for unpredictability (Coetzee & Harry, 2014b) appear to predict career adaptability resources. Proactive personality is relevant, too, but its positive effect on career adaptability appears to be through career decision-making self-efficacy (Hou, Wu, & Liu, 2014) or entrepreneurial alertness to opportunities (Uy, 2014). Some other individual characteristics, such as a high need for following social norms and high need for acceptance, might impede career adaptability resources (Stoltz, Wolff, Monroe, Farris, & Mzahreh, 2013).

Johnston, 2016 (pp.12-13)

Contextual differences in the role of career adaptability

Mid-career changers

Ebberwein, Krieshok, Ulven and Prosser (2004) conducted qualitative research which found that stronger career adaptability resources corresponded to a more positive career transition experience and better coping for mid-career changers. Furthermore, mid-career changers can use formal learning, on-the-job learning and self-directed learning to further develop their career adaptability. Brown, Bimrose, Barnes, & Hughes (2012) highlight, for example:

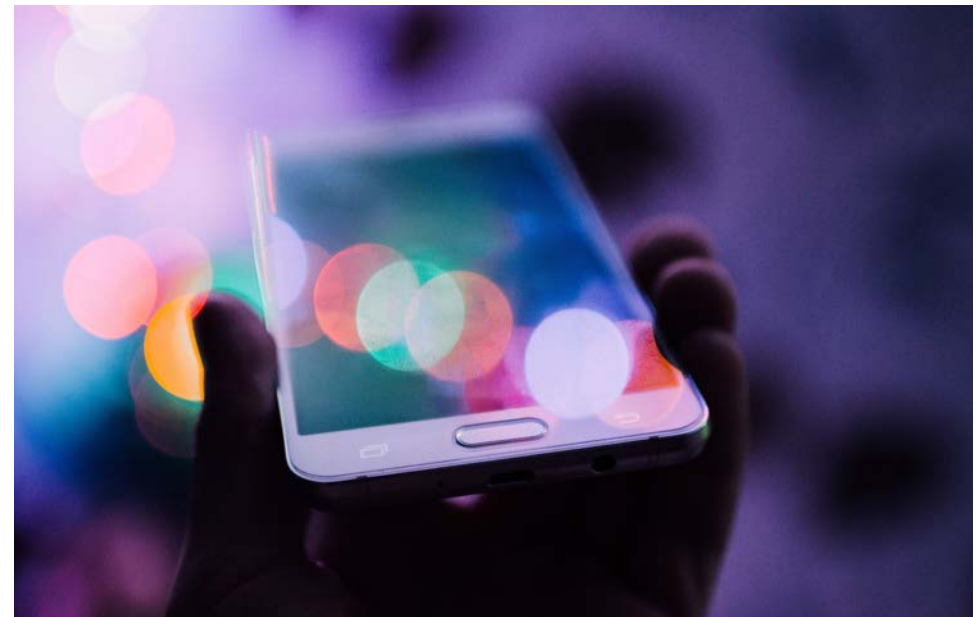
The informal learning associated with personal networks was often important in many contexts over a career—from hearing about job opportunities and gaining initial entry to work through to many aspects of continuing career development, including choices about different ways of updating skills, knowledge and experience.

Brown et al., 2012 (p.758)

They also indicate a predictor of career adaptability is the motivation of the individual to learn and develop their competencies (inter alia: Creed et al, 2009; O'Connell et al, 2008; Cronshaw and Jethmalani, 2005).

Older workers

In their study of women over 50, Whiston, Feldwisch, Evans, Blackman, & Gilman, (2015) found that women often described themselves in relation to their external circumstances and internal subjective experiences, and that the relevance of career adaptability lasted throughout their career. It found that older women report career adaptability and its sub-dimensions as being important resources for their interaction with the world of work.



Early career

Finally, for younger adults entering work or developing careers, previous motivation and parental support appeared as important precursors to the development of career adaptability resources (Shulman et al, 2014).

Motivations to learn digital and digital-complementary skills

Learning how to manage the impact of technology on our lives is becoming increasingly important as technology changes. Estimates suggest that nearly 50 per cent of all jobs in developed countries are 'highly susceptible' to being replaced by digital technologies in the next 20 years (Frey and Osborne, 2017, as cited by Bode and Gold, 2018).

Brynjolfsson and McAfee (2011, as cited in Bode and Gold, 2018) suggest that digitalisation offers many opportunities for the workforce and creates a range of new jobs. However, they caution that many of these will emerge in different industries and require different skills. Acemoglu and Restrepo (2018) suggest that skill mismatches may fuel significant levels of unemployment in the short and medium term. Despite this, progress towards increasing the digital skills of workforces at risk of automation has been mixed. In 2018, Lloyds Bank estimated that 4.3 million people (8%) in the UK had no basic digital skills and that this figure had increased by almost 500,000 since 2017. Of those that had improved their digital skills in the last ten months, almost one in three had done so to improve

their performance and productivity at work. However, just 6% of this group had received digital training through their workplace.¹⁸

However, this rapid evidence review has identified a significant gap in the evidence relating to the motivations for adult workers to improve their digital skills. Within the parameters of this review, we identified no high-quality evaluations of relevant initiatives. Bode and Gold agree, arguing that more research is required.

How precisely [initiatives which strongly motivate adult employees to invest in digital skills training] these measures should be designed is impossible to say ex ante, and will likely differ across countries. Exploring successful ways of motivating eligible workers to participate in the program will likely take several years of trial and error, and will have to be supported by careful scientific evaluations and extensive exchange of experiences.

Bode and Gold, 2018 (p.7)

Part 2: What works to increase adult workers' motivation to learn

This section explores approaches and policy interventions that have been shown by available evidence to influence adult workers' motivations to learn and develop career adaptability skills. However, this review finds a worrying lack of research

that focuses explicitly on what works to motivate learners to develop digital or digital-complementary skills.

Summary

Reflecting on the evidence base

This section draws extensively on two focal publications, described in detail in Appendix 6. The first, undertaken by Claire Johnston (Department of Work and Organizational Psychology at the University of Bern, Switzerland) is a systematic review of 116 empirical studies relating to career adaptability. The second, a report published by the European Commission's Directorate-General for Employment, Social Affairs and Inclusion presents an in-depth analysis of adult learning policies and their effectiveness in Europe. This reflects the findings of a literature review and consultation with policymakers and experts, undertaken by Beadle in 2015. OECD examples of strategies to improve digital skills are outlined, although this review found little evidence relating approaches to impact.

Key learnings

- Success factors proposed include encouraging positive dispositions towards learning, employer support for/investment in learning, improving equity of access to training, provision of high-quality learning opportunities (with

relevance for individuals and employers) and coordinated (aligned at national and local level) and accountable (evaluated) policies for lifelong learning.

- Awareness raising, incentivised training and flexible provision are considered to be particularly important in motivating learning among socially-excluded groups.
- Career guidance/counselling interventions appear to be positively associated with motivations to learn, particularly those that encourage self-reflection.
- Individual learning accounts (ILAs), providing individuals with resources to take up training on their own initiative, have been introduced in several countries. But evidence of their impact is currently limited.
- Evidence from healthcare settings suggests that several factors contribute to success in improving digital capabilities of staff, including the influence of 'digital champions', effective leadership, organisational culture, and improved access (including protected time for learning).
- There is a clear requirement for systematic data collection and monitoring of policy intervention, to evidence impact and outcomes and identify best practice for motivating adult workers to participate in learning.

Guiding principles for improving adult workers' motivations to learn

The models and concepts presented in Part 1 relating to what drives motivations to learn have both theoretical and practical implications for policymakers, practitioners and researchers concerned with encouraging learning behaviour among adult workers.

Models of learning and evidence relating to personal characteristic variations provide useful contextual understanding, which can be used to ensure approaches and techniques are (theoretically) fit for purpose within the intended audience/situation. For example, while it is known that personality can predict career adaptability, it is unlikely that policy changes could (or indeed should) influence personality to improve this trait. However, through applied understanding of the influence of personality, career guidance/counselling approaches can more effectively target those traits which are malleable to encourage motivation to learn.

Acting to affect intrinsic motivation to learn

Intrinsically-motivated learning, spurred by an internal drive for autonomy, competence or relatedness, is unlikely to be influenced by direct (external) short-term strategies to improve adult workers' participation in learning. However, intrinsic motivation may have greater relevance for long-term policy planning, particularly in terms of understanding the influence of cultural or social norms in determining the value placed on continuous learning. Policy actions to improve learning participation through social/environmental planning (for example, through communications campaigns) benefit from theoretical understanding of how social context relates to the development of internalised goals and intrinsic motivation to learn.

Acting to affect extrinsic motivation to learn

Strategies that apply an understanding of how extrinsic motivations and external factors impact on motivations to learn appear to have the greatest potential to directly influence adult workers' learning behaviour, at least in the short to medium term. Potential policy approaches include fiscal measures (to remove financial barriers), service provision and environmental or social planning (to increase opportunities for learning, remove situational barriers such as childcare or travel and create a culture of continuous learning), and introducing guidelines, regulation, and legislation (for example, to increase employer support and investment or access to career interviews in the workplace).

This review identified little evidence from which to establish best practice or identify definitive guiding principles to influence adult workers' motivation to learn. In identifying examples of what works to increase adult workers' motivation to learn, this review has drawn heavily on the work of Beadle (2015), who undertook a literature review (of 72 sources and ten country case studies), and consultation among policymakers and experts to evaluate the performance of European countries in adult education and training. Beadle's conclusions regarding the success factors for adult learning policy are outlined in 'Focal study 1' below, and Figure 3 on the following page.

The European Council (Beadle, 2015) proposes a concept (Figure 2, overleaf) that reflects the three levels at which the evidence and data has been analysed:

- **The first level** consists of six key success factors identified as being critical to deliver effective adult learning.
- **The second level** focuses on outputs, outcomes and impacts that are associated with learning relating to the learner; employer and community.
- **The third level**, described as 'building blocks', describes the actual policy actions that lead to an increase in participation in learning.

The building blocks of success: effectiveness of adult learning policies, Beadle (2015)

Improving learners' disposition towards learning

Steps taken to improve an individual's positive disposition towards learning are important in improving participation and retention in adult learning. Beadle suggests a range of strategies relating to information and guidance that include improving awareness of training; providing guidance for learners about options; engaging social partners in promotion and recruitment of learners and ensuring a positive initial experience.

Increasing employers' investment in learning

There is a positive association between participation rates in adult learning and the level of employer funding. Beadle reports that as work-related motivation is one of the key drivers of learning, job-related training is particularly effective in attracting participants.

Improving equity of access for all

The framework recognises the challenges in engaging disadvantaged and underrepresented groups in learning, and calls for additional targeted support for underrepresented audiences. Beadle suggests that intermediary groups, for example trade unions and community groups, can play an important role.

