Personalisation of Learning: Developing the case for implementation within Defence Learning establishments

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ABSTRACT

Personalisation of learning (PL) refers to the orchestration of a customized learning experience that is tailored for and/or adapted to the requirements of the individual learner. In the last decade, the capability of technology to deliver PL has increased significantly, influencing learning strategies, not only in education but also in wider industry. From a UK Defence perspective, the key drivers for PL are improving human capability and operational effectiveness to deliver a competent and sustainable workforce. The cost of individualizing training remains a significant hurdle for any training delivery authority. To date, however, there is scant evidence that the benefit of introducing PL outweighs the costs of implementation. To produce said evidence, the research team adopted a mixed methods approach, providing a qualitative assessment of existing PL initiatives within UK Defence, including trainer-led and self-regulated approaches (e.g., goal diaries), as well as a quantitative analysis of technology-enabled PL (e.g., adaptive learning). The team have developed a trial using a proprietary adaptive learning tool, which alters the pace and presentation of content using measures of learner performance and confidence. The team will test this tool on a cohort of Defence learners. The team hypothesized that PL will offer advantages, in terms of efficiencies, over traditional standardised training. Finally, to support the effective implementation of PL, the team have developed a PL Decision Support Process—a framework that captures the 'characteristics' that need to be in place and managed in order to support deployment and sustainability of PL. This paper provides an overview of the research approach, findings to date, and plans for the future. This paper is likely to be of interest to learning specialists, those involved with the delivery of training, and to senior decision makers.

ABOUT THE AUTHORS

Dr Matt T. Richins is a Principal Psychologist for the Defence Science and Technology Laboratory (Dstl) within the UK MOD. Matt has over 10 years' experience conducting behavioural science research in both academia and the UK Civil Service, with several peer-reviewed publications. Matt currently has a senior technical role focused on improving the efficiency and effectiveness of training and education (T&E) within Defence.

Daisy Mundy is a Principal Consultant currently working as the Research Theme Lead for Training and Education within Dstl's Human and Social Sciences Research Capability (HSSRC). A former British Army Educational and Training Services (ETS) officer with over 25 years' military service, she has a strong background in the design, development, delivery and evaluation of military training, and has designed, led and successfully project-managed several research and development projects on behalf of UK Defence, advising on training policy, strategy and change management issues. Her research work has required her to develop a thorough understanding of wider cultural and technical aspects of training and learning approaches, including organisational attitudes to training, concepts of trainer capability, modern training methods, and current media technologies.

Dr Carole Deighton is a Principal Psychologist for the Defence Science and Technology Laboratory (Dstl) (within UK MOD) with 30 years' experience providing technical leadership to research and consultancy projects in the areas

of competence management, skill fade, personalization of learning, work-underload, team and collective training, and human performance to Defence and high-risk industries (e.g., Rail, Emergency services, Civil Aviation). Her previous roles have included the provision of specialist advice while embedded in the Human Factors Integration Policy team, Headquarters Defence Equipment and Support, technical theme leadership within large UK MOD funded research programmes, and working within multi-disciplinary teams on the conceptual design, test and evaluation of UK Defence training and air platform capabilities.

Audrey Caldeira-Hankey is a Senior Principal Scientist for the Defence Science and Technology Laboratory (Dstl) (within UK MOD) with over 20 years' experience of conducting and maximising exploitation of training research to Defence and the UK Armed Services. Audrey currently has a lead technical role focused on identifying those methods and techniques with potential to improve the efficiency or effectiveness of training and education (T&E) within Defence. Audrey is also a lead technical advisor in support to the procurement (design phases) of training systems for future UK Defence vehicle platforms. Her previous roles have included provision of specialist advice while embedded in the Training Branch of Army HQ. This advice informed training policy, acquisition of future training systems and reaching back into Dstl to direct research to inform gaps in Land training provision from individual to team through to collective training.

Tracy Grimshaw is a Principal Psychologist at QinetiQ Ltd. She has over twenty years' research experience in military maritime, air and land domains. Her experience includes analysing training needs and assessing complementing tools for the Royal Navy, evaluating Army collective training and conducting trials for RAF individual training. She is Technical Lead for MOD spatial disorientation programmes, providing refresher training for aircrew. In recent years has developed and analysed trials in military flight simulators of scenario-based disorientation training.

Karen Newell is a Human Factors and Occupational Psychology Consultant at QinetiQ Ltd. She has over ten years' experience of conducting quantitative and qualitative research to assess and understand human behaviour in complex socio-technical systems. Karen has worked on numerous studies for UK Defence including in relation to selection, assessment and training and to further understanding of wider personnel issues such as levels of digital literacy, work-life balance in the Armed Forces and future workforce needs.

