Mechanisms of Change in Professional Development – A Tailored Taxonomy for the Civil Service Context

Background

This output is based on a systematic review commissioned by Government Skills to investigate the effectiveness of professional development interventions within the civil service and adjacent contexts. The review analyses professional development interventions with experimental or quasi-experimental designs, conducted in OECD countries, focusing on outcomes such as skills, knowledge, networks, work performance, and productivity. Due to limited research specific to civil service employees, the review also considered evidence from the wider public and private sectors where roles align with the five largest UK civil service professions, which constitute the majority of the civil service workforce.

While the comprehensive findings are detailed in a separate technical report, this output focuses on one key outcome: a tailored taxonomy of mechanisms of change designed to aid learning and development practitioners in the intentional design, delivery, and evaluation of professional development within the civil service.

Why we developed a tailored taxonomy

In reviewing professional development interventions within the civil service and adjacent settings, we found that it is often unclear what makes these interventions work or not. While we know that elements such as coaching, training sessions, or mentoring are commonly used, it is less clear what specifically about those activities actually drives change. There are many ways, for example, to run a training session. To address this, we set out to better understand the mechanisms—the active ingredients—behind successful learning and development in the civil service context.

To do this, we turned to a well-established, evidence-based framework from behavioural science: the Behaviour Change Technique (BCT) taxonomy. Developed through extensive research and expert consensus, the BCT taxonomy provides a standardised way to describe the different components of interventions that aim to change behaviour. It was designed to help researchers and practitioners across fields identify and compare what a programme is doing.

We used the BCT taxonomy as a starting point for our own work, adapting it for use in the context of civil service professional development. Our goal was to create a more accessible and relevant version of this taxonomy, tailored specifically to the kinds of learning interventions found in the civil service and adjacent contexts. Although our review looked at outcomes like skills and productivity, we used a behavioural lens to explore mechanisms as professional development aims to support the application of learning in practice, driving improvements in how people work.

The result is a simplified, context-specific taxonomy that preserves the rigour of the original BCT framework but makes it easier to apply in practice, both for designing and evaluating interventions.

How we developed the taxonomy

Our taxonomy builds on the well-established BCT taxonomy, which classifies 93 mechanisms across 16 groups. We tested and refined this framework through an iterative coding process using the studies identified in the systematic review of effective professional development design in the civil service context. Three key steps shaped our adaptations:

- We began by reviewing the full BCT taxonomy and removing any mechanisms that did not align with the context of professional development interventions. In addition, we then focused on mechanisms that were actively used in the studies included in the systematic review.
- We refined definitions and added two mechanisms—"feedback (unspecified)" and "social support (collaboration)"—to reflect practices common in civil service learning environments.
- In addition, we updated the example given for each mechanism to reflect the civil service context and make it easier for practitioners to recognise the mechanism in practice.

The final taxonomy consists of 29 mechanisms across 11 groups. Full details of the taxonomy and definitions are included in the revised taxonomy section.

What we know so far

Our systematic review helped identify the mechanisms most commonly used in civil service professional development interventions. Most interventions incorporated multiple mechanisms; often four or more. The most prevalent was behavioural practice or rehearsal, which appeared in 18 studies and involves practising a behaviour repeatedly to build habits and skills. This was followed by instruction on how to perform the behaviour, feedback on behaviour, social support (unspecified), and goal setting (behaviour).