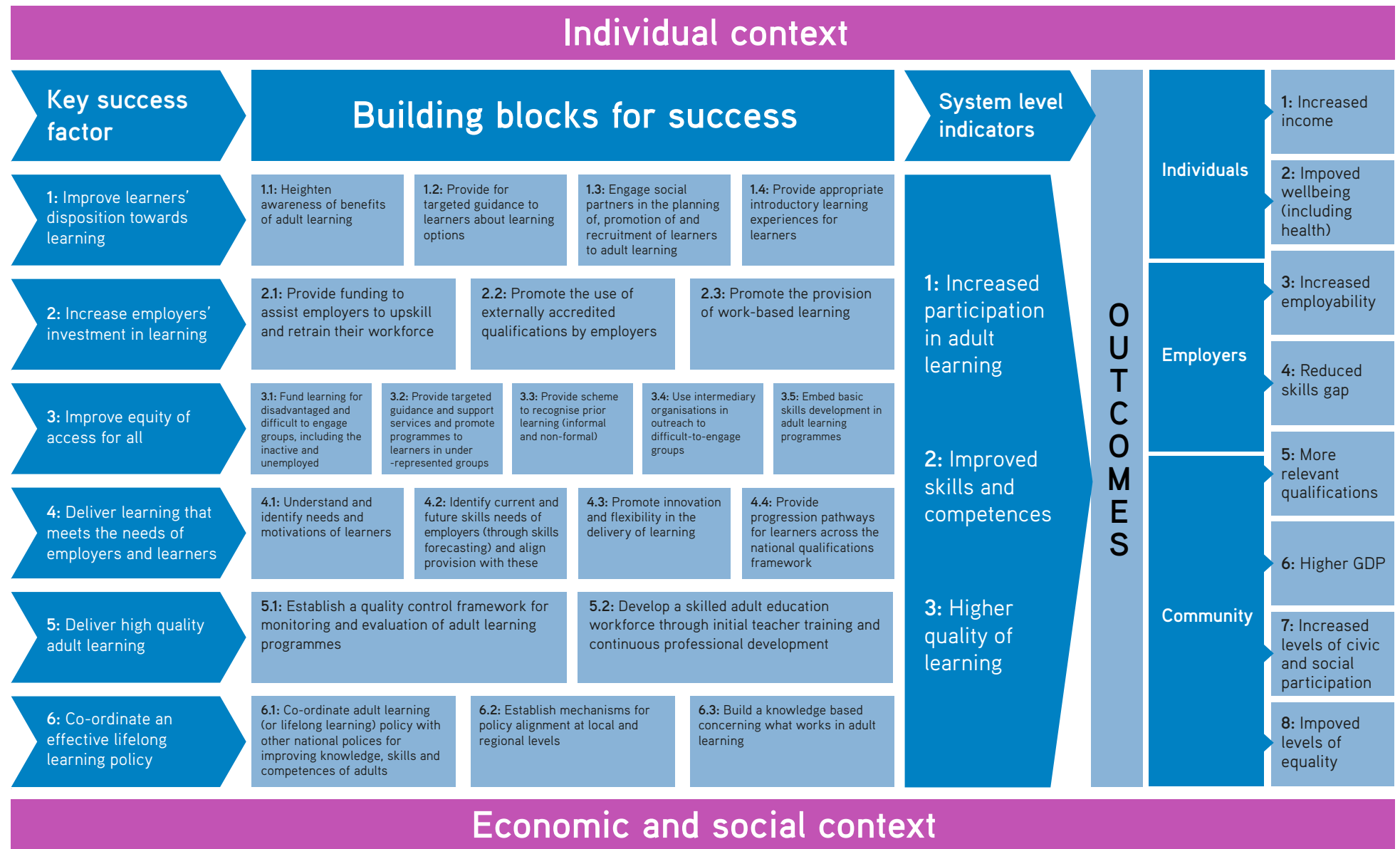
Delivering relevant and high-quality learning to employers and learners

The framework recognises that learning is most effective when it takes accounts of the needs and motivations of both employers and learners and is of sufficient quality (also see Anwari et al, 2011). This increases both the impact and future participation in learning.

Coordinating effective lifelong learning policy

The framework calls for a coordinated and accountable lifelong learning strategy, which is monitored through collection of data and evidence (also see Cedefop, OECD). However, the European Commission finds a lack of consistency in evaluation activities and evidencing impacts and outcomes is therefore challenging. Evaluations tend to focus on shorter-term outcomes such as gains in knowledge and confidence, measured through self-assessment.

Figure 6: An in-depth analysis of adult learning policies and their effectiveness in Europe conceptual framework (Beadle, 2015, p.86)



Emerging evidence on effectiveness of strategies to increase motivation to learn

Across studies identified by this review, there is very little experimental evidence of impact, although some correlational evidence (such as Eisele et al, 2013; Van der Horst and Klehe, 2018) highlights promising strategies. There is some evidence of the impact of career guidance/counselling interventions within the workplace on increasing motivation to learn, although this is limited.

Specific career guidance and counselling interventions as part of learning programmes

Self-reflection programmes

Self-reflection appears to have an important role in the success of career guidance/counselling interventions. A small qualitative study undertaken by Stauffer et al (2014, as cited in Johnston, 2018) found that exposure to brief career counselling sessions may help individuals become more adaptable. Specifically, the authors found that career counselling sessions may increase people's adaptability by exposing them to vocational inventories¹⁹ (including personality, interest, intelligence or aptitude), and values instruments that help to build participants' social, emotional and cognitive capacities.

Personal development plans

Self-reflection was also found to be important by Eisele et al (2013), in a study which set out to understand the conditions under which personal development plans (PDPs) can effectively support professional learning. This study considered both employer and employee experiences of their implementation. To do this, a questionnaire was distributed to employees of a Dutch governmental office which measured perceived effectiveness of the tool (undertaking learning activities and performance). Using regression analysis, the authors found that learning and reflection practices were positively related to the number of learning activities undertaken by employees and to perceived performance. They also noted the influencing effects of employees' motivation to learn, with the tool's perceived effectiveness dependent upon employees' efforts and motivation.

ePortfolios

Similar findings were reported for a small longitudinal quasi-experimental study by Van der Horst and Klehe (2018), which considered the role of ePortfolios (online portfolios that allow users to demonstrate their competence and skills and reflect on their development). Comparing the intervention group (regional state-owned organisation) with a control group, they found that those from the intervention group showed a greater increase in career adaptive responses, and were able to demonstrate more self-knowledge and insight about their current position on the labour market than those in the control group. After six months, individuals from the intervention group had a better understanding of their personal qualities, desirable job features and career options than those who did not participate, although the strength of this evidence is limited by the relatively small sample size (of less than 60).

Job content plateau interventions

Jiang et al (2018) undertook research into the relationship between career adaptability and the point at which an employee feels unchallenged by their current role – and considers their work has become routine and boring – something termed the job content plateau. They focused on the effects of job self-efficacy²⁰ and length of time within a job across two studies with independent samples. The first explored the impact of job tenure on the relationship between career adaptability and job content plateau. The second study, designed to verify the results of the first and test the influence of job self-efficacy, enabled researchers to investigate the three-way interaction effect of career adaptability, job tenure and job-efficacy on the job content plateau. The findings suggest that job tenure is a moderator of the relationship between career adaptability and job content plateau. And the interaction between job tenure and career adaptability in predicting job content plateaus was influenced by job self-efficacy. Jiang et al conclude that being adaptable in an individual's career is particularly important for longer-tenured employees dealing with job content plateaus. They also suggest that individuals with low self-efficacy and long tenure are most likely to benefit from adaptability when considering career development.

Developing career adaptability skills among emerging adults

Much of the research into approaches to developing career adaptability skills has been undertaken within academic institutions, among those aged 18 – 25 entering, or in the early stages of, jobs and careers. While out of scope for this review (which is focused on workers), some have a longitudinal aspect (recording employment outcomes), and all have relevance for the labour market competencies of interest to this review.

Investigating transitions from education to work, Koen et al (2012) considered how career adaptability resources might benefit emerging adults. They designed and tested a theory-driven training programme aimed at improving participants' career adaptability in a sustainable way, based on the assumption that this may foster participants' later career adaptability levels as well as their employment quality. Graduates were offered a free job search preparation workshop at a 'renowned recruitment agency' that specialised in graduate recruitment. To test the efficacy of the approach, a longitudinal quasi-experiment was run to compare the development of each career adaptability dimension between a training and control group over a period of six months. Repeated measures analysis showed an overall increase in concern, control and curiosity within the intervention group compared with no increase (concern) or even an overall decrease (control and curiosity) within the control group. Qualitatively, intervention group participants who had found a job also reported good employment outcomes.

Cheung & Jin (2016) tested the effectiveness of a one-semester academic career course in fostering participants' career exploration in a Hong Kong University. Students from an unrelated academic course in the same semester were included as a comparison group. Pre/post assessments were conducted to assess impact in terms of career decision-making, career adaptability and relational support. The authors found consistent evidence that career exploration is linked with career information, and career decision self-efficacy.

The level of involvement associated with career guidance/counselling interventions appears to have an impact (at least among this audience). Janeiro et al (2014) analysed the effect of two types of career interventions (a single career information session and a six-week career intervention) on the career adaptability of Portuguese students with different career-coping styles. The study found that while the single session had a positive impact in terms of career curiosity and career confidence (in one group of students), the six-week career intervention had a significant impact on the curiosity and confidence of a larger number of participants. This was deemed to have a more robust effect in students with pessimistic, superficial or insecure career coping styles.

Introduction of individual learning accounts

Individual Learning Accounts (ILAs) are schemes that provide individuals with resources they can use to take up further digital (and non-digital) training on their own initiative. They link training rights to individuals rather than to specific jobs, with the intention that they be used throughout individuals' careers.

The French Individualised Learning Account (Compte Personnel de Formation – CPF), was introduced in January 2015. It allows any active worker (including the self-employed) to acquire training rights that can be mobilised throughout their professional life and through periods of non-employment, and are transferable between employers. According to the French Ministry of Labour, the CPF is central to the law: *“For the freedom to choose one's professional future”* (*“Pour la liberté de choisir son avenir professionnel”*), adopted in September 2018, and will act as the main tool for accessing training.

In 2017, the Dutch government announced its intention to replace the tax deduction for training costs with a personal learning account for all citizens with a basic qualification. This is designed to draw together all the strands of the government's lifelong learning policy.

Other measures have attempted to simply enhance individuals' ability to track and evidence their training record. In Portugal, for example, an online tool called the Passaporte Qualifica was created in 2017 which records education and training already attained and provides guidance to further possible education and training pathways throughout an individual's career. In Spain, the government plans to establish an account to track all training received throughout an individual's career (as well as a separate funding system of training vouchers).

Although this review found no evidence relating to the effectiveness of ILAs, a forthcoming OECD report, 'Individual Learning Accounts: Panacea or Pandora's Box?', provides some emerging details on countries that have used ILAs and/or similar initiatives. It is expected that this study will find that ILAs can be an important, emerging approach to training interventions which help structure learning over a career

Approaches to improve digital skills

Research in health settings has identified workload and time pressure as a barrier to the development of digital skills. A survey conducted in 2012 of 500 community nurses found that one-in-three community nurses are still working largely with paper-based systems and that there are at least 67 differently-named IT systems being used within community healthcare. The authors argued that significant potential exists to 'lever the opportunities that technology creates' but it will take investment and leadership (RCN, 2012). More recently, the UK's Royal College of Nursing held two digital summits in 2015 and identified an aim that, by 2020, every UK nurse should be an 'e-nurse'. The RCN suggests that:

This concept can take many forms. It includes involving nursing and midwifery staff in the design and implementation of IT, increasing access to education and training, and using data to improve care.²¹

The first output of these summits was the joint production between Health Education England and the RCN,²² which identified six digital literacy areas. These digital literacies are capabilities that fit an individual for working, learning, participating and thriving in a digital society:

- Digital identity, wellbeing, safety and security
- Communication, collaboration and participation
- Teaching, learning and personal/professional development
- Technical proficiency
- Information, data and media literacies
- Creation, innovation and scholarship.

