TASK-BASED LEARNING DESIGN IN PHARMA AND LIFE SCIENCES:

A STRATEGY FOR IMPROVING PERFORMANCE, COMPLIANCE AND TIME TO COMPETENCE IN PROCESS-DRIVEN FUNCTIONS.

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Successfully embedding a culture of continuous learning can be a huge competitive advantage to an organisation. In fact, McKinsey's Organisational Health Index lists learning and capabilities as indicators of organisational health and found that organisations which scored highly in these domains outperform their competitors in the long term.[1]

Learning and capability are particularly crucial areas to the pharma industry as it is going through a period of unprecedented change. Take manufacturing and supply chain as an example: in 2019, investment in the pharma supply chain topped a record-breaking $1 billion.[2] Companies taking advantage of new processes and technology are transforming this business function into a competitive advantage with new technologies like blockchain helping track drugs from factory to customer, both accurately and securely. With a system of barcodes, blockchain makes tracing drugs throughout the supply chain easier and more efficient. This means that you can verify the authenticity of drugs as well as allow all parties to see if the process has become compromised at any point. To add to this, regulators (such as pharmacy inspectors) can monitor the rate of counterfeit drugs entering the supply chain with greater accuracy.[3]

Research and development (R&D) is facing fast-paced change too as the patents on many medicines will expire over the next few years, leaving many pharma companies very exposed: only four out of ten companies have enough products in their pipelines to fill the impending revenue gap.[4] To stay competitive, organisations have had to change the way that their R&D is carried out to improve productivity, with technologies like AI, big data and advanced analytics being brought in to help.[5] In ICON's report, *'Digital Disruption in Biopharma: How digital transformation can reverse declining'*, the authors describe AI as "(having) many potential applications in clinical trials both near- and long-term. These range from automating routine study data entry functions, to analysing EHR data to find suitable candidates and sites for clinical studies, to monitoring and encouraging patient compliance with study protocols, to adaptive dose finding, to discovering and modelling potential new molecules and therapies."

1. Gagnon C, et al. Organizational health: A fast track to performance improvement. Available at: https://www.mckinsey.com/business-functions/organization/our-insights/organizational-health-a-fast-track-to-performance-improvement.
2. CBINSIGHTS, Pharma supply chain funding reaches record-breaking $1B+. Available at: https://www.cbinsights.com/research/pharma-supply-chain-funding/.
3. Christopher Clements et al. Accurate, audited and secure - How blockchain could strengthen the pharmaceutical supply chain. Available at: https://www.pwc.co.uk/healthcare/pdf/health-blockchain-supplychain-report%20v4.pdf.
4. Pharma 2020: Virtual R&D - Which path will you take?. Available at: https://www.pwc.com/gx/en/pharma-life-sciences/pdf/pharma2020_virtualrd_final2.pdf.
5. Whitepaper by ICON: Digital Disruption in Biopharma: How digital transformation can reverse declining ROI in R&D.

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These changing ways of working and new technologies put a massive strain on the workforce as they require the upskilling of both scientists and technicians to enable them to keep up with the changing technologies, processes and SOPs.
In addition, the speed of change is increasing: for anyone working in the manufacturing and supply chain or R&D today, it is doubtful that they currently have the skills that they will need in 5, or even 3 years from now. This puts added pressure on the business to retrain and upskill the workforce on an almost annual basis. The big question is: **How does the learning function serve both the business and employee by keeping up with this demand?**
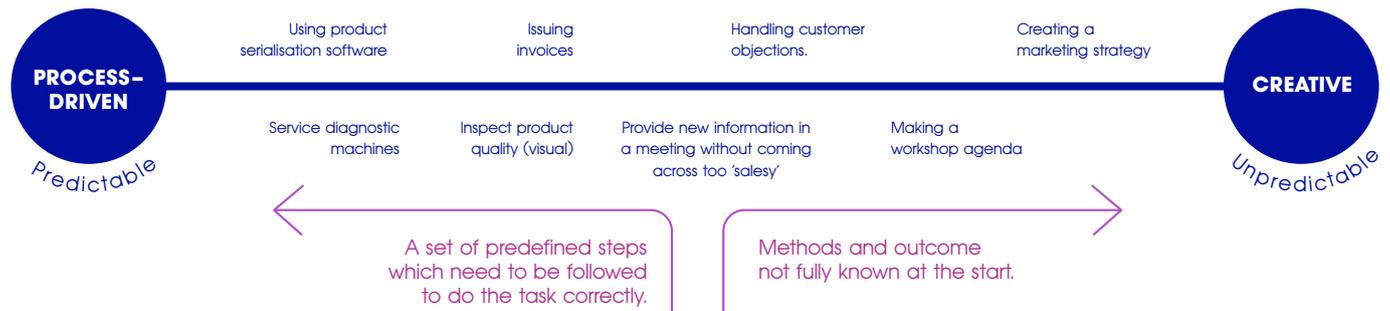
The challenge with this is that an organisation's learning and capability requirement can be very different depending on which department you are in. Take a global marketing executive for example: to be successful, their role comes with a high degree of creativity. Their job must deal with enormous market variability and constant change. This means that their output is not predictable. Compare that to a technician in a laboratory or manufacturing plant whose success depends on producing a standard outcome every time. They need to follow SOPs and produce their output according to a strict set of quality and safety standards.