Figure 1. Most common mechanisms identified in 27 included papers
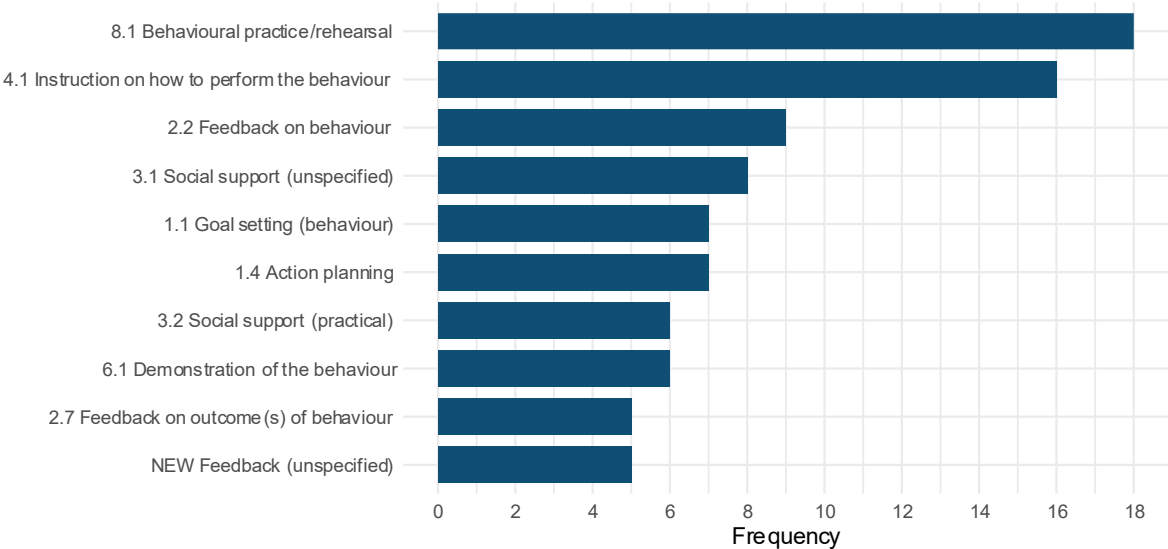
We found some variation in mechanisms depending on the professional group targeted. For interventions aimed at operational delivery staff—the most frequently studied group—there was a strong emphasis on social support and habit formation. By contrast, interventions for other common civil service professions more commonly featured mechanisms around feedback and action planning.

Although we explored whether particular mechanisms were linked to greater impact on skills, knowledge, networks, work performance, or productivity, the small number of studies and inconsistent reporting made it difficult to draw firm conclusions. No clear link was found between the number of mechanisms in an intervention and its reported effectiveness. Both simple and more complex interventions (in terms of the number of mechanisms used) showed positive results. This suggests that it may not be the number of mechanisms that matters most, but rather which mechanisms are used and how well they are delivered—a hypothesis that needs further investigation. However, in other public sector contexts, like teaching, where stronger evidence exists, more mechanisms have been linked to greater effectiveness (Cordingley et al., 2015)[1].

Ultimately, while the review sheds light on the mechanisms most commonly used in professional development interventions in the civil service context, the evidence base is not yet strong enough to make statements on the effectiveness of those mechanisms, or combinations of them, for outcomes like knowledge, skills, performance, or productivity. This highlights the need for consistent reporting of learning and development interventions in the civil service, using this taxonomy, and more evaluation of the impact and implementation of those interventions.

Using the taxonomy in practice

Our tailored taxonomy is designed to be a practical tool for those involved in designing, delivering, or evaluating professional development in the civil service. While it draws on a rigorous, evidence-based framework, its purpose is to support real-world application, making it easier for practitioners to design more intentional, effective interventions.

Design and review with greater clarity

The taxonomy helps practitioners move beyond generic labels like "training" or "coaching" and focuses instead on the specific mechanisms that drive change. For example, when developing a leadership course, you might deliberately build in behavioural practice (e.g., role-plays), feedback on behaviour (e.g., observation and structured feedback), or goal setting (e.g., personal development plans).

It can also be used to review and strengthen existing learning offers. Mapping an intervention against the taxonomy allows you to see which mechanisms are being used and which might be missing. This can reveal whether a programme is overly reliant on passive forms of learning (like instruction), or whether it could benefit from more active ingredients, such as social support or feedback. While the link between the number of mechanisms and effectiveness is inconclusive in our context, evidence from other public sector settings suggests this is worth further investigation. The

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[1] Cordingley, P., Higgins, S., Greany, T., Buckler, N., Coles-Jordan, D., Crisp, B., Saunders, L., Coe, R., 2015. Developing Great Teaching: Lessons from the international reviews into effective professional development.

taxonomy is a simple but powerful way to improve design quality and intentionality. It might also help identify which elements of a learning and development programme are most important for generating impact, promoting more efficient designs.