The report identifies several factors that contribute to success in improving digital capabilities of staff, highlighting in particular the importance of 'digital champions' (whether through the creation of formal or informal roles, or rewarding those who champion digital on an ad hoc basis). Other success factors identified include:

- **Leadership** (i.e. the removal of barriers, and building digital literacy into vision and strategies)
- **Organisational culture** (decentralising control over digital working and encouraging an organisational culture that is open and trusting)
- **Improving access** (allowing time for development and improvement of digital capabilities, access to resources/tools and rewarding learning).

Policymakers have responded to the changing skill requirements by emphasising lifelong learning. Lifelong learning has been recognised as an important goal in the United Nation's Sustainable Development Goals and was assigned high priority by the G20 since its 2009 Pittsburgh Summit (Bode and Gold, 2018). However, the same authors argued that the majority of adult training in OECD countries reached the highly skilled, and developed skills to improve productivity rather than mobility.

Orlik (2018) identified five learning barriers to upskilling the workforce for digitalisation: the culture of learning; motivation; leadership; resources and access to training (p.13). Bode and Gold (2018) noted considerable variation in provision across countries, suggesting that the peculiarities of a country's economic and cultural institutions, and their education systems, influence the take-up of opportunities.

The OECD Future of Work initiative (2019a) provides a snapshot of macro-level policy actions being taken by countries in response to how technological progress affects job quantity and quality, as well as labour market inclusiveness. The report draws on a survey conducted in tandem with the European Commission of 44 OECD, EU and G20 countries in 2018.

Many countries outlined how they are working to futureproof workers in new forms of work. Strategies outlined fell into one of three areas of focus:

- Forecasting future skills needs to align supply and demand of skills
- Training programmes focused on digital skills
- Support for existing employees to reskill, including programmes targeted towards industries or occupations with greater risk of automation.

The report identified a number of approaches used to encourage participation in lifelong learning:

- **In Wallonia (Belgium)**, the training agency Le Forem organises distance training and facilitates access to Massive Open Online Courses (MOOC) offered by partners.
- **The Swedish** questionnaire response mentioned that they have provided a legislative framework to facilitate MOOCs.
- **The Israeli** Ministry of Labour said that it was developing online courses and examining pilot programmes for distance training.

- **In Portugal**, the NAU Project launched in October 2017 aims to design a platform for the provision of content for distance education and training, using MOOCs.
- **In Mexico**, the Secretariat of Labour and Social Welfare (STPS) runs the Remote Training Programme for Workers (PROCADIST), which provides free online courses for workers across the country. Since 2015, the virtual training environment can be accessed via mobile devices in addition to computers.
- **The United States** Department of Labour noted that it had helped community colleges to develop and expand online, accelerated learning strategies for adults (pp. 63 - 64).

Contextual variations in what works to improve motivation to learn

Despite recognition that engagement in adult learning is necessary for sustained social and economic inclusion, only around 40 per cent of low-skilled adults living in OECD countries participated in adult learning in any given year (PIAAC²³ data, 2012, as cited in OECD, 2019a; OECD, 2019b). With evidence that policy and financial investment can reduce inequalities in access to learning (and increase overall adult participation), it is important to understand contextual variations in what works to improve adult workers' motivation to learn (Beadle et al, 2015). This review identified some (albeit limited) evidence explaining differences in the effectiveness of strategies and techniques by the demographic groups the learning interventions are targeting.

Evidence for approaches that have targeted individual or contextual variations in motivation to learn have for the most part focused on inclusivity, particularly among low-skilled workers. Bode and Gold (2018) describe 'motivation-enhancing measures', which fall into three broad themes

Awareness raising

Evidence highlights the importance of promoting the social and economic benefits of training, particularly for low-skilled workers. The OECD (2019a) stated that adult workers needed better information to make informed choices about training and cited public awareness campaigns as a practical solution. Bode and Gold (2018) also called for greater information and awareness-raising. Fourage et al (2013) and UKCES (2012) suggested that awareness-raising should focus on the positive economic returns of undertaking training and its potential for career progression.

Incentivising training

Increasingly, workers' contractual arrangements are more flexible, including, for example, casual or fixed-term contracts, and self-employment. The OECD (2019a) stated that these workers are likely to face multiple barriers to lifelong learning. In such instances, the worker may have limited access to publicly/employer-funded training programmes. There is evidence that practical steps such as paying low-skilled staff to attend, or offering other financial incentives, improve the take-up of training opportunities (UKCES, 2012; Bode and Gold, 2018).

Flexible provision

There is some evidence that offering flexible provision can address barriers to participation. Bode and Gold (2018) suggested that low-skilled employees whose jobs are at increased risk of automation should be entitled to time off to train. Cedefop (2014) also stresses the importance of flexibility, suggesting that strategies to support 'mid-career' workers should include providing careers guidance, identifying appropriate learning strategies, offering career breaks and supporting continuous training.

Comparing the strength of evidence for strategies to improve motivations to learn

The extent to which it is possible to definitively rank approaches and techniques in terms of the strength of evidence for their effectiveness is limited by the range of concept definitions and scales/metrics that have been used to measure impact. Other authors who have sought to compare the strength of strategies outlined in the literature also describe difficulties in disentangling the impact of all the influences on adult workers' motivations to learn (UKCES, 2012; Johnston, 2018).

To assess where the greatest effectiveness has been observed, the table below maps the strategies identified by this review against the Theoretical Domains Framework, a behavioural change tool aligned to the COM-B model (See Part 1, Factors that impact on adult workers' motivation to learn).



Effective strategies for increasing the uptake of continued commitment to training people in work

Behaviour categories	Theoretical Domains Framework (TDF)	Examples of areas of research to inform the REA search criteria
Physical capability	Physical skills	<p>Relates to the impact of prior qualifications/skills level, time since last learning/employment progression, and ability or motivation to learn. Beadle et al (2015) suggest that successful interventions should:</p> <ul style="list-style-type: none"> • Fund learning for the inactive/unemployed/disadvantaged/difficult-to-engage • Provide schemes to recognise prior learning (formal and non-formal, to improve equity of access for all) • Embed basic skills development in adult learning programmes (to improve equity of access for all)
Psychological capability	Knowledge	
	Cognitive/interpersonal skills	<p>Prior learning experiences have been shown to impact on future training/learning decisions. Therefore, strategies to improve participation of adult learners should ensure:</p> <ul style="list-style-type: none"> • Provision delivers appropriate introductory learning experiences, and high-quality training that is relevant to the needs and motivations of both employers and learners (Beadle, 2015; Anwari, 2011) • Quality assurance frameworks are established for monitoring/evaluating adult learning programmes (Beadle, 2015) • Provision of a skilled adult education workforce (Beadle, 2015)
	Memory, attention & decision processes	<p>Relates to an individual's ability to learn/digest information. Beadle et al (2015; also see Kantar, 2018) discuss strategies to:</p> <ul style="list-style-type: none"> • Provide guidance about options to improve learners' disposition towards learning • Provide targeted guidance and support services, and promote programmes to learners in underrepresented groups
	Behavioural regulation	
Social opportunity	Social influences	<p>Relates to the impact of peer actions, and social (or industry) norms. Access to peers, expertise, and learning networks have been shown to be the strongest predictor of opportunities to engage in workplace learning (Lloyd et al, 2014), and encouragement from influential people is a key behavioural influencer (Kantar, 2018). Strategies should:</p> <ul style="list-style-type: none"> • Improve awareness of training, engage social partners in promotion and recruitment of learners to improve learners' disposition towards learning (Beadle et al, 2015) • Engage intermediate groups (such as trade unions and community groups) to target underrepresented audiences (Beadle et al, 2015) • Promoting digital champions through formal or informal roles, or rewarding those who champion digital, and fostering an organisational culture that decentralises control over digital working and encourages an open and trusting culture (RCN) • Effective organisational leadership which removes barriers, and builds digital literacy into vision and strategies

Behaviour categories	Theoretical Domains Framework (TDF)	Examples of areas of research to inform the REA search criteria
Physical opportunity	Environmental context & resources	<p>A person's physical environment and access to resources can affect their ability to take up opportunities to learn. Changes in adverse circumstances can lead to behaviour change and positive environments can encourage and support people in making changes.</p> <ul style="list-style-type: none"> • E.g. situational barriers (cited by 27% non-learners, LWI, 2018). • 'Opportunity structures' help sustain motivation to complete learning (Cedefop, 2014) • Protected learning time is a key enabler of workplace learning (Lloyd et al, 2014) • Reflected at policy level in UK (Flexible Learning Fund), Hungary (removal of restrictions on short courses), Flanders (flexible entrepreneurship programmes), and France (El Khomri Law). (OECD, 2019a) • Increase employers' investments in training to improve participation rates, through provision of funding, promoting the use of externally accredited qualifications, and the provision of work-based learning (Beadle et al, 2015) • Coordinated and effective life-long learning policy informed by ongoing evaluation of long-term outcomes – align with other national policies for improving knowledge, skills and competencies of adults, and establish mechanisms for delivery at local/regional levels. Build knowledge base for 'what works' in adult learning (Beadle, 2015; Cedefop; OECD) • Promote innovation and flexibility in the delivery of learning (Beadle, 2015; also see Bode and Gold, 2018, and Cedefop, 2014, who stress the importance of flexibility and offering time off to train) • Allowing time for development and improvement of digital capabilities, access to resources/tools (RCN)
Reflective motivation	Social/professional role and identity	<p>Relates to reflective processes involving plans (self-conscious intentions) and evaluations (beliefs about what is good and bad) when decision-making.</p> <ul style="list-style-type: none"> • E.g. integration (motivated to reflect something of the self) • Career motivation, personal advancement
	Beliefs about capabilities	<p>Relates to self-conscious intentions and notions of self-efficacy, competence and perceived behavioural control when decision-making.</p> <ul style="list-style-type: none"> • E.g. dispositional barriers (beliefs about own ability/suitability to train, cited by 37% non-learners, LWI, 2018) • Careers counselling strategies that incorporate self-reflection to support professional learning (e.g. PDPs, Eisele et al, 2013; vocational inventories, Stauffer et al, 2014; ePortfolios, Van der Horst and Klehe, 2018)
	Beliefs about consequences	<p>Relates to notions of outcome expectancy, attitudes, reinforcement, punishment and consequences when decision-making.</p> <ul style="list-style-type: none"> • Extrinsic motivations • Ensuring a positive initial experience to improve learners' disposition towards learning (Beadle et al, 2015)