Adrian Snook is a Director at Learning Accelerators Ltd. Adrian has worked close to the cutting-edge of innovation in learning and development for most of the last 28 years, having filled influential roles within award-winning multimedia, virtual reality, e-learning, performance consulting, technology and soft-skills training providers as well as senior positions within FTSE100 corporates such as Babcock International Group and Capita plc. In 1997 Adrian was the lead consultant for one of the UK's very first adaptive learning projects. He spent five years as Head of Consultancy for Babcock, leading an outstanding team of learning and development professionals working on a challenging range of international learning and performance projects across land, sea, air and nuclear environments. Following a six month role as Client Director with Capita Plc Adrian re-launched the Learning Accelerators brand in June 2019, providing independent advice and support to major employers engaged in accelerated learning initiatives.

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INTRODUCTION

The concept of personalisation within the training and education (T&E) domain is not a new one and there is considerable literature on the topic from the 1980s onwards. The defined purposes of personalisation of learning (PL) in the literature are quite varied, with some focusing on strategies to support those with learning disabilities or brain injury, while others acknowledged the educational theories that were gaining popularity in the 1980s and 1990s (Butler, 1984; Gardner, 1999). In the mid to late 1990s, as the capabilities of technology and the influence of the Internet increased, the focus shifted more towards the development of systems for intelligent teaching, able to reach much larger, geographically dispersed student audiences and engage effectively with their diverse learning needs and expectations. During the last two decades, PL has become a key driver behind education policy in the United Kingdom (UK) and the United States (US), and this has had a strong influence on the development of new learning technologies. In the last decade, the capability of learning technologies to deliver a more personalised approach to learning has increased significantly and there is evidence in the literature that this has influenced T&E, but also in wider industry and other public sectors. Drivers for PL in the UK public sector are geared toward the development of a strong national skills base, through inclusion and academic achievement. As the capabilities of technology have developed, drivers linked to recruitment, retention and performance/talent management have also emerged for both public and private sector organisations.

MILITARY CONTEXT

The world is getting increasingly complex and the future operating environment is uncertain. The rate of change and level of uncertainty may outpace good governance and unity. Given the challenges of an uncertain future, the future workforce is likely to be more diverse than ever; bringing skills, knowledge and experience to Defence in a way that has never been seen before. We may no longer think of our recruits as pliable plastic, ready to be pressed into the same set mould; we will have to appreciate that unique figures can create an even more powerful force. But to harness and maximise all of those unique components we need to think about how we train our future workforce – encompassing military, civilian, and reservists across a range of functions and trades. A "one-size-fits-all" approach is unlikely to be suitable, reflecting rather that "one-size-fits-none". As such, personalisation of T&E is going to become increasingly important. From a UK Ministry of Defence (MOD) perspective, human capability and operational effectiveness are key drivers for PL. People are seen as central to UK MOD's priorities; the requirement is for a capable, motivated, balanced and sustainable workforce that is agile, adaptable and affordable through a Whole Force Approach (MOD, 2016). A main objective of the Defence People Strategy is to deliver an 'adaptable and sustainable workforce', which is achieved through activities including: "harnessing modern technologies to drive greater efficiency and effectiveness," (MOD, 2020: p 4). The vision is for agile, coordinated training pipelines and flexible, personalised through-career learning pathways which manage the flow of trained personnel to meet UK MOD capability requirements while reflecting individual talent, aspirations, and needs (MOD, 2018a; MOD,

2018b).[1] The development and implementation of these pathways is in progress and is linked to specific single Service[2] and UK MOD[3] projects. The aim is to integrate T&E systems with the human resource system, providing a people capability framework which supports a Whole Force by Design (MOD, 2016).

APPROACH

In order to investigate the utility of PL within UK Defence learning, the research team utilized a mixed methods approach, comprising qualitative interviews as well as quantitative analysis. The three phases are outlined in Figure 1, below.
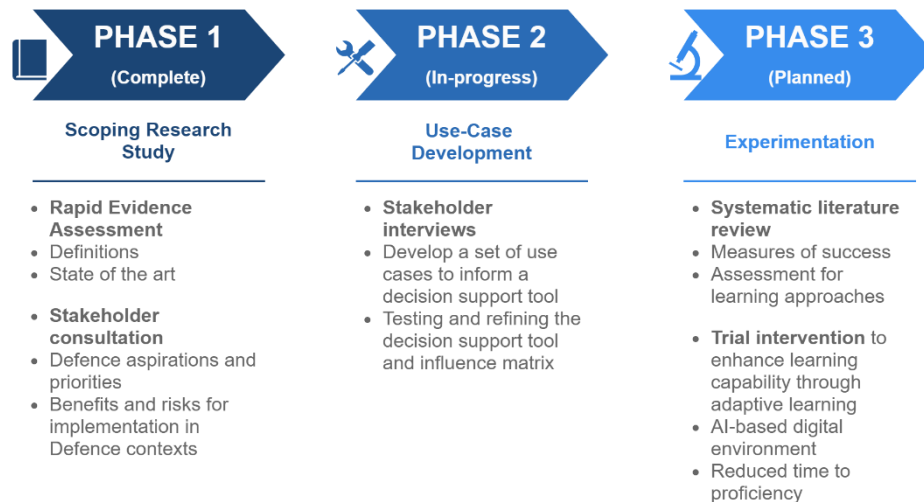
Figure 1. Research Methodology