Their processes are largely set in stone to ensure that their output is predictable. The focus of this paper is on the process-driven roles and it will look at how **task-based learning** can work for these highly regulated functions to improve performance, while taking less time away from the job for training.

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TASK-BASED LEARNING AND
HOW TO APPROACH IT

Task-based learning describes an approach to designing and delivering learning built on how skills are applied in the workplace, with the focus on supporting performance and workflow learning. It does not eliminate the need for upfront learning and the mastery of important concepts, but seeks to reduce these to a minimum while increasing effective performance on the job.

The majority of tasks and processes in the workplace fall along a continuum from process-driven to creative. A process-driven task is one where a set of clear predefined steps needs to be taken, while a creative task is one where there is no predefined way to achieve the goal and new methods of working need to be applied each time. You could also think of process-driven tasks as 'predictable' and creative tasks as 'unpredictable'.

PROCESS–DRIVEN
Predictable

CREATIVE
Unpredictable

Using product serialisation software

Issuing invoices

Handling customer objections.

Creating a marketing strategy

Service diagnostic machines

Inspect product quality (visual)

Provide new information in a meeting without coming across too 'salesy'

Making a workshop agenda

A set of predefined steps which need to be followed to do the task correctly.

Methods and outcome not fully known at the start.

These two ends of the continuum require very different learning methodologies. Certain departments such as manufacturing and supply chain and R&D tend to fall to the process-driven side and can benefit from a task-based learning model. As ways of working in these departments are changing fast, it is more important than ever that employees keep up to date, while minimising their time away from work.