Behaviour categories	Theoretical Domains Framework (TDF)	Examples of areas of research to inform the REA search criteria
Reflective motivation (continued)	Optimism	
	Intentions	<p>Relates to a conscious decision to perform a behaviour or a resolve to act in a certain way when decision-making.</p> <ul style="list-style-type: none"> • Organisational commitment impacts on motivation to learn (Federici, 2019) • Individual learning accounts (e.g. the Compte Personnel de Formation in France) to provide individuals with resources they can use to take up further digital (and non-digital) training on their own initiative (not yet evaluated)
	Goals	<p>Relates to intention, goal setting, and commitment when decision-making.</p> <ul style="list-style-type: none"> • E.g. identification (motivated to achieve a relevant personal goal) • Provide progression pathways for learners across the national qualifications framework (Beadle, 2015)
Automatic motivation	Reinforcement	<p>Relates to automatic processes involving emotional reactions, desires (wants and needs), impulses, inhibitions, drive states and reflex responses when decision-making.</p> <ul style="list-style-type: none"> • E.g. external regulation (to avoid punishment/gain reward), introjection (avoid anxiety, seek approval) • Identify current and future skills needs of employers and align provision with these (Beadle, 2015) • Rewarding learning (RCN), paying low-skilled staff to attend or offering other financial incentives (UKCES, 2012; Bode and Gold, 2018)
	Emotion	<p>Relates to a reaction pattern, involving behavioural and physiological elements by which an individual deals with an event when decision-making.</p> <ul style="list-style-type: none"> • E.g. Intrinsic motivations (towards autonomy, competence and relatedness)

Strategies were identified relating to almost all the theoretical domains aligned to capability, opportunity and motivation. The range of evidence relating to opportunity is somewhat greater than that for other domains but predominantly relates to early-stage articulations of innovations (Nesta Standards of Evidence, Level 1), with some observations of positive associative relationships (Nesta Standards of Evidence Level 2). Strategies relating to opportunity can be divided into:

- **Social influences**, typically focused on using persuasion (communications) and/or modelling (aspirational role modelling) techniques to harness the positive influence of peer, social and industry norms.
- **Environmental context and resources**, focused on the removal of financial, material or situational barriers to adult learning. This encompasses a range of intervention types and policy levers targeting enablement (increasing means/removing barriers) through service provision, fiscal measures, guidelines, regulation and/or legislation.

Strategies discussed in relation to motivation typically involve:

- **Education and persuasion** (e.g. communications and marketing, role models, partnerships), service provision (e.g. career guidance/counselling)
- **Enablement** (e.g. legislative entitlement to a careers interview, individual learning accounts and career progression pathways)

- **Environmental/social restructuring** (e.g. skills forecasting and aligned provision)
- **Providing incentives** (e.g. rewarding learning behaviours).

Discussion of these strategies sometimes draws on evidence of a positive change in learning behaviours or outcomes, but rarely exceeds Nesta's Level 2 Standards of Evidence.

There is less evidence/discussion of approaches aligned to the capability domain. Strategies tend to be concerned with improving equality of access by addressing disadvantage in terms of physical capability or increasing participation/completion by ensuring that decision-making is well-informed and driven by positive past learning experiences. Strategies identified relating to capability are typically based on early-stage articulations of innovations to improve adult learning (limited to Nesta Level 1 Standards of Evidence).

As noted elsewhere in this report, there is clear requirement for increased systematic data collection and monitoring of policy interventions, to evidence impacts and outcomes and identify best practice for motivating adult workers to participate in learning (Bode and Gold, 2018; Beadle, 2015). By building the evidence base in this way, policymakers, practitioners and researchers would be better able to rank strategies and techniques, with consideration of any contextual differences and to reflect priority outcomes.

03.

Conclusions and
implications for policy,
research and practice

Key learnings

The available evidence suggests a stronger policy focus on flexible career learning could realise benefits. Career learning is defined as a process of self-reflection, supported within a dialogical learning environment, that enables individuals to actively shape and develop their career goals and actions on a lifelong basis (Hughes, 2019). Career learning needs to be inclusive and cover middle and lower-skilled roles as well as higher-skilled ones. Finding new and innovative ways of reaching into workplaces has become an urgent imperative.

At a macro-policy level, this review identifies the importance of interventions and policy levers that enable learning. These levers cover enhanced service provision, fiscal measures, regulation and guidelines and/or legislation.

There is potential for a randomised control trial (RCT) to explore motivations to learn digital skills for the workplace. It may be worth considering the following themes:

Key findings

- Careers IAG strategies across the learner journey
- Strategies that fall into the 'capability' strand of the COM-B model which are under-evidenced
- Focus on one or more 'tipping points' – the trigger at which personal benefits outweigh personal costs.

Building on the key findings highlighted above, this review finds limited research covering the delivery of digital skills in the workplace and the associated competencies required by employers. We also find the range of quasi-experimental and experimental evidence available on career adaptability, digital skills and digital competencies is weak and requires greater attention by researchers and

policymakers. However, the majority of adult training in OECD countries is geared towards people who are already highly skilled and focused on developing skills that improve productivity, rather than social and economic well-being.

This review finds that the policy discourse around adult learning and skills needs to place greater emphasis on career adaptability. Career guidance/coaching/counselling practices are already in sporadic use today, mainly for higher-skilled roles. However, there is less evidence that such practices have been extended to middle and lower-skilled roles.

The findings clearly illustrate that adults' motivation to learn varies significantly, due to a highly complex web of factors and elements, both personal and environmental. The trigger to participation in learning for each adult comes at a tipping point where personal benefits outweigh personal costs. Strategies discussed in relation to motivation typically involve education and persuasion (e.g. communications and marketing, role models, partnerships); service provision (e.g. career guidance/counselling); enablement (e.g. a legislative entitlement to a careers interview, individual learning accounts and career progression pathways); environmental/social restructuring (e.g. skills forecasting and aligned provision), and the provision of incentives (e.g. rewarding learning behaviours).

Our review has found that providing greater opportunity and access to provision is an important external factor that influences training take-up. At a macro-policy level, therefore, the following range of intervention types and policy levers that target enablement should be considered through enhanced service provision (physical capability); fiscal measures (physical capability; automatic motivation); regulation and guidelines (physical opportunity) and/or legislation (physical opportunity; reflective motivation).

Enhanced service provision through national infrastructure projects

Strengthening national careers and employability services to target more specifically adults in the workplace, particularly those who face redundancy, is important. Physical capability is a relevant behaviour category here. Beadle et al (2015) suggest that embedding skills development in adult learning programmes

to improve equality of access for all is key. In Mexico, the Secretariat of Labour and Social Welfare (STPS) runs the Remote Training Program for Workers (PROCADIST), which provides free online courses for workers across the country. Since 2015, the virtual training environment can be accessed via mobile devices in addition to computers. The United States Department of Labour has helped community colleges to develop and expand online, accelerated learning strategies for adults. Belgium offers organised distance training and a major training agency facilitates access to Massive Open Online Courses (MOOCs) offered by partners. Awareness-raising is key – and this is recognised by academics and policymakers alike (OECD, 2019; Beadle, 2015). Awareness-raising campaigns should be implemented to promote the need for lifelong learning, career adaptability and digital skills. These could involve intermediate groups such as trade unions and digital champions (social opportunity). These should stimulate interest in increasing adults' access to education and training through improved information on education and training pathways. To be most impactful, campaigns should take account of the different stages of the learner journey as described by Kantar in 2018.

National fiscal measures can target infrastructure or learners

Ensuring that programmes are funded (physical capability) is important. In England, the forthcoming National Retraining Scheme aimed at 'adults in work' brings a pledged investment from the Treasury of £100m. Evidence from 'cost and outreach pilots' clearly demonstrates that robust local leadership and coordination is vital in ensuring effective delivery. A key challenge is to develop a coherent national framework and lifelong learning activities that can be shaped and implemented locally to meet the needs of local people and businesses.

It is also important to reward learning (automatic motivation). Paying low-skilled staff to attend or offering other financial incentives can improve the take-up of opportunities (Bode and Gold, 2018; UKCES, 2012). This includes an exploration of incentives for adults to learn in the workplace, ranging from in-house

company incentives to employer and government-funded accessible training and development for adults in work. Any national framework should include the use of such skills for providing a decent life within society and community and to equip individuals with the skills and understanding of the appropriate use of technology within their social relations and their life course. There is scope for greater attention to be given to the 'returns on investment' for adults participating in learning (i.e. the economic, social and cultural benefits).

Regulation and/or guidelines may benefit by channelling through employer bodies

Career motivation and progression pathways (largely extrinsic factors as seen in 'reflective motivation') are influential factors in the decision to undertake workplace learning. Industry-led and professional bodies such as national and regional digital partnerships, the CIPD (professional body for HR and people development) and the UK Career Development Institute among others have a key role to play in this. They can articulate career progression pathways to adults and contribute to skills forecasting. However, much of this work is fragmented and requires a sharper focus and shared vision on strategies to engage with adults in the workplace introducing new and innovative approaches.

Legislation adds costs to employers for the benefit of workers

Organisational commitment impacts on motivation to learn (reflective motivation) and providing opportunity structures help sustain motivation to complete learning (Physical opportunity – Cedefop, 2014). In France, all employees are entitled to a 'career interview' at least every two years. It allows employees to consider their career development in terms of qualifications and jobs. Every six years, the employer has to produce a written appraisal of all employees' careers and in enterprises with 50 or more employees, this document will be used to check whether the employee has benefited from sufficient training. The document is sent

to the bipartite body in charge of managing the professional training at sectoral level (OPCA); if not, a bonus of 100 hours (130 hours for part-time employees) will be automatically added by the OPCA to their individual training account. Interviews draw on training passports and Compte Personnel de Formation (free tuition on government-approved programmes with paid leave from work). New and innovative ways of reaching into workplaces to ensure quality skills provision to counter the threat of mass automation has become an urgent imperative. Education cannot be divided up in a neat vocational/leisure divide. What individuals learn can become relevant in a host of unpredictable circumstances. Advances in digital developments afford new opportunities aimed at improving the capacity of adults in work to acquire new knowledge and to upgrade their skills in an evolving economy.

Substantial further research and evaluation is possible but will need a distinct focus

Researchers should be encouraged to focus on further work in those areas requiring additional evidence to strengthen the case for investment, for example:

- More systematic data collection and monitoring of policy interventions, to evidence impacts and outcomes and identify best practice for motivating adult workers to participate in learning (Bode and Gold, 2018; Beadle, 2015). By building the evidence base in this way, policymakers, practitioners and researchers would be better able to rank strategies and techniques, with consideration of any contextual differences and to reflect priority outcomes.
- Effective strategies to extend career adaptability policies and practices, including career guidance/coaching/counselling to middle and lower-skilled roles (Chan & Mai, 2015; Johnston, Maggiori, & Rossier, 2016; Zacher, 2015; (cited in Johnston, 2018); Eisele et al, 2013).
- Innovative ways of incentivising and accrediting formal and informal learning in the workplace (UKCES, 2012; Bode and Gold, 2018).

- Randomised control trials (RCTs) examining adults' motivation to learn digital skills for the workplace. The factors that influence the decision to run an RCT and some design considerations are outlined in more detail in Appendix 6.
- Use of artificial intelligence (AI) and data management systems that can capture adult learning trajectories such as: chatbots and labour market intelligence/information (LMI) online systems.
- Returns on investment (ROI) for adults participating in learning (i.e. the economic, social and cultural benefits) and ways in which this can be communicated effectively.