Phase 1 of the research was a 6-month scoping study, conducted between January and July 2019, and drew upon individuals from Dstl and an industry team headed by QinetiQ and RINA Consulting Defence Ltd (Mundy & Deighton, 2019; Deighton & Mundy, 2019). The aim of Phase 1 was to establish the state of the art with regards to PL approaches, and to understand and shape UK MOD aspirations for PL. The work comprised a rapid evidence assessment and stakeholder consultation. The rapid evidence assessment surveyed PL literature (c100+ sources) and identified definitions, models, theories, and state of the art approaches. Where possible, the assessment drew upon controlled studies and meta-analyses to identify empirical evidence of benefits and challenges associated with the implementation of PL. The consultation was conducted with 17 UK MOD and Single Service stakeholders at Training Directorate level. This activity identified UK MOD perspectives and aspirations for PL, and current or planned innovations in T&E. This included a sample of eight UK MOD cases where PL approaches were already being implemented to varying degrees. A thematic analysis and team-based workshops were conducted to establish a working definition and model of PL, measures of effectiveness, and to identify broad themes regarding what may need to be put in place to support the effective deployment and sustainability of different PL approaches in a UK MOD context. These themes were then used to develop a PL decision support process, i.e., a set of evaluation criteria and a framework that could be used by UK MOD to: provide a systematic way of describing where PL is being used in UK MOD; inform decision-making relating to where PL could be rapidly deployed; and identify areas where longer term investment is required to ensure the sustainability of PL initiatives.

Phase 2 of the research was an internal activity at Dstl, conducted between January and June 2020. The aim for Phase 2 was to test and evaluate the effectiveness of the PL decision support rocess that was developed in Phase 1. The development of detailed use cases was required to support the test and evaluation of the Decision Support Process, as

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[1] This might include physical as well as learning needs, such as domestic and geographic stability (Kirby et al., 2014).

[2] Programme Castle (Army); Project Selborne (Royal Navy); Programme Socrates (Royal Air Force).

[3] Defence Education Pathway Initiative

exemplars of existing PL initiatives are used to inform the process. A series of structured interviews was conducted with stakeholders involved in training policy, management, and delivery to collect detailed information on the planning, design, implementation, and evaluation of four existing PL initiatives in different UK MOD organisations and at various stages of maturity. Interviews were conducted with personnel at Army Recruiting and Initial Training Command, Defence Academy, and Defence School of Electronic and Mechanical Engineering. A separate interview was then conducted with stakeholders from Army Recruiting and Initial Training Command who were seeking to implement a new, technology-based PL initiative. A questionnaire was developed, based on the eight steps of the Decision Support Process and scaffolded with supporting information from the scoping study research and from the four use cases. This was used to walk the stakeholders through the Decision Support Process while gaining feedback on its usability and perceived value in terms of supporting end-users to establish: the suitability of the PL approach for the target audience and the organisational context; the readiness of the organisation to implement and sustain a selected PL approach; the critical factors that would need to be addressed in order to implement and sustain the PL approach; and, whether the PL approach should be taken forward or not in this case. An internal team workshop was then conducted to review the findings from all interviews and previous team workshops and to establish recommendations on: further refinement of the Decision Support Process; further refinement of tools/guidance for its implementation; and main avenues of exploitation within the UK MOD training community.

Finally, Phase 3 of the research programme will undertake qualitative research to identify measures of success and assessment for learning approaches for PL and conduct an empirical assessment of PL by evaluating the use of an adaptive learning tool in a UK MOD training establishment. Adaptive learning is a hybrid approach which merges intelligent tutoring systems (ITS) and adaptive hypermedia. The aim of ITS is to adaptively deliver content to learners, while setting boundaries for learners and restricting opportunities to support free exploration. Adaptive hypermedia systems, on the other hand, supply the most relevant content and navigation paths by adapting the content. The combination of these approaches in adaptive learning allows personalisation of learning content according to students' needs (Yarandi, Jahankhani, & Tawil, 2013). The trial will use an artificial intelligence-based digital environment that simulates one-to-one tutoring to create a personal learning path for an individual and will measure the effect of adaptive learning on learning effectiveness and efficiency. Measures will include time taken to reach proficiency as compared to standard face-to-face classroom delivery of the same training content, as well as levels of learner engagement and confidence. It is hoped that initial exploration of these issues will help to inform future work in this field.