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DON'T OVERTRAIN

Part of the reason that reskilling employees seems such an onerous and Sisyphean task is the time it takes to remove people from work and 'teach' them everything that they need to know each time there is a change to the process.
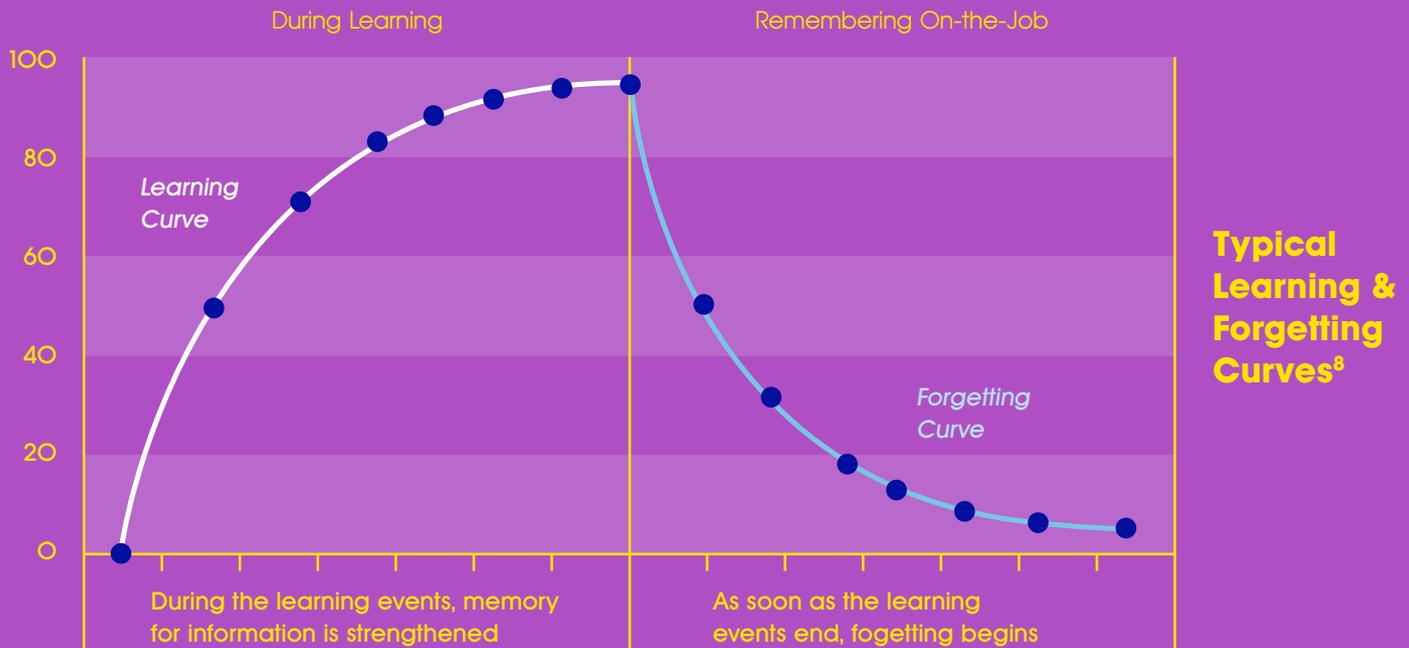
The problem may be that you are **overtraining** your employees in times of change, giving them **too much** information. The traditional method, when rolling out a new process, system or methodology, is to get people in the classroom or in front of a computer to let them study the new tasks and processes from top to bottom. In order to create all the learning material, courses get requested from L&D, technical SMEs then write up learning objectives and learning content is produced in the form of e-learning or face-to-face classes. Employees are taken away from their jobs and taught the new way of things before being sent back to implement them. Unfortunately, this is largely a waste of time and money – the problem is **transference**.

We know what is taught in classrooms and e-learning courses has a very low transference rate; studies by Ebinghaus[6] and Thalheimer[7] have shown that what we learn in a learning event quickly leaves us.

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6. Memory: A Contribution to Experimental Psychology. Hermann Ebbinghaus (1885).
7. Thalheimer, W. (2006, February). "Spacing Learning Events Over Time: What the Research Says,"
   Available at: https://https://www.phase-6.com/system/galleries/download/lernsoftware/Spacing_Learning_Over_Time__March2009v1_.pdf.

Typical Learning & Forgetting Curves[8]

During Learning   Remembering On-the-Job

Learning Curve

Forgetting Curve

During the learning events, memory for information is strengthened

As soon as the learning events end, fogetting begins

Research has shown that, on average, between 10%[9] and 47%[10] of what is learned in training is applied at work. While this is quite a wide range, it is clear that transferring what is learned during training to the workplace is an issue.

But we don't need studies to tell us this: we can see it from our own experience. Take a look at the list of training methods below:

- In the classroom (virtual or instructor-led)
- Learning by doing
- e-learning
- On-the-job training
- Mentoring

Think of the last time you started a new job, used some new software or learned a new process. How did you learn the most? If you ordered the list from most to least useful, classroom training and e-learning would most likely not be in the top two.

So why, when upskilling a work force or trying to improve performance, do we focus so much of our time and energy on upfront e-learning and classroom training, when we know that learning and support on the job is a more effective way to learn?

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8. Thalheimer, W. (2006, February). "Spacing Learning Events Over Time: What the Research Says,". Available at: https://www.phase-6.com/system/galleries/download/lernsoftware/Spacing_Learning_Over_Time__March2009v1_.pdf.
9. Wexley, K. N., & Baldwin, T. T. (1986). Post-training strategies for facilitating positive transfer: An empirical exploration. Academy of Management Journal, 29, 503-520.
10. Saks and Belcourt, An investigation of training activities and transfer of training in organizations 2006.

MANAGING REGULATOR EXPECTATIONS AND
INTERNAL COMPLIANCE

One of the reasons that we create so much learning content in the form of e-learning and slide decks is to ensure that learners have 'read everything' – in the hope that it will meet regulatory expectations and compliance standards. This leads to a situation where training and assessments are primarily designed to create an audit footprint rather than ensure people carry out the task correctly. It is true that pharmaceutical companies face a particularly challenging set of rules and regulations across all aspects of their business. To avoid large fines and damage to reputation, it is crucial to be able to satisfy regulators, but this has to be done at the same time as ensuring correct behaviours on the job. This cannot be done through training content alone.