Build shared understanding

When evaluating an intervention's impact, it is often hard to tell what made the difference. By clearly identifying the mechanisms at play and using a shared, standardised language, practitioners can better track and compare what is being delivered across teams, departments, or programmes.

Over time, using a consistent taxonomy across interventions can support the development of a stronger evidence base. By capturing and comparing the mechanisms used in different contexts, practitioners and organisations can begin to build a clearer picture of what works and what does not work across the civil service. This framework creates the foundations for more informed decision-making and continuous improvement.

Adapting the taxonomy over time

We do not consider this taxonomy to be exhaustive or permanent; rather, it reflects our current understanding of the set of interventions that have so far been tried within the studies included in the systematic review and will likely evolve with continued use, reflection, and experimentation. As you use it, you may find that some mechanisms need refining, or that new ones emerge. We encourage practitioners and researchers to treat it as a living resource—something that can and should evolve based on new evidence. Our tailored taxonomy is more accessible and context-specific than the full BCT taxonomy, which includes 93 mechanisms in total, some of which do not currently seem applicable to civil service learning design. However, if you come across an activity or design feature that does not seem to fit within our version, the BCT taxonomy remains a useful reference point. It provides a broader set of evidence-based mechanisms than our tailored version and can be drawn on if needed. It may also suggest previously underused mechanisms to incorporate into future interventions.

Acknowledgements

This taxonomy draws directly on the BCT taxonomy developed by Susan Michie and colleagues[2], whose work provides the foundational structure for understanding mechanisms of change in behavioural interventions. We also acknowledge the Education Endowment Foundation, whose innovative application of the BCT taxonomy in educational settings[3] informed the development of our approach, particularly the use of the taxonomy as a coding and design tool for professional

[2] Michie, S., Richardson, M., Johnston, M., Abraham, C., Francis, J., Hardeman, W., Eccles, M.P., Cane, J., Wood, C.E., 2013. The behaviour change technique taxonomy (v1) of 93 hierarchically clustered techniques: building an international consensus for the reporting of behaviour change interventions. *Annals of Behavioral Medicine*, 46(1), 81–95. https://doi.org/10.1007/s12160-013-9486-6

[3] Sims, S., Fletcher-Wood, H., O'Mara-Eves, A., Cottingham, S., Stansfield, C., Van Herwegen, J., Anders, J., 2021. *What are the characteristics of teacher professional development that increase pupil achievement? A systematic review and meta-analysis.* London: Education Endowment Foundation. Available from: https://educationendowmentfoundation.org.uk/education-evidence/evidence-reviews/teacher-professional-development-characteristics.

development interventions. Our work adapts and builds on these contributions to meet the specific needs of civil service learning and development.

The revised taxonomy

The table below outlines each mechanism, identified by its number and label within the BCT taxonomy. We followed the same numbering and groupings as the original BCT taxonomy, making it clear which mechanisms were removed. Any newly added mechanisms are labelled as such in the No. column, and any adaptations to the BCT definitions have been formatted in bold.

Table 1. Revised taxonomy

No.	Category	Label	Definition	Example
1.1	Goals and Planning	Goal setting (behaviour)	Set or agree on a goal defined in terms of the behaviour to be achieved. Note: Only code goal setting if there is sufficient evidence that goal set as part of intervention; if goal unspecified or a behavioural outcome, code 1.3, Goal setting (outcome); if the goal defines a specific context, frequency, duration, or intensity for the behaviour, also code 1.4, Action planning	Participants develop a set of goals on the specific initiatives to implement in their team or unit, particularly regarding how they perform goal-oriented development dialogues with their employees.
1.2	Goals and Planning	Problem solving	Analyse, or prompt the individual to analyse, factors influencing the behaviour and generate or select strategies that include overcoming barriers and/or increasing facilitators Note: barrier identification without solutions is insufficient.	Participants identify potential setbacks, such as missing deadlines due to competing priorities, and generate solutions for them.