FINDINGS

Phase 1: Scoping Research Study

Based on the range of PL definitions and descriptions contained in the literature, the study concluded that PL should be defined as a process (i.e., personalisation) rather than as a product or state (i.e., personalised) and that it should be directly linked to one or more of the following organisational goals: Training efficiency (e.g., reductions in time to competence, training costs, skill fade management); operational effectiveness (e.g., retention and learning transfer; increased competence in role; agility in role); learner achievement (e.g., increased student knowledge, skills, competence); learner engagement (e.g., increased student enrolment, attendance, completion); and learning culture (e.g., inclusion, lifelong learning, and self-regulated learning).

The following working definition of PL was developed and recommended by the research team:

> *Personalisation of learning (PL) is the orchestration of a customised learning experience that is tailored for and/or adapted to the requirements of the individual learner, in order to optimise learning outcomes in line with the organisational goal(s).*

The PL model shown in Figure 2 was developed based on the findings of the rapid evidence assessment of the literature. In this model, the learner is the constant, while the variables of environment, teacher, and technology may be orchestrated in a wide range of ways to achieve the customized learning experience. Underpinning this PL model are educational and psychological theories which situate the learner at the center, but which also emphasize the role of the three variables in supporting an effective learning experience. In the literature, the design of PL approaches was clearly influenced by the need to recognize and cater for learning preferences, although this was not linked to 'learning

styles' theories. The role of the learner in self-regulating their learning was seen as an overarching concept for PL, but this was strongly caveated by the need for scaffolding to support the development of these self-regulatory skills.

Figure 2. The PL Model

The rapid evidence assessment identified a relatively new theory, Connectivism (McLoughlin, 2013), which recognizes the importance of ensuring learners have the necessary skills to create and exploit personalised social networks in their learning environment. Assessment for learning (DfES, 2004) was also identified as a fundamental element for any PL approach. This not only informs the teacher and/or the technology of learner progress and needs, but also supports development of the learner's cognition (the mental process involved in knowing, understanding, and learning), metacognition (the ways learners monitor and purposefully direct their learning) and motivation, all of which underpin self-regulation of learning (McKeown et al., 2014). Assessment for learning approaches identified in the literature ranged from simple formative assessment techniques in the classroom, to online diagnostic assessments, or more complex learning analytics software collecting data over an extended period of time, allowing the monitoring of career progress and experience levels of individuals. The importance of learning analytics in PL was a strong theme, which was linked in some literature to competency-based learning theories. In these cases, competency frameworks provide ways of collecting, measuring and sharing data across various technology platforms in order to manage individual performance data and provide learners with a way of visualizing progress towards their career objectives.

The PL models in the rapid evidence assessment and UK MOD case studies demonstrated a broad range of approaches linked to differing organisational goals. The concept of a learning and performance ecosystem was evident in both literature and UK MOD examples; this offered a context-specific framework within which PL could be enabled by connecting learners and supporting them with a broad range of learning content, processes, and technologies. The learning and performance ecosystem was seen as not only connecting and supporting learners in their learning, but also capturing, analyzing, and exploiting learning data to enable effective PL. In its simplest form, this concept was presented in case studies as a blended learning environment, where a blend of learning approaches had been integrated to provide an environment which best supported PL. A more complex example was seen in the aspiration for a 'people capability framework', which integrates T&E and People Lines of Development to deliver agile, coordinated training pipelines and flexible, personalised through-career learning pathways. Several themes emerged that relate to the use of technology to adjust the pace and content of specific learning interventions to the learner's needs, and/or to increase the scale on which PL could be delivered. Examples of PL at this level were primarily at the prototype stage and included:

- Personal learning assistants – embodied pedagogical virtual agents, which act as a guide, with a library of curated learning resources focused either on teaching or refreshing a specific subject, or on providing advice and guidance on a career topic.
- Intelligent tutoring systems – adaptive, personalised instructional systems designed to mimic one-on-one human tutoring. ITS support 'learning by doing', offering guidance and explanations, pointing out errors and tailoring the curriculum as students work on computer-based problems or simulations of real-world tasks. ITS was considered particularly effective for teaching science, technology, engineering and mathematics subjects on a large scale, with some results at least as good as with a human tutor;
- Adaptive learning systems – learning technologies which monitor student progress, using data to modify instruction at any time. There were several examples in the literature of US Defence research projects focusing on adaptive learning systems and a number of examples of higher education institutions in the US that are already claiming significant benefits from their use in terms of student engagement and achievement;
- Brain-computer interface – devices which acquire and transform neural signals into actions intended by the user. This is seen as a rapidly developing area of research to which the US military, in particular, has made significant contribution. Currently, the military are interested in how this could streamline cognitive processes and enhance the decision-making process. There were only limited examples in the literature of brain-computer interface as a learning technology.