A survey by Deloitte and Compliance Week[11] suggests that the most common way to measure compliance training effectiveness is if **90–95%** of employees finish it.

While in the EY's 2016 Global Fraud Survey[12], **42%** of respondents said that they could justify unethical behaviour in order to meet financial targets.

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11. Deloitte, Compliance Week, In Focus:2016 Compliance Trends Survey. Available at: https://www2.deloitte.com/content/dam/Deloitte/us/Documents/governance-risk-compliance/us-advisory-compliance-week-survey.pdf.
12. EY, Corporate misconduct - individual consequences, Global enforcement focuses the spotlight on executive integrity, 2016. Available at: http://www.ey.com/Publication/vwLUAssets/ey-global-fraud-survey-2016/$FILE/ey-global-fraud-survey-final.pdf.

The figures on the previous page show that while 95% of people may be considered compliant because they completed training, 42% would consider not applying the training. While not the same sample group, it is obvious that there is a disconnect between doing training and changing behaviours. It confirms a 'dirty secret' of the training industry: completing and passing training is a very poor measure of how effective it actually is.

If you are responsible for compliance within your organisation, you have to ask yourself: in the face of a serious breach, will just showing that your employees have seen the rules be enough to avoid problems with the regulators? In addition, is it ethical to try and abdicate responsibility for the safety of your staff and customers by 'throwing' content at them?

The reality is that people don't need to read everything and they don't need to know the theory and history behind everything that they do. They just need to know how to do the task at hand when they are doing it. This means giving them only the necessary concepts and supporting them with robust processes, coupled with performance support. It is only in the areas where the stakes are too high for getting it wrong or where the process is too complex that we need to augment the performance support and workflow learning with classroom learning, practice and simulation.

Task-based learning acknowledges need and provides a stronger training basis because only essential training is provided up front, with supporting learning provided during the execution of risk-assessed tasks. Designing a programme that risk assesses human error-prone areas and prioritises support at the areas of need can provide evidence of compliance as well as increasing effective performance on the job.

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CREATING EFFICIENT, EFFECTIVE
TASK-BASED LEARNING

Often corporate training is created entirely divorced from the context in which the job is being carried out. The learning is content- or topic-centred and focusses on theory rather than how the theory is applied. If you think of this in the context of Bob Mosher and Conrad Gottfredson's *'Five Moments of Learning Need',*[13] the bulk of the training that we create is only useful for the first two moments:

1 Learning for the first time (New) **2** Learning more (More)	**Formal, non-workflow training**

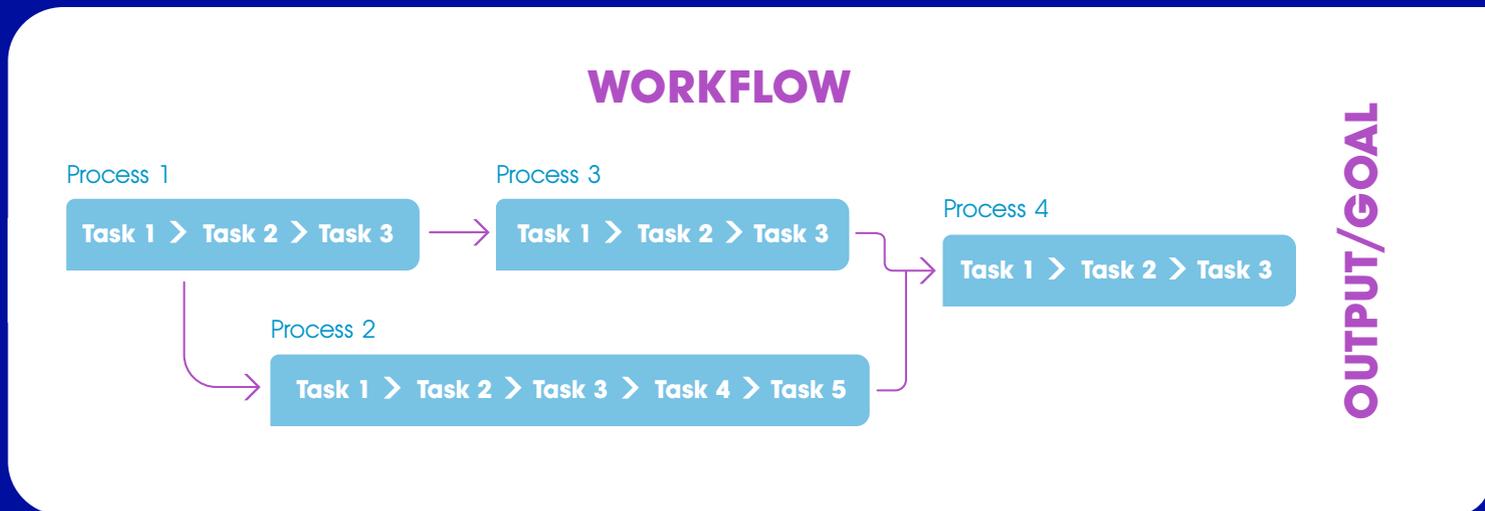|	
3 Applying what you've learned (Apply) **4** When things go wrong (Problem-solving) **5** When things change (Change)	**Reality when applying the learning in the workflow**