At practice level, there is scope for:

- Adults' increased access to bite-sized modules of learning, open educational resources and synchronous online sessions, using video streaming, either as part of blended learning courses or in the form of 'webinars'.
- The coming together of industry-led and professional bodies to co-create and communicate 21st century career-switching and progression routes aimed at adults in the workplace.
- National careers and employability support systems to be strengthened through a greater focus on careers information, advice and guidance in the workplace and local communities.

Finally, reaching out deep into local communities, with a compelling narrative to increase adults' participation in formal and informal learning, is essential. The art of persuasion and education (investment in communications, advertising and marketing) in the form of awareness-raising through a major campaign and/or multiple media campaigns is one way forward.

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Appendix 1: Methodology

This report is based on a rapid evidence assessment (REA) approach as a method to evaluate secondary research evidence. An REA is like a systematic review in that it adopts an explicit and systematic methodology; the difference is that an REA cedes some level of rigour to fit the required work within the constraints of available resources – i.e. time, budget and staffing levels (Thomas, Newman & Oliver, 2013).

Scoping

With reference to the research brief and through dialogue with Nesta, an initial list of search terms was drawn up. The scope of the review was defined and limits were set, (e.g. agreeing which subjects should be excluded from the review and setting thresholds for the quantity and quality of evidence to include). The research questions were reviewed and refined accordingly.

Table 3: Search terms for research question 1

1	2	3*	4*	5*	6	7
Factors	Impact	Adult workers	Motivation	Learn	Career adaptability skills	Developmental needs
Social determinants	Influence	Adults in work	Propensity	Train	Employability skills	Workplace learning/ training
Enablers	Effect	Employees		Develop	Digital skills	Work-based learning/ training
Barriers					Digital complementary skills	Vocational training
Extrinsic					Lifelong learning	Vocational education
Intrinsic					Digitalisation	Motivation to learn

Search

Three methods were used to source evidence for review: searching for experimental and peer-reviewed evidence via an academic library service; searching online for publicly available ('grey') literature; and identification of relevant material through citations within sources acquired and recommendations from associates with expertise in relevant fields of study.

Search terms

After consultation with Nesta, an agreed set of search terms were identified. There was one set of terms for each of the primary research questions, and each set comprised multiple lists of terms organised by theme. RQ1 had a set of six lists of terms, to which we added another list after findings from initial searches (adding some terms identified in early search results); RQ2 had a set of nine lists, later cut down to seven following a re-definition of scope in consultation with Nesta. The lists of terms are presented below.

Table 4: Search terms for research question 2

1*	2*	3*	4	5	6	7*
Adult workers	Strategies	Impact	Motivation	Learn	Digital approaches	Career adaptability skills
Adults in work	Technique	Effectiveness	Participation	Learning	Online learning	Employability skills
Employees	Intervention		Behaviour	Train	E-learning	Digital skills
Low skill workers	Initiative		Mind-set	Training		Digital complementary skills
Medium skill workers	Policy			Develop		Digital learning
Trade union members				Developmental needs		Digital literacy
				Workplace learning/ training		Digitalisation
				Work-based learning/ training		
				Vocational training		
				Vocational education		
				Motivation to learn		
				Motivation for learning		

The original planned approach was to run a search for every possible combination of the search terms. For RQ1, this worked out to more than 2,000 searches, and for RQ2 it meant more than 200,000 searches. Because it would be unfeasible to undertake this many searches within the time available, and also because many of those combinations would return duplicate results, the approach taken was to prioritise selected lists of terms. For RQ1, the priority lists were 3, 4 and 5 (marked with * in the tables above); for RQ2, the priorities were lists 1, 2 and 7. We identified a few more search terms from keywords listed in the articles returned from the initial searches. This allowed for subsequent searches using these new terms in combination with the priority lists of search terms.

We conducted two types of search for material: online searches for publicly available evidence using Google search, and searches of an academic library database for research evidence published in peer-reviewed journals. The academic search was undertaken via a portal with access to multiple databases of journals and periodicals covering the sciences, economics, social sciences, politics, finance and international studies. The list of databases includes JSTOR, Science Direct, Nexis UK, Ingenta, Emerald, International Bibliography of the Social Sciences, and the British Humanities Index.



Search parameters

Searching was restricted to sources written in English within OECD countries and published within the last ten years. The following inclusion/exclusion criteria were also applied:

To include

- Studies of adults 25+ (focusing on 18+) in full-time or part-time paid work/employment
- Career adaptability skills
- Digital or digital-complementary skills
- Development interventions
- Career development or transitions at level 3 (A-level or equivalent or below) or below
- RCTs (quasi-experimental and experimental studies), observational studies.

To exclude

- Studies concerned exclusively with gig economy workers or self-employed adults
- Unemployed and economically inactive adults
- Studies focused solely on career development or transitions at level 4 (equivalent to BTEC Professional Diploma level) or above
- Studies that are not concerned with learning for/at work, or which are focused only on psychology, motivation or career theory
- Evidence that is clearly based on a single person's opinion
- Studies of career development training among FE/HE students (irrespective of whether they also happen to have a part-time job).

Search results

In the academic literature search, we performed 285 searches for RQ1 and 672 for RQ2. These searches yielded totals of 2,548 and 3,292 articles (respectively). Titles were scanned in a screening process to decide whether they should be considered for review or rejected. A total of 167 articles and reports were selected for review after screening from the RQ1 search results and 115 from the RQ2 search.

Table 5: Quantitative summary of searches and results.

Search type	Searches	Sources for screening	Sources for review
Academic RQ1	169	2,548	73
Academic RQ2	336	3,292	80
Grey RQ1	116	3,480	94
Grey RQ2	336	10,080	35

Screening and sorting

After identifying potentially relevant sources of information through searching, the titles of these sources were scanned to decide whether they were relevant enough to be included for further assessment. From the material identified as relevant, we collated bibliographic information and established which of the research questions each could contribute to. After this categorisation process, each source was evaluated in terms of methodological strength, and any experimental methods (e.g. randomised control trials) were also identified. A quality assessment framework was applied, as detailed in Table 6. This process allowed us to quantify the relevance and quality of each source. With this quantitative measure, the top 50 sources would be selected for full review and analysis, to be incorporated into the final report.

Review and analysis

Applying the quality assessment framework to the shortlisted material resulted in a quantitative assessment of each source. From this list, the top 50 sources of evidence were selected for a full review. To this were added a few extra sources of evidence that had been recommended by associates, making a total of 65 sources for in-depth review. The review process summarised the aims, methods and relevant findings for each source. The approach was structured by the seven research questions, with relevant findings mapped to each question.

Synthesis of findings

The final stage was to synthesise the findings from the selected evidence in order to answer the research questions.

Table 6: Quality assessment framework used to screen and categorise shortlisted material

	No score (0)	Low score (1)	Medium score (2)	High score (3)
Relevance Extent to which source has direct relevance to research questions	No relevance to any research questions (RQs) (Exclude)	Some relevance to at least one primary RQ	Highly relevant to at least one primary RQ	Highly relevant to at least one primary RQ, and potential relevance to secondary RQs
Transparency Extent to which the objectives are clearly stated	No clear objective stated (Include if other criteria met, but highlight limitations)	General statement of purpose (defines context)	Brief statement of objectives (i.e. defines context and variables)	Specific statement of objectives (i.e. detailed definition of context, variables and hypotheses)
Method Methodological basis for evidence	No methodological information provided (Exclude)	Theoretical or conceptual	Observational research (e.g. longitudinal or cross-sectional qual. or quant. studies), secondary reviews	Experimental or quasi-experimental studies (RCT, simulated randomisation)
Execution Evaluated against expected quality criteria for the specific method (for example, potential for bias in experimental approaches, or misinterpretation of meaning in observational analysis)	Insufficient information provided. Poorly executed, limitations undefined, or defined with high risk of bias or misinterpretation (Include if other criteria met, but highlight limitations)	Satisfactorily executed, limitations articulated, moderate risk of bias or misinterpretation	Well executed, limitations articulated, low risk of bias or misinterpretation	Very well executed. Limitations articulated and mitigated, so minimal likelihood of bias or misinterpretation
Overall score	Average used to establish a hierarchy of evidence, from which 50 articles will be selected ²⁴			

Appendix 2: Overview of strength of evidence against each research question

Figure 7: Summary of strength of evidence: number of sources and quality assessment scores