The current innovations identified in UK MOD tended to include PL models with a greater focus on the trainer. This includes coaching programmes in basic training using a tailored assessment for learning model (e.g., Target Learner Model – see Table 1) or coaching in conjunction with learning technology (e.g., Mastery Learning or Fixed Mastery, Variable Time approach; Bloom, 1968). In these cases, there was an emphasis on preparing trainers to adopt a more facilitative approach, so that they were able to conduct effective assessment for learning, scaffolding the learner where necessary while encouraging the development of self-regulation of learning skills.

The intended outcomes or benefits for the PL models identified in the literature and from UK MOD stakeholder consultation focused on both training efficiency and effectiveness, but also recognised the benefit of increased learner engagement and the development of self-regulation of learning skills, where this was evident. Findings in the literature suggested that implementation of PL approaches in schools and higher education was still relatively new and that robust evidence of benefits may take a longer time to emerge.

PL influences and elements. An on-going thematic analysis of the evidence gathered in Phase 1 of the research indicated that there are broadly eight key areas influencing the effective implementation and sustainability of PL within a UK MOD context (Figure 3). These areas of influence are further described by a set of 36 topics (e.g., leadership, capacity for innovation, competence management, training staff skills for PL, accrediting prior experience, usability, pipeline optimization) and supporting explanatory notes. The evidence suggests that these eight areas of influence are relevant both today and in the future, with some areas being more or less important depending on key UK MOD technological, social, and political drivers. It is advocated that these eight areas constitute a framework within which to highlight what may need to be put in place to support the effective deployment and sustainability of PL in any organisation. These eight areas are complementary to the key components of the PL model (shown in Figure 2 above) and referred to as the 'Eight Areas of Influence on PL Decision Making' (see Figure 3).
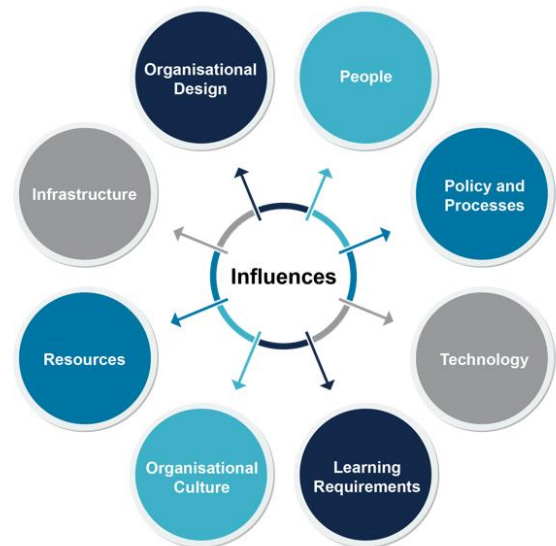
Figure 3. The Eight Areas of Influence on PL Decision Making

The PL Decision Support Process. The scoping study found that while PL could simply be acknowledged as good practice in a learner-centric training strategy, it comes with cost and effort, and therefore requires a business case which clearly identifies anticipated return on investment and/or return on expectations. Understanding the different approaches and the potential benefits of PL, and how these will support the organization's strategic drivers, was considered an important step in developing the business case, through reference to existing UK MOD and non-UK MOD use cases which offer robust empirical evidence on the benefits associated with specific PL approaches.