No.	Category	Label	Definition	Example
1.3	Goals and Planning	Goal setting (outcome)	Set or agree on a goal defined in terms of a positive outcome of wanted behaviour Note: only code guidelines if set as a goal in an intervention context; if goal is a behaviour, code 1.1, Goal setting (behaviour); if goal unspecified code 1.3, Goal setting (outcome)	Participants set a specific, difficult goal for the Behavioural Observation Scale (BOS) score they wished to receive when their workplace observers assessed their usage of skills back at work using BOS forms.
1.4	Goals and Planning	Action planning	Prompt detailed planning of performance of the behaviour (must include at least one of context, frequency, duration, and intensity). Note: evidence of action planning does not necessarily imply goal setting, only code latter if sufficient evidence.	Participants are encouraged to create a detailed plan for conducting weekly team check-ins, specifying the time and day of the week and the length of each meeting.
1.7	Goals and Planning	Review outcome goal(s)	Review outcome goal(s) jointly with the person **or prompt the person to review their outcome goal(s)** and consider modifying goal(s) in light of achievement. This may lead to resetting the same goal, a small change in that goal, or setting a new goal instead of, or in addition to, the first.	Participants are asked to reflect on the experiences, successes, and failures in applying their leadership development plan, developed as part of the training programme, and review their outcome goals based on that.
1.9	Goals and Planning	Commitment	Ask the person to affirm or reaffirm statements indicating commitment to change the behaviour Note: if defined in terms of the behaviour to be achieved, also code 1.1, Goal setting (behaviour)	Participants are asked to publicly state their goals in discussion with their peers to increase commitment.

No.	Category	Label	Definition	Example
2.1	Feedback and Monitoring	Monitoring of behaviour by others without feedback	Observe or record behaviour with the person's knowledge as part of a behaviour change strategy. Note: if monitoring is part of a data collection procedure rather than a strategy aimed at changing behaviour, do not code; if feedback given, code only 2.2, Feedback on behaviour, and not 2.1, Monitoring of behaviour by others without feedback; if monitoring outcome(s) code 2.5, Monitoring outcome(s) of behaviour by others without feedback; if self-monitoring behaviour, code 2.3, Self-monitoring of behaviour.	Facilitators observe participants during role-play scenarios, with their knowledge, to track how they handle conflict resolution in workplace situations as part of improving interpersonal effectiveness.
2.2	Feedback and Monitoring	Feedback on behaviour	Monitor and provide informative or evaluative feedback on performance of the behaviour (e.g., form, frequency, duration, intensity). Note: If feedback is on outcome(s) of behaviour, code 2.7, Feedback on outcome(s) of behaviour; if there is no clear evidence that feedback was given, code 2.1, Monitoring of behaviour by others without feedback.	Facilitators observe participants in mock leadership meetings and provide feedback on their communication clarity, engagement frequency, and areas for improvement.

No.	Category	Label	Definition	Example
2.3	Feedback and Monitoring	Self-monitoring of behaviour	Encourage the person to monitor **or** record their behaviour(s) as part of a behaviour change strategy. Note: if monitoring is part of a data collection procedure rather than a strategy aimed at changing behaviour, do not code; if monitoring of outcome of behaviour, code 2.4, Self-monitoring of outcome(s) of behaviour; if monitoring is by someone else (without feedback), code 2.1, Monitoring of behaviour by others without feedback.	Participants are asked to keep a daily log of how they manage their time, noting tasks completed and interruptions, to identify patterns and improve time management skills.
2.4	Feedback and Monitoring	Self-monitoring of outcome(s) of behaviour	Establish a method for the person to monitor and record the outcome(s) of their behaviour as part of a behaviour change strategy. Note: if monitoring is part of a data collection procedure rather than a strategy aimed at changing behaviour, do not code ; if monitoring behaviour, code 2.3, Self-monitoring of behaviour; if monitoring is by someone else (without feedback), code 2.5, Monitoring outcome(s) of behaviour by others without feedback.	Participants are provided with a template to track the completion rates of their assigned projects over a month, enabling them to evaluate their productivity and identify areas for improvement.