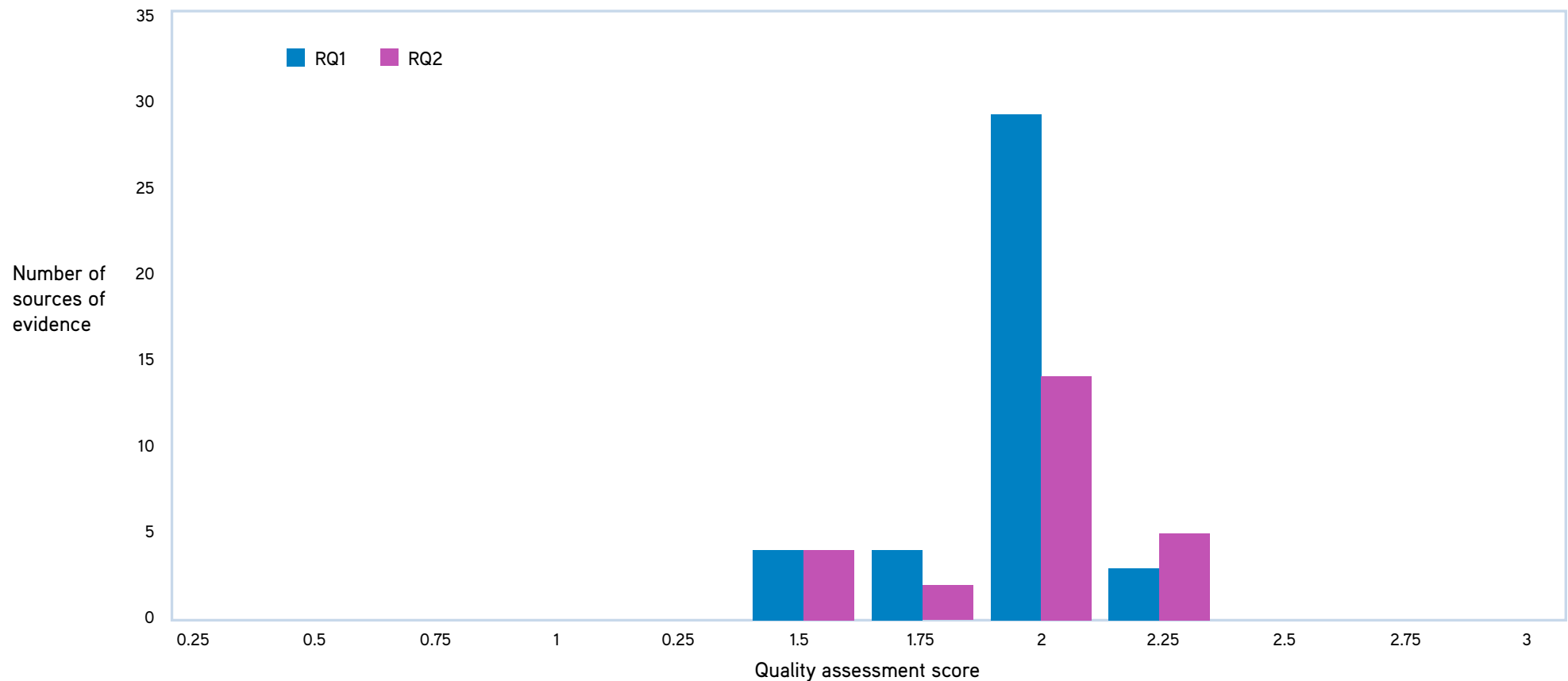
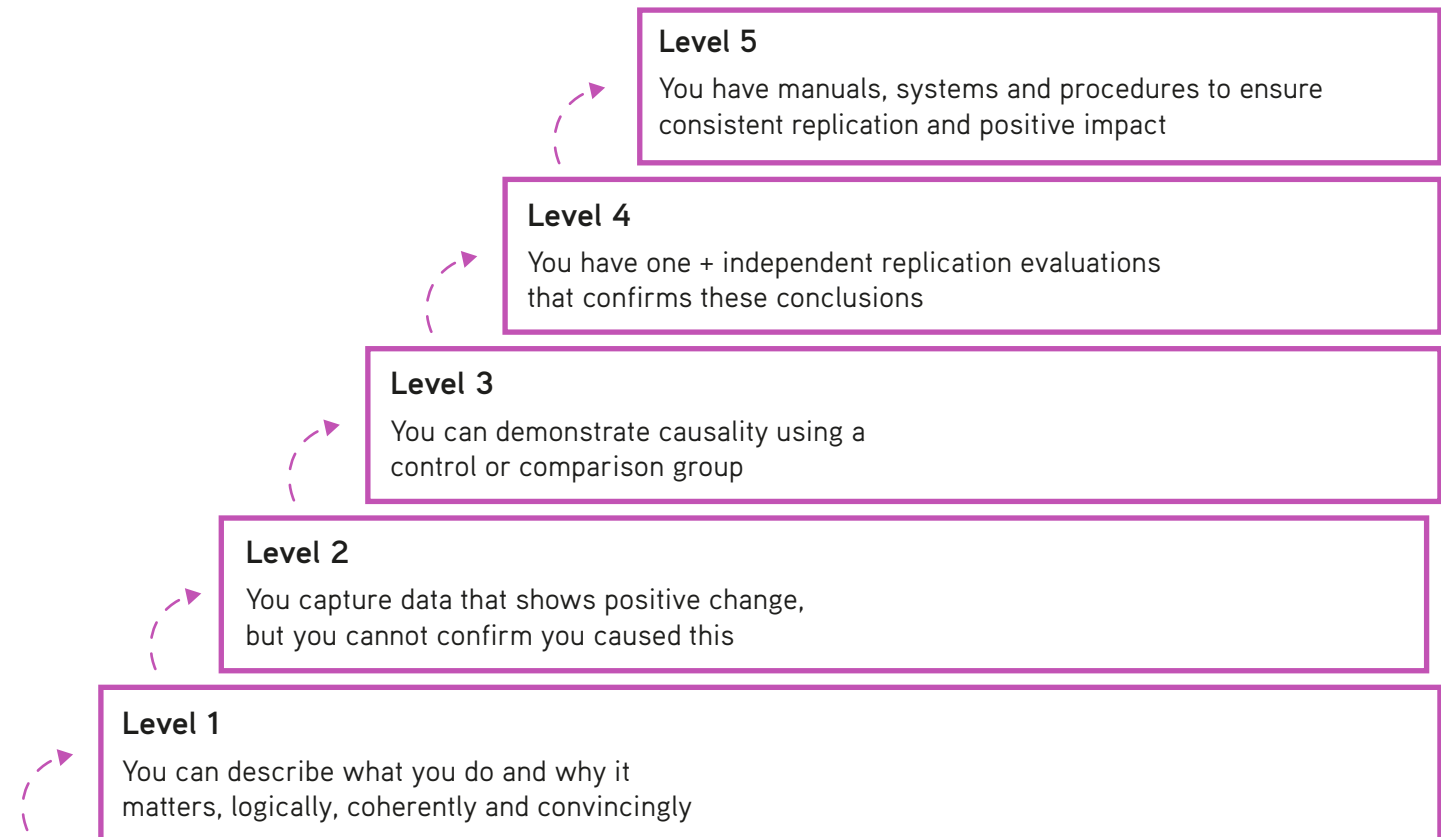


Figure 8: Standards of evidence for impact investing (Puttick, R., and Ludlow, J., 2012)

Inclusion into this study was dependent upon an aggregated quality assessment score based on four factors: relevance; method; transparency and execution (detailed in Table 6). When methodological robustness alone is considered, most sources included in this review scored either '1' (theoretical or conceptual) or '2' (observational research, secondary reviews). These broadly align with Nesta's Standards of Evidence Levels 1 and 2.

In 2013, Nesta published an overview of the Nesta Standards of Evidence. These standards are designed to align with academic levels of rigour, while managing to ensure appropriate impact measurement.



Appendix 3: Conceptual frameworks

COM-B

Behavioural Framework

The REA drew on the COM-B model (Michie, Stralen & West, 2011; see Figure 9 and Table 7) to identify, analyse and interpret the evidence around interventions that can influence motivations to engage in learning.

Figure 9: Overview of COM-B model aligned to Service Provision Policy

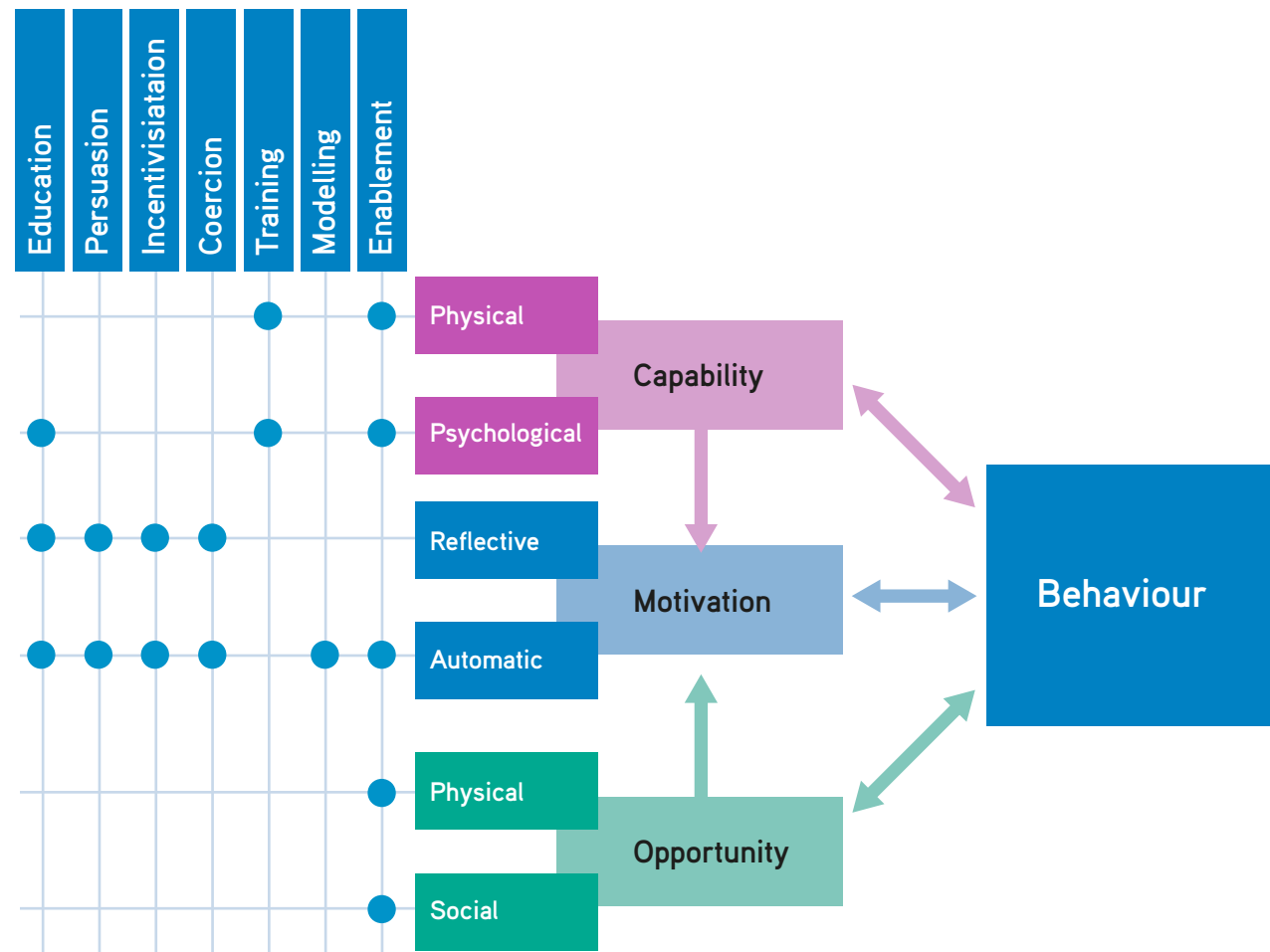


Table 7: Overview of COM-B model aligned to Service Provision Policy

Interventions	Policies
Education: Increasing knowledge or understanding	Communication/marketing: Using print, electronic, telephonic or broadcast media
Persuasion: Using communication to induce positive or negative feelings or stimulate action	Guidelines: Creating documents that recommend or mandate practice
Incentivisation: Creating expectation of reward	Fiscal: Reducing or increasing the financial cost of a given behaviour
Coercion: Creating expectation of punishment or cost	Regulation: Establishing rules or principles of behaviour or practice
Training: Imparting skills	Legislation: Making or changing laws
Restriction: Using rules to reduce or increase target behaviour	Environmental/social planning: Designing and/or controlling the physical or social environment
Environmental restructuring: Changing the physical or social context	Service provision: Delivering a service
Modelling: Providing an example for people to aspire to or imitate	
Enablement: Increasing means/reducing barriers to increase capability or opportunity	

Specifically, the search strategy and analysis of evidence was informed by overlaying the research questions against the Theoretical Domains Framework (TDF, summarised in Table 8, also see initial behavioural framework). The selection and analysis of evidence aimed to identify and categorise interventions in terms of the following definitions.

Table 8: Summary of Theoretical Domains Framework

COM-B Category	Theoretical Domains Framework
Physical capability	Physical skills
Psychological capability	Knowledge; Cognitive / interpersonal skills; Memory; Attention and decision processes; and Behavioural regulation.
Reflective motivation	Social/professional role and identity; Beliefs about capabilities; Beliefs about consequences; Optimism; Intentions; Goals
Automatic motivation	Emotion; Reinforcement
Physical opportunity	Environmental context and resources
Social opportunity	Social influences

Appendix 4: Terms explained

List of terms in the report that need explanation/definition

Terms highlighted below in bold are defined elsewhere in this glossary.