The prototype of a PL Decision Support Process was developed as an output of the scoping study, aimed at improving understanding of the implications of introducing PL across UK MOD T&E. The construction of this PL Decision Support Process was based on the research team's analysis of qualitative information and evidence gathered in the course of the scoping study. It comprises an eight-step process which includes reference to existing use cases and the eight areas of influence, to inform decision-making relating to the adoption of PL approaches. Early steps (1-3) in this process include an identification of organisational goals, measures of success and relevant learner variables and learning variables. This is followed by the selection of relevant PL components (i.e., learner, teacher, environment, technology); and a description of the candidate PL approach (drawing on existing use case examples). Final steps (6-8) include a systematic assessment of what might influence the implementation of the PL concept within the organisation, a consideration of the maturity of the organisation (i.e., a simple gap analysis), and concluding with the requirement to develop an implementation plan. This process is illustrated in Figure 4 with each step described in more detail in the following sub-sections.
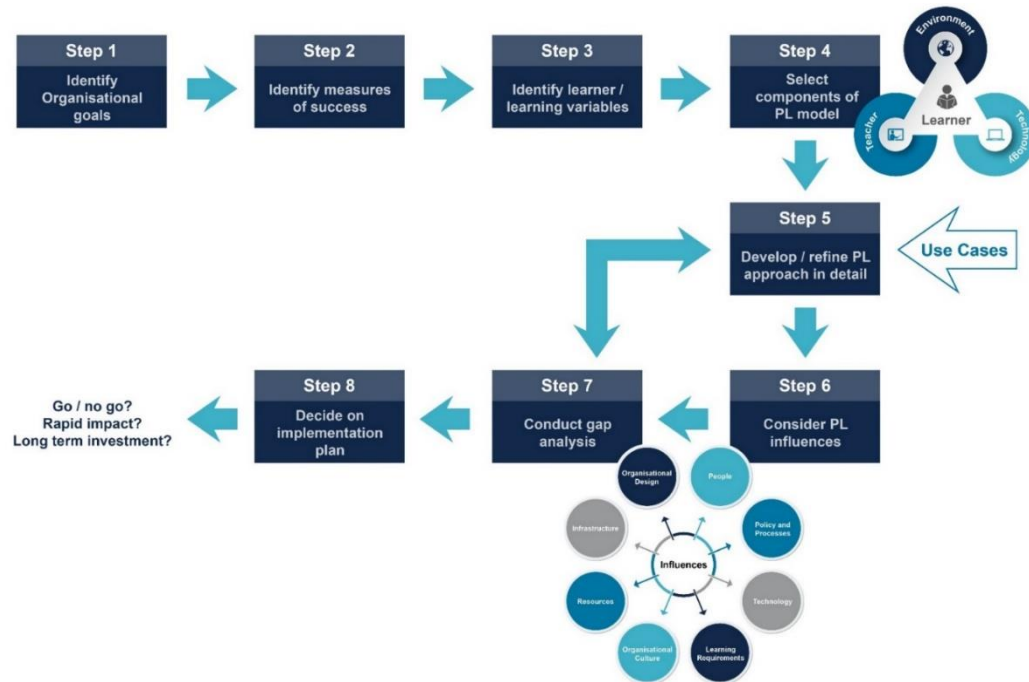
Figure 4. The PL Decision Support Process

Step 1 - Identify organisational goals. PL approaches are defined by the organisational outcome(s) that they seek to achieve. Therefore, the first step in the PL Decision Support Process is to clearly identify the expected benefit(s) of PL in the context of the organization's strategic vision and objectives by completing the statement "PL will help us to…". This enables organisational goals to be set in terms of return on investment and return on expectations.

Step 2 - Identify measures of success. Measures and observations are identified which will indicate that the PL approach is making progress towards the desired organisational goals. This clarifies the focus of the PL approach and informs Step 3, i.e., the 'learner variables' and 'learning variables' which are to be targeted. It is helpful at this stage to identify not only the measures of success (e.g., competence level reached in shortest time possible by each individual) but also the metrics and data (e.g., average time to training completion, first attempt pass rates) that will need to be captured to support this assessment and provide empirical evidence of progress.

Step 3 - Identify 'learner variables'/'learning variables.' Based on an understanding of the goals and measures of success, this step identifies the learner variables and learning variables that will be addressed in this PL approach. For example, the PL approach might target the individual learner's previous knowledge/experience and aptitude ('learner variables'), aiming to adapt the learning content, pace and duration (learning variables) in order to reduce training time and costs. However, the PL approach might also target the learner's preferences for learning ('learner variable') to ensure training effectiveness, and the time and location of the learning ('learning variable') to sustain learning over time and maintain operational effectiveness.

Step 4 - Select components of the PL model. Once the learner variables and learning variables have been identified, the components of the PL model can be selected. In some cases, this decision will be intuitive, e.g., if the aim is to adapt content, pace and duration then it is likely that the Technology component will be the most efficient way of achieving this. However, decisions at this stage will also be informed by an understanding of the target audience and the training content. For example, PL approaches for basic training may consider the Teacher component to be essential, while approaches to annual mandatory training may focus on the Technology component adapting learning for a wide, diverse audience, also significantly reducing the burden on trainer time. It is useful for this step and for step 5 to examine similar, existing PL use cases which can offer empirical evidence of the expected benefits, and likely challenges associated with implementation of a particular PL approach.

Step 5 - Develop and refine the PL approach. Once the components of the PL model have been selected, these are developed into an initial PL approach, e.g., what type of technology will be used, how Teacher and Technology will

interact. This step (and Step 4) may be revisited in iterative fashion after PL influences have been considered in the next two steps, to refine the PL approach to achieve the organisational goals in the most efficient and effective manner for the organisational context.

Step 6 – Consider PL influences. The purpose of the influence matrix is to support decision-making relating to what needs to be in place, to support the implementation and sustainability of a PL approach. This involves a review of the importance of each PL component given the key features of the PL approach (as described at process Step 5). At this step, the assessment is undertaken solely in relation to the features of the PL approach, rather than the maturity of the organisation.