No.	Category	Label	Definition	Example
2.5	Feedback and Monitoring	Monitoring of outcome(s) of behaviour without feedback	Observe or record outcomes of behaviour with the person's knowledge as part of a behaviour change strategy. Note: if monitoring is part of a data collection procedure rather than a strategy aimed at changing behaviour, do not code; if feedback given, code only 2.7, Feedback on outcome(s) of behaviour; if monitoring behaviour code 2.1, Monitoring of behaviour by others without feedback; if self-monitoring outcome(s), code 2.4, Self monitoring of outcome(s) of behaviour.	Progress toward the goals identified by participants in the training programme is monitored by programme facilitators.
2.7	Feedback and Monitoring	Feedback on outcome(s) of behaviour	Monitor and provide feedback on the outcome of performance of the behaviour. Note: Feedback on outcome(s) of behaviour; if feedback is on behaviour code 2.2, Feedback on behaviour; if there is no clear evidence that feedback was given code 2.5, Monitoring outcome(s) of behaviour by others without feedback; if feedback on behaviour is evaluative e.g. praise, also code 10.4, Social reward.	Employees managed by participants complete a survey providing feedback on whether their leaders set a clear vision, align them with organisational goals, clarify contributions to achieving those goals, and foster cooperation among employees.

No.	Category	Label	Definition	Example
NEW	Feedback and Monitoring	Feedback (unspecified)	Monitor and provide feedback related to the behaviour (general). Note: used in situations where detailed information on whether the feedback focused on behaviour or outcome of behaviour.	Participants of a training programme are provided with multisource feedback six months after completing the programme.
3.1	Social support	Social support (unspecified)	Advise on, arrange, or provide social support (e.g., from friends, relatives, colleagues,' buddies' or staff) or non-contingent praise or reward for the performance of the behaviour. It includes encouragement and counselling, but only when it is directed at the behaviour. Note: attending a group class and/or mention of 'follow-up' does not necessarily apply this BCT; support must be explicitly mentioned; if practical, code 3.2, Social support (practical).	Participants shared their goals with goal setting peers, who provided feedback on these goals.

No.	Category	Label	Definition	Example
3.2	Social support	Social support (practical)	Advise on, arrange, or provide practical help (e.g., from friends, relatives, colleagues, 'buddies', or staff) for performance of the behaviour. Note: if emotional, code 3.3, Social support (emotional); if general or unspecified, code 3.1, Social support (unspecified) If only restructuring the physical environment or adding objects to the environment, code 12.1, Restructuring the physical environment or 12.5, Adding objects to the environment; attending a group or class and/or mention of 'follow up' does not necessarily apply this BCT, support must be explicitly mentioned.	As part of a professional development training, a mentor arranges regular check-ins with a participant to offer guidance on how to improve project management skills and provide feedback on their progress.
NEW	Social support	Social support (collaboration)	Facilitate or encourage mutual engagement and shared responsibility among individuals (e.g., peers, colleagues, or group members) to support and encourage each other in performing the behaviour. This includes collaborative activities, such as group discussions, knowledge exchanges, joint problem-solving, and co-developing strategies for behaviour change.	During a team-based training session, participants are grouped to collaborate on solving a case study, encouraging them to share insights, support each other's ideas, and co-develop strategies for improving efficiency in their department.

No.	Category	Label	Definition	Example
4.1	Shaping knowledge	Instruction on how to perform the behaviour	Advise or agree on how to perform the behaviour (includes 'Skills training'). Note: when the person attends classes, such as exercise or cookery, code 4.1, Instruction on how to perform the behaviour, 8.1, behavioural practice/rehearsal and 6.1, Demonstration of the behaviour.	As part of a professional development workshop, a facilitator provides step-by-step guidance on how to conduct effective performance appraisals, including techniques for delivering constructive feedback.
6.1	Comparison of Behaviour	Demonstration of the behaviour	Provide an observable sample of the performance of the behaviour, directly in person or indirectly, e.g., via film, pictures, for the person to aspire to or imitate (includes 'Modelling'). Note: if advised to practice, also code, 8.1, Behavioural practice and rehearsal; If provided with instructions on how to perform, also code 4.1, Instruction on how to perform the behaviour.	Training programme facilitators role model important learning aspects, for instance, showing by example how confidentiality is developed and maintained (by sharing information on their own workplace and illustrating how a translation process would look in their own context).
6.3	Comparison of Behaviour	Information about others' approval	Provide information about what other people think about the behaviour. The information clarifies whether others will like, approve of, or disapprove of what the person is doing or will do.	In a development workshop, a participant is informed that their team members have expressed appreciation for their recent efforts in improving meeting efficiency, which encourages them to continue using the new techniques.
7.1	Associations	Prompts/cues	Introduce or define environmental or social stimulus with the purpose of prompting or cueing the behaviour. The prompt or	Following the training programme, participants received regular emails from the programme