Affective organisational commitment

Emotional attitude towards work. In employment research, 'organisational commitment' refers to the attachment of an employee to their employing organisation, and it results when employees find meaning in their work (Beukes & Botha, 2013). 'Affective' refers to emotion, thus von Treuer, McHardy & Earl (2013) use the term 'affective organisational commitment' to specify an emotional form of organisational commitment.

Boundary-less careers

A career concept that emphasises "*individual responsibility for active career management and [implies] that adaptability is required to be successful.*" (Johnston, 2016, p.3). A "*boundary-less mindset*" is a correlate of career adaptability resources (Johnston, 2016, p.12).

Career adaptability

"An adult's 'readiness to cope with changing work and working conditions'" (Super & Knsel, 1981, p.195 in: Johnston, 2016, p.3).

"A psychosocial construct that denotes an individual's readiness and resources for coping with current and imminent vocational development tasks" (Savickas, 2005, p.51 in: Johnston, 2016, p.5).

"A psychosocial resource for managing career-related tasks, transitions, and traumas" (Rudolph, Lavigne & Zacher, 2016).

Career calling

Settling on "*a career that is meaningful [...] and involves personally significant activities*"; a "*dominant career-related goal*" (Praskova, Creed & Hood, 2015, p.86).

However, there is no agreement over the definition of career calling [...] although there is consensus that people with a calling consider their work to be deeply meaningful and approach it with a strong sense of purpose and desire to contribute to others in the community (Praskova, Creed & Hood, 2015, p.87).

[...] with the emphasis on continuous learning and adaptability in changing work environments, [...] new conceptualizations now highlight that a career calling predominantly originates within the individual and is central to one's identity (Praskova, Creed & Hood, 2015, p.88).

Career decidedness

An individual's degree of confidence in following a specific career direction (Restubog, Florentino and Garcia, 2010).

The extent to which individuals are certain about their intended career paths (Fearon, Nachmias, McLaughlin & Jackson (2016).

Career learning

A process of self-reflection, supported within a dialogical learning environment, which enables individuals to actively shape and develop their career goals and actions on a lifelong basis (Hughes, 2019).

Career optimism

“A non-intellective motivational factor reflecting expectations of the best possible outcome in relation to one’s future career development” (Tolentino et al, 2013, p.42).

Cognitive constructivism

An approach to educational psychology (e.g. Piaget, Perry) that contrasts with behavioural studies by focusing on mental process.

Common to most cognitivist approaches is the idea that knowledge comprises symbolic mental representations, such as propositions and images, together with a mechanism that operates on those representations. Knowledge is seen as something that is actively constructed by learners based on their existing cognitive structures. Therefore, learning is relative to their stage of cognitive development, and understanding the learner’s existing intellectual framework is central to understanding the learning process. (Berkeley GSI Teaching and Resource Centre, 2019).

Cognitive learning theory

Another term for **cognitive constructivism**.

Cognitive structures

The basic mental processes that people use to process information. Also known as mental structures, mental tools and patterns of thought. In **cognitive constructivism**, *“learners adapt and develop by assimilating and accommodating new information into existing cognitive structures.”* (Berkeley GSI Teaching and Resource Centre, 2019).

Intrinsic motivation

Currently understood as self-motivation, as opposed to external motivation. Previously (up to 1970s) referred to behaviour undertaken for its own sake, as opposed to for another purpose (Jovanovic & Matejevic, 2014).

Job involvement

An employee’s psychological identification with their job (von Treuer, McHardy & Earl, 2013).

Learning goal orientation

Motivation to learn based on the development of skills (learning orientation) as opposed to learning for the purpose of achieving a qualification or grade (grade or performance orientation) (Dweck, 1986). Some studies treat learning goal orientation as a component of **career adaptability**:

Learning goal-oriented individuals perceive ability as malleable and proficiency as contingent on expended effort. As a result of this mastery orientation, they tend to engage in adaptive behaviours to enhance competencies (Tolentino, Garcia, Lu, Restubog, Bordia & Plewa, 2014, p.41).

“...learning goal-oriented individuals are more likely to perceive life circumstances (e.g. work transitions) as career enablers rather than barriers.” (Tolentino et al, 2013, p.41).

Motivational systems theory

A theoretical framework in research on motivational behaviour developed by Martin Ford, which proposes that *“achievement and competence are the results of a motivated, skilful and biologically capable person interacting with a responsive environment.”* (Ford, 1992, p.70 in: Campbell, 2007, p.12).

Narrative counselling

Also known as narrative therapy, an approach to counselling based on the idea that people create narratives to interpret things. Some studies suggest that narrative counselling contributes to the enhancement of career adaptability resources (Johnston, 2016, p.20).

Proactive personality

“An individual’s predisposition to initiate action aimed at influencing one’s environment.” (Tolentino et al, 2013, p.41).

Protean careers

A career concept that emphasises *“individual responsibility for active career management and [implies] that adaptability is required to be successful.”* (Johnston, 2016, p.3). *“Protean career attitudes”* are *“positive correlates of career adaptability resources.”* (Johnston, 2016, p.12).

Psychosocial construct

A category of concepts that involve both psychological and social aspects.

Self-regulation

In vocational research, the capacities that enable people to deal with problems, i.e. career adaptability resources.

Career adaptability resources are the self-regulation strengths or capacities that a person may draw upon to solve the unfamiliar, complex and ill-defined problems presented by developmental vocational tasks, occupational transitions and work traumas. (Savickas & Porfeli, 2012, p.662).

Self-regulation is based on multiple subsystems and not performed by a single structure. A configuration of resources serves development. Accordingly, career construction theory represents career adaptability resources as an aggregate construct. (Savickas & Porfeli, 2012, p.663).

Social constructivism

“A learning theory based on the ideas of Vygotsky (1978) that human development is socially situated and knowledge is constructed through interaction with others.” (McKinley, 2015, p.184).

Utility perceptions

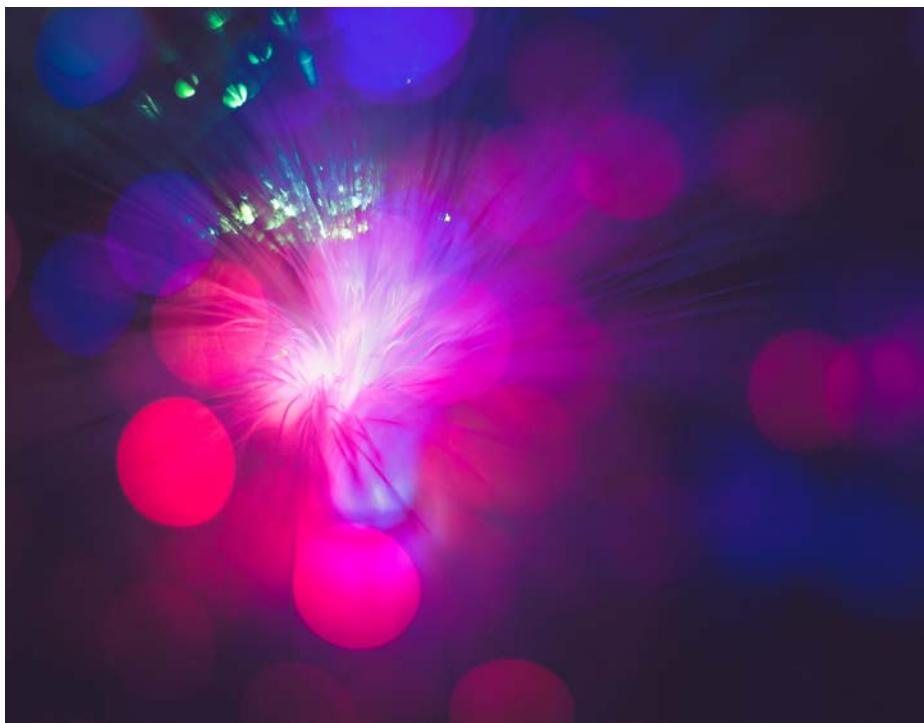
“An individual’s attitudes towards the usefulness of training programmes.” (Ford & Noe, 1987, cited in: von Treuer, McHardy & Earl, 2013, p.609). A predictor of motivation to learn (correlation: $r = 0.71$, $p < 0.01$; linear regression: $\beta = 0.614$, $p = 0.000$, von Treuer, McHardy & Earl, 2013).

Vocational identity status (Porfeli & Savickas, 2012)

A positive correlate with career adaptability resources (Porfeli & Savickas, 2012, cited in Johnston, 2016, p.12).

Appendix 5: Key source summaries

Where we have drawn extensively from particular sources, we include a summary of the source. This includes further information on author/discipline, research objective and results found.



Kantar Public & Learning and Work Institute (2018): Decisions of adult learners

This report for the Department for Education is one of the few sources included in this REA to use the COM-B model. It aims *“to understand adults’ experiences of, and decisions about, learning.”* (p.7).

The findings are based on research involving in-depth interviews with 70 learners and focus groups with 16 adults who were not currently learning.

Key findings:

“The study reveals that, for every learner, there exists a complex and unique relationship between their own perceptions of the personal benefits and personal costs of learning.” (p.7).

The report argues that *“the trigger to participate in learning [...] comes at a tipping point where personal benefits (or ‘pros’) outweigh personal costs (‘cons’)”* (p.7). The changing balance of positive and negative factors that arise through changing circumstances means that adults are *“tipped into or out of learning”* at various points in their career journey.

The report identifies a four-stage cycle of decision-making (pre-contemplation, contemplation, determination and maintenance) and 12 associated factors that influence engagement with learning:

The report formulates an attitudinal typology of learners with six categories: lifelong learners, tentative learners, defiant learners, exhausted learners, outcome-focused learners, and ‘stuck in status quo’ learners. Attitudes to learning determine *“whether, when and how”* adults engage with learning. Because different learner types face different barriers to learning, different types of intervention are more or less effective for each group.

Johnston, C.S. (2018): A systematic review of the career adaptability literature and future outlook

This systematic review by Claire Johnston is the most recent, relevant and comprehensive of the literature reviews included in this REA. Johnston is based in the Department of Work and Organizational Psychology at the University of Bern, Switzerland. The review focuses on recent empirical evidence relating to career adaptability, also including intervention studies, measures of career adaptability and theoretical foundations such as Career Construction Theory (CCT). Johnston's review is thorough and nuanced, identifying subtle but significant differences in the various research approaches to the subject, for example the distinction (or lack of) between career adaptability readiness, resources, responses and results.

It is based on 116 sources, including book chapters in addition to academic articles. The search procedure was based on the terms 'career' and 'adaptability' in titles, abstracts and keywords. Of more than 500 sources resulting from the search, 127 passed the criteria for inclusion. One limitation of this review is that it doesn't say what these criteria were, or how they were applied; there is not enough information about the system that was used in this systematic review.

Key findings:

Career adaptability resources and responses are factors that support participation in learning. Johnston usefully summarises the main findings in tables: one table maps career adaptability constructs against CCT, another identifies predictors and outcomes of resources and responses.

Beadle, S. (2015): An in-depth analysis of adult learning policies and their effectiveness in Europe

A report published by the European Commission's Directorate-General for Employment, Social Affairs and Inclusion, focusing on evidence about how to increase adult learners' disposition towards learning and increasing employers' investment in learning.