Step 7 - Conduct gap analysis. This step in the process considers the maturity of the organisation in relation to the subset of PL components which were judged as important. The organisation may decide to set an initial threshold which includes only those influences which achieved an importance rating of 'Critical' or 'High'. An initial gap analysis may be rapid and undertaken using a simple rating scale format, or traffic light type system (Red, Amber, Green) to grade the extent of the gap between 'where the organisation is and where it needs to be' to ensure that important PL enablers are in place. The outcome of this rapid and initial assessment might conclude that the particular PL approach is or is not feasible given the maturity of the organisation. Where feasibility is judged as positive, then further detailed analysis of PL enablers, in relation to the PL option, may be justified. A decision to take forward the option for further analysis but with some modification or to gather further evidence (e.g., from other institutions who have experience of implementing the PL approach) might also be concluded.

Step 8 - Decide on implementation plan. A decision to take forward the PL approach requires the construction of an implementation plan that is valid given the characteristics of the learning organisation and which is cognizant of existing and other planned initiatives.

In summary, Phase 1 of the research established the state of the art with regards to PL approaches as well as the interests but also the challenges for UK MOD. This led to the development of the Decision Support Process which guides stakeholders through the critical factors that would need to be addressed in order to implement and sustain a PL approach. This process was tested in Phase 2 of the research.

Phase 2: Use Case Development

This section reports the development of four use cases, gathered in consultation with three Defence Training establishments and representing different career stages designated as Phase 1 (basic training), Phase 2 (trade training) and Phase 3 (career training).

Table 1. The PL initiatives developed and model components represented

Stakeholder Organisation (Phase of Training)	PL Initiative	PL Model Components
Army Recruiting and Initial Training Command (Basic)	• Compass for Life Model • Target Learner Model	Learner - Teacher
Defence School of Electronic and Mechanical Engineers (Trade)	Personalised Maths Programme	Learner – Teacher - Technology
Defence Academy (Career)	Defence Education Pathway	Learner – Teacher – Technology – Environment

Army Recruiting and Initial Training Command – The 'Target Learner Model' (TLM)

Overview. Adapted from the 'four corner' model (The Football Association[4]), the Target Learner Model programme provides a framework for a holistic approach to developing Army recruits during their basic training and beyond. Based around the four domains of Physical, Technical/Tactical, Psychological, and Social learning needs, trainers are

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[4] http://www.thefa.com/learning/coaching/the-fas-4-corner-model

guided in identifying individual learning needs and selecting relevant learning-related interventions (e.g., individual challenge, additional physical development, peer support, one-to-one revision/learning). This initiative is linked to the Defence strategic goals of retention and managing individual recruit performance and development requirements through a PL approach. The aim is for general good practice in training, but learner achievement, learner engagement and learning culture are all relevant in this context.

Resources. It was noted by the interviewees that the main resource required for this initiative are people. Section commanders operate at the face of the approach, supervising around eight to ten troops. The platoon commanders have the same responsibilities, but on a wider scale, although they are not as involved in the actual delivery of the feedback. A number of key documents are used by personnel to support delivery including: an initial interview sheet; a recruit performance diary used to provide recruits with a better idea of the Target Learner Model matrix and to see how they were being graded; a recruit report book; a trainer guide to coaching and mentoring; and a company referrals report which provides handover notes on the recruit to the receiving unit. Those responsible for setting up this initiative remarked that it required coordination, ideally by one person, and top cover from the chain of command to support the roll-out. It also required significant buy-in from the trainers and deliverers who are involved. The concept and product were introduced using a number of working groups with trainers and with the target audience, this helped to create ownership.

Army Recruiting and Initial Training Command – The 'Compass for Life' Model

Overview. Designed around the values-based Compass for Life™ development programme for schools and businesses,[5] this programme provides a framework for a 'strategy for success' for Army recruits during their basic training and beyond. Based on self-assessment of individual learning needs, previous experience and aptitude, recruits are encouraged and supported to set personalised aims/goals. These underpin their completion of basic training through the Common Military Syllabus and are then carried forward into individuals' careers. The aim for this approach is to set the foundations of a learning culture, encouraging new recruits to set personal goals which form a pathway to serve the rest of their career, as well as to increase individual learner achievement through a culture of personal development.

Resources. As a trainer-led approach, the main resources required for Compass for Life are Section Commanders and Defence Trainers. The main documentation to support is a paper-based reflective diary, which is issued to the recruit on the first day at Army Recruiting and Initial Training Command. The diary includes an A3 map of the Compass for Life journey. The recruits are also given attitudinal surveys intermittently to determine wellbeing, engagement, and overall acceptability of the programme. There is scope to digitize the diary and potentially to deliver attitudinal surveys through a digitized platform; currently, the trial team prefer to stick to a low-tech approach. Through Life Cost analysis is currently underway.