No.	Category	Label	Definition	Example
			cue would normally occur at the time or place of performance. Note: when a stimulus is linked to a specific action in an if-then plan, including one or more of frequency, duration or intensity, also code 1.4, Action planning.	facilitators reminding them of tips and providing advice covered during the training.
8.1	Repetition and substitution	Behavioural practice/rehearsal	Prompt practice or rehearsal of the performance of the behaviour one or more times, in a context or at a time when the performance may not be necessary, in order to increase habit and skill. Note: if aiming to associate performance with the context, also code 8.3, Habit formation.	As part of a training program, participants are asked to role-play conflict resolution scenarios during a practice session to build their skills and increase confidence in handling such situations in the future.
8.2	Repetition and substitution	Behaviour substitution	Prompt substitution of the unwanted behaviour with a wanted or neutral behaviour.	Participants are encouraged to replace procrastination with a practice of setting short, focused work intervals followed by brief breaks to help improve productivity.
8.3	Repetition and substitution	Habit formation	**Encourage practice and repetition of the behaviour within the same context, including through booster training sessions, to strengthen the association between the context and the behaviour.** Note: also code 8.1, behavioural practice/rehearsal.	Participants are asked to repeatedly practice delivering clear and concise messages during team meetings, so that the act of speaking in meetings becomes a trigger for using these skills effectively.
8.7	Repetition and	Graded tasks	Set easy-to-perform tasks, making them increasingly	Participants are asked to conduct a cognitive

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	substitution		difficult, but achievable, until behaviour is performed.	training programme, which consists of maze exercises with increasing difficulty.
10.3	Reward and threat	Non-specific reward	Arrange delivery of a reward if and only if there has been effort and/or progress in performing the behaviour (includes 'Positive reinforcement').	Employees are able to participate in further professional development training if they demonstrate the ability to apply the skills covered in the initial training programme.
10.6	Reward and threat	Non-specific incentive	Inform that a reward will be delivered if and only if there has been effort and/or progress in performing the behaviour (includes 'Positive reinforcement'). Note: if incentive is material, code 10.1, Material incentive (behaviour), if social, code 10.5, Social incentive and not 10.6, Non-specific incentive; if incentive is for outcome, code 10.8, Incentive (outcome). If reward is delivered, also code one of: 10.2, Material reward (behaviour); 10.3, Non-specific reward; 10.4, Social reward, 10.9, Self-reward; 10.10, Reward (outcome).	Before participating in the training programme, employees are informed that if, following completion, they are able to demonstrate the skills covered, they will be eligible to participate in another, more advanced, professional development programme.
13.2	Identity	Framing/reframing	Suggest the deliberate adoption of a perspective or new perspective on behaviour (e.g., its purpose) in order to change cognitions or emotions about performing the behaviour (includes 'Cognitive structuring').	When introducing employees to the leadership development program, it is framed as an essential component of the organisation's broader business strategy, highlighting how their

No.	Category	Label	Definition	Example
				participation and growth directly support the organisation's objectives.
14.5	Scheduled Consequences	Rewarding completion	Build up behaviour by arranging reward following final component of the behaviour; gradually add the components of the behaviour that occur earlier in the behavioural sequence (includes 'Backward chaining').	In a customer service training, participants are initially rewarded for successfully completing the final step of resolving customer complaints. Gradually, earlier steps – such as acknowledging the complaint and gathering information – are added to the sequence, with rewards given once the entire process is completed effectively.
16.3	Covert Learning	Vicarious consequences	Prompt observation of the outcomes experienced by others when they perform this behaviour (e.g., the positive and negative consequences they encounter as a result of performing the behaviour).	During a leadership training session, participants watch a video of a colleague effectively managing a difficult conversation with a team member, highlighting the positive outcomes, such as improved team morale and respect, to encourage similar behaviour.