The aims are to evaluate the performance of European countries in adult education and training and to identify factors of effective development policies in countries that perform well.

Methods include a literature review, citing 72 sources, and 10 country case studies. A conceptual framework was developed to explain the key factors and how they interact, based on *"an iterative approach of drawing on the research and consulting with policymakers and experts"* (p.25).

Key findings:

The report has some useful findings. It defines effectiveness in adult learning policy in terms of achieving economic and social outcomes for beneficiaries including learners, employers and the wider community. It identifies the key elements of successful policy in terms of inputs/activities and outputs/outcomes, and it explains the link between them. However, this study also shows that the benefits of learning are inaccessible for a large number of adults. This is partly because they don't participate in learning, but also because some policies are ineffective and there is insufficient policy monitoring. A final output from this study is an analytical framework to help policymakers to analyse their learning policies.

Cedefop (2014): Navigating difficult waters: learning for career and labour market transitions

A research paper based on interviews with around 25 people in each of five EU countries by the European Centre for the Development of Vocational Training.

Building on previous work by Cedefop, this study provides evidence that *“learning can support labour market transitions of adult workers by increasing their adaptability”* (p.1).

Key findings:

The findings include identification of factors that support career transitions, including institutional factors and individual behaviours. Some of the findings relate to the COM-B model, though without explicit reference to it.

Four key dimensions of adaptability are identified: learning through challenging work; updating a substantive knowledge base; learning through interactions at work; and being self-directed and self-reflexive (p.8).

The report presents a model of learning for career transitions, comprising *“three interrelated representations”*: the first representation views learning as a process of development – *“learning as becoming”*; the second comprises four domains of development – relational, cognitive, practical and emotional; the third acknowledges that learning is always contextualised in opportunity structures – the labour market, occupational pathways, employer attitude, opportunities for learning.

Bimrose, Brown, Barnes, & Hughes (2011a): The role of career adaptability in skills supply

A report for the UK Commission for Employment and Skills (UKCES) by Warwick Institute for Employment Research (IER). This study aims to add to understanding of career adaptability and how it can improve the provision of careers support services and help individuals support themselves better.

The methodology included a literature review and telephone interviews with UK and Norwegian participants. The report examines the individual characteristics that relate to career adaptability (CA) and identifies five competencies of CA among published research evidence. Although it doesn't refer explicitly to the COM-B model, the report discusses closely related elements such as context and opportunity.

Key findings:

Understanding career adaptability and developing effective policy requires moving beyond traditional concepts of employability. The concept of 'opportunity structures' *“conveys the existing tension between the need for openness and flexibility on the one hand and structured pathways on the other”* (p.iv). Government data on 'destination measures' has potential to contribute to identifying career adaptive competencies. This relates to the point made by Beadle (2015) about the need for better policy monitoring data.

Kispeter (2019): What motivates people to improve their digital skills? What can policy actors and businesses do to encourage digital up-skilling?

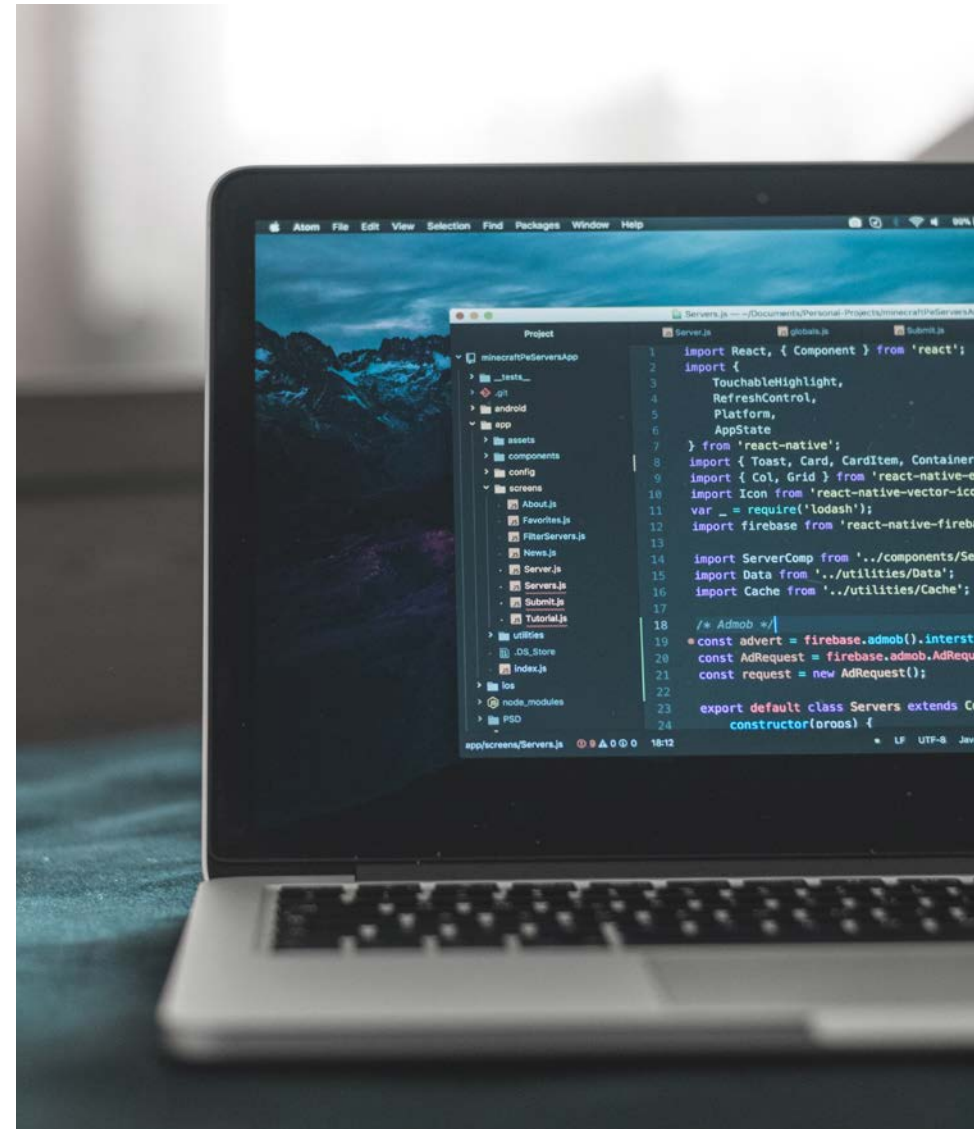
An unpublished report for the Department for Digital, Culture, Media & Sport by the Digital Skills and Inclusion Research Working Group at the Warwick Institute for Employment Research.

This REA focuses on three aims: identifying the main issues in studies of employees' motivation to learn, understanding how motivation varies by demographic characteristics, and finding the most effective policies and interventions. A total of 133 sources passed the screening stage to be incorporated into the review. Quality of evidence was assessed using the EPPI-Centre (2002) methodology.

Key findings

This literature review is useful because it is one of the few sources to provide evidence on the development of digital skills. It makes the important point that a narrow focus on digital skills may be counter-productive because the changing nature of the workplace may be faster and more extensive than we currently assume. Digital skills need a foundation of traditional employability skills: the cognitive skills of literacy and numeracy; non-cognitive skills such as problem-solving; and job-specific technical skills.

The review discusses three theories of learning – behaviourist, cognitive constructivist and social constructivist – identifying how each deals with motivation to learn. It shows how these learning theories vary in the extent to which they view motivation as intrinsic or extrinsic (B: extrinsic; CC: intrinsic; SC: both). Within the analysis of behaviourist theories, this study discusses COM-B (Gloster et al, 2017), the MINDSPACE framework (Dolan et al, 2010) and EAST (Behavioural Insights Team, 2015).



Endnotes

1. Industry 4.0 is a term used to describe the trend in automation in manufacturing technologies and includes 'cyber-physical systems', the internet, cloud computing and cognitive computing. It is commonly referred to as the fourth industrial revolution.
2. See Appendix 2.
3. The Coordinated Plan builds on a 'declaration of cooperation' that was signed by all EU Member States and Norway in the context of the Digital Day 2018, emphasising the willingness to cooperate more closely on AI.
4. Tuomi, I. The Impact of Artificial Intelligence on Learning, Teaching, and Education. Policies for the future, Eds. Cabrera, M., Vuorikari, R & Punie, Y., Publications Office of the European Union, Luxembourg, 2018.
5. This represents businesses with one to nine employees.
6. <https://www.axa.co.uk/newsroom/media-releases/2018/adult-education-decline-is-creating-a-land-of-missed-opportunity/>
7. See Appendix 2.
8. Deci, E., (1972) Intrinsic motivation, extrinsic reinforcement, and inequity. Journal of Personality and social psychology Vol22 No 1 p113.
9. Platform work is an employment form in which organisations or individuals use an online or mobile platform to match customers and clients with workers who provide services in return for money.
10. Strategic framework for European cooperation in education and training is a forum that allows EU member states to cooperate in building best practice.
11. IAG refers to the provision of factual information relating to careers and learning neutrally, without exploring the merits of different options.
12. Places the emphasis on the individual (rather than organisations or external norms/concerns) in determining career outcomes. See Appendix 4 for detailed definition.
13. Encourages mobility, flexibility, and personal responsibility for developing knowledge and networks. See Appendix 4 for detailed definition.
14. 'Psychosocial construct' may be defined as a variable which draws on psychological and sociological concepts to explain an individual's readiness and resources to navigate career development, transitions and stresses.
15. For example, to advance in rank, dignity, position, etc.
16. In contrast, adapting responses are those behaviours that help individuals to adjust to changing conditions, while adaptation results are the actual results of adapting.
17. <https://www.caba.org.uk/how-we-help/career-development/career-adaptability-tool-introduction>
18. https://www.lloydsbank.com/assets/media/pdfs/banking_with_us/whats-happening/LB-Consumer-Digital-Index-2018-Report.pdf
19. Vocational inventories are instruments that help to measure a person's relative interest in career options.
20. Job self-efficacy is a term used to describe an individual's confidence in doing job tasks. In this study, it is used as a moderator of the interaction effects between career adaptability and job tenure on the job content plateau.
21. <https://www.rcn.org.uk/clinical-topics/ehealth/every-nurse-an-e-nurse>
22. <https://www.hee.nhs.uk/our-work/digital-literacy>
23. Programme for the International Assessment of Adult Competencies is an international study in 24 countries of cognitive and workplace skills undertaken by OECD.
24. Selective judgements may be made, prioritising relevance to ensure adequate coverage against research questions – this would be discussed with Nesta to ensure consensus of requirement.
25. The literature on employers' use and uptake of training for workers is large and outside the scope of this review.
26. Bandura, A. (2006) Guide for Constructing Self-Efficacy Scales. In: Pajares, F. and Urdan, T.S., Eds., Self-Efficacy Beliefs of Adolescents, Age Information Publishing, Greenwich, 307-337.

About *Digital Frontrunners*, CFE Research and Nesta

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Digital Frontrunners is a collaborative programme to help senior policymakers create a more inclusive digital economy. It is managed by Nesta, the innovation foundation, and supported by Google.

www.nesta.org.uk/project/digital-frontrunners



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