Defence School of Electronic and Mechanical Engineers – 'Bridging Maths' Programme

Overview. Bridging Maths is a foundation programme for trainee engineers, which is contextualized to the employment role of the individual, so that trainees understand the relevance and importance of learning maths concepts in order to be able to do their job effectively. The longer-term aspiration is to develop an adaptive version of this programme, which adapts the learning content to the previous experience and the aptitude of the individual trainee. The aim is to target trainee attitudes, to get buy-in to studying maths, which means that the course must be interesting, engaging, and relevant to them. The first tranche of the programme trial will contextualize the course content for specific employment roles (e.g., mechanical engineers), so will be personalised at the cohort level. The second tranche will then look to personalize content according to the individual learner. The learner will take a quiz to establish their understanding of real-world applications of maths and adaptive learning will then be used to personalize the individual's learning pathway. This first tranche uses a Learner – Teacher approach primarily, with supporting resources available from a Virtual Learning Environment. In the second tranche, technology will play a greater part in adapting learning content to suit the learner.

Resources. The main requirements for this approach are people and materials. Trainers need to understand the concept of the flipped classroom approach in order to be able to work effectively with the new programme. Online learning

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[5] https://compassforlife.co.uk/business/

resources are provided through a Virtual Learning Environment and will be used both for teaching in the classroom and for self-directed study/flipped learning outside of the classroom (e.g., reference to an online textbook or YouTube or short video / audio feed are optional resources that learners can select according to their preference).

Defence Academy – 'Defence Education Pathway'

Overview. This targets individuals who are either preparing for next level of promotion or who wish to develop their education. This is a Whole Force approach and therefore includes Civil Service and Reservists. This initiative is linked to talent management strategy and the UK Defence New Employment Model, which is intended to inform executive, professional, and specialist streams. This is seen as foundation level education that underpins all of these streams. The aim in this first phase is to provide all eligible officers with the opportunity to study relevant topics at Advanced Command Staff Course level over time, using micro-learning. This will allow individuals to identify their own aims and pathways for learning. The vision is to accredit learning in a personalised way (e.g., a modular Masters degree) and ensure that it has transfer value beyond Defence.

Resources. The intention for this initiative is to combine the benefits of online micro-learning through a digital platform (Defence Learning Environment) with tutor-led action learning, using a flipped approach. Aspirations include providing unlimited access to online library resources to encourage wider exploration of subjects through self-regulated learning.

Testing and Refining the Decision Support Process

The team were provided with an opportunity to test the PL Decision Support Process with stakeholders who were considering a PL initiative. Army Recruiting and Initial Training Command were considering the adoption of an online adaptive training system, which had recently been trialled by the US Air Force (Hawkins, 2020) with recruits in basic training. Following a guided interview and feedback session, stakeholders reported the questionnaire to be a useful tool in navigating the PL Decision Support Process, commenting specifically on the value of the examples provided, e.g., types of organisational goal, measures and metrics, PL strategies, and existing Use Cases. There were a number of suggestions regarding enhancement, but it was agreed that the PL Decision Support Process itself was fit for purpose in its current form. Stakeholders considered the PL Decision Support Process to be logical and relevant; they had found it very useful in the initial stages of the process to focus on the goals, measures and metrics of their PL initiative. They confirmed the need for a tool in the wider UK MOD context to inform training transformation processes and to help inform senior stakeholders' decisions on the types of innovation that should be tested/adopted. They also identified other stakeholder groups in the training community who could exploit specific elements of the PL Decision Support Process, including policy desk holders preparing business cases for training transformation initiatives.

SUMMARY

In this project, Dstl has sought to identify and develop tools and techniques which will enable the cost effective and efficient provision of personalised T&E. Further evidence is now required to show whether the level of benefit achieved would outweigh the time, cost, and resource required to implement PL on a larger, enterprise scale. Phase 3 of the research will develop an evaluation framework to assist stakeholders in identifying measures of success for their PL initiatives and a trial will commence in the summer of 2021, working with a UK MOD training organisation to measure the effect of adaptive learning on learning effectiveness and efficiency. The final report for Phase 3 will be published in 2022.

While the programme of research is not yet complete, Dstl has been actively supporting UK MOD in decision-making for PL. In particular, stakeholders at Army Recruiting and Initial Training Command have been keen to support and utilize the research, as noted by the Learning Development Advisor at Army Recruiting and Initial Training Command:

"Dstl have excelled in stakeholder engagement. From the initial scoping emails, followed by face-to-face discussion and then using virtual communications during COVID-19. This has allowed the focus of the research to be tailored to the needs of the customer to ensure there is a realistic opportunity for the research to make a difference."

It is through this level of engagement that Dstl is setting the groundwork for UK MOD to become self-aware and agile, allowing the UK workforce to continue to adapt and thrive in the rapidly developing complex environment of the future.

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