It is possible to create more effective learning and improved performance by turning the design flow on its head. Instead of initially focusing on the concepts, theory and learning objectives, analyse the workflow, tasks and the environment in which the job is being done. From there, work backwards to what support may be needed on the job, what practice may be needed and finally what theory and concepts are necessary in order to carry out the task.

The theory is that you don't need to grasp the fundamental concepts to do something well; in fact, you need to be able to do something well before you fully understand the concepts. Take language as an example: you learn to speak long before you are taught about grammar. If you want to learn a new language, immersing yourself in it is far more effective than sitting in a classroom learning the fundamentals of sentence construction.

13. Gottfredson C, Mosher B. 5 Moments of Need. Available at: https://www.5momentsofneed.com/.

APPLYING
TASK-BASED LEARNING DESIGN

1. Start with a workflow analysis

A **workflow analysis** identifies the tasks and processes that a person has to do to complete the workflow. There may be multiple processes in a workflow. While the entire workflow may include different people from different functions, each process would generally be what one person needs to do.

WORKFLOW

Process 1
| Task 1 > Task 2 > Task 3 |

Process 3
| Task 1 > Task 2 > Task 3 |

Process 4
| Task 1 > Task 2 > Task 3 |

Process 2
| Task 1 > Task 2 > Task 3 > Task 4 > Task 5 |

OUTPUT/GOAL

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2. Identify the consequential and inconsequential tasks

The next step is to look at each task in a process and decide how consequential it would be if it was done incorrectly or missed completely.

The tasks will fall into:

Consequential

Making an error in this task will be hard to rectify and is hazardous or has a negative impact on the entire process or business.

Inconsequential

Making an error in this task will be easy to rectify and the consequences of the error are not hazardous and will have negligible negative impact on the entire process or business.

Depending on the nature of the tasks, you could have more task types here to allow for a little more nuance.

For each of the tasks in the inconsequential bracket, you probably don't need a training course. It will most likely be more effective for you to support the learner in doing that task correctly on the job. Even if it is a complex task which requires some grounding in knowledge, it will be more effective to give that knowledge in the context of the task being done.[14]

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14. Van Merriënboer, J. J. G. (1997). Training complex cognitive skills: A four-component instructional design model for technical training. Englewood Cliffs, NJ: Educational Technology Publications.

3. Identify the triggers

How does a person know when they need support with a task? This is an important question if you want to effectively use workflow learning and performance support. There needs to be a trigger which alerts someone to the fact they should look for support. What this trigger is and when it happens is crucial to creating and delivering the right kind of learning. Broadly speaking, there are three kinds of triggers:

SYSTEMIC: The system or environment 'knows' the task is not being completed properly and alerts the person. For example, if an operative in a warehouse needs to change the print on a distribution label, there may be an online form to fill in. If they do not fill in all the fields or there are letters where numbers should be, the system will realise that the task has not been performed correctly and alerts the operative with an error message and a possible fix.
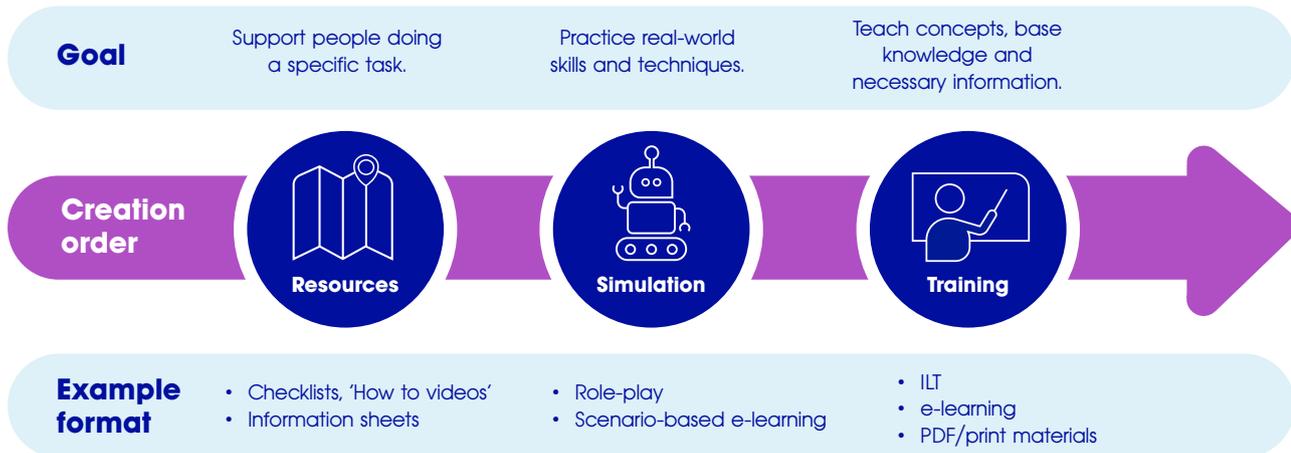
INTRINSIC: The doer knows that they are doing a task incorrectly or can't do a task because they are not getting the desired immediate outcome. Using the label example, the operative may not know how to get the printer to work or, when they do, the text is misaligned or obviously incorrect in another way.

EXTRINSIC: The doer does not know they are doing a task incorrectly. The issue becomes apparent later in the workflow or in the final product and alerts the doer retrospectively. With our label example, the operative may have printed the labels and been happy with the result, but the boxes are then sent to the wrong site. The error on the label is only noted later in the workflow.

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4. Identify learning interventions

Once you understand the workflow, tasks, consequences and triggers, you are in a good position to identify what kind of interventions are necessary.

This is where traditional learning design may not work. Traditionally, we would start at the 'bottom' and identify what people had to know or what the learning objectives were. Once we had furnished the learners with that knowledge, we would allow them to practice through scenarios or simulations, finally letting them loose on the job with job aids or resources for support. However, as described earlier, we all tend to prefer learning by jumping in and learning by doing, rather than sitting through e-learning or classroom sessions. It stands to reason that learning design should follow that direction too and start from the 'top' with the tasks that people have to do in the workflow.

Goal	Support people doing a specific task.	Practice real-world skills and techniques.	Teach concepts, base knowledge and necessary information.
Creation order	Resources	Simulation	Training
Example format	• Checklists, 'How to videos' • Information sheets	• Role-play • Scenario-based e-learning	• ILT • e-learning • PDF/print materials

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Start with the tasks in the inconsequential group and have 'systemic' or 'intrinsic' triggers, i.e. the ones in which the doer will know if they have gone wrong, either by the system telling them or where it is obvious to them. There is no need for theory or practice with these – just let people get on with it. Create useful performance-support tools that act as quick guides and which can be used if users are struggling. Ensure that these tools are available where and when the user will carry out the task. Examples of performance-support tools include things like checklists, completed examples, step-by-step guides, maps and information sheets. There should be no need for any further training here because doing the job will be the best teacher and, as getting the tasks wrong is not a critical issue, real life can be the classroom.

Next you need to look at the inconsequential tasks which have an extrinsic trigger, i.e. the doer may carry out these tasks incorrectly without realising it. With these tasks simulations and practice work well as you will be able to create a 'trigger' in the mind of the doer to bring their attention to the area which needs to be carried out differently.

By recreating the task in a simulation, you can either demonstrate best practice or highlight how a task needs be done and allow space to practice. This way, when the doer is carrying out the task, they will know where mistakes are made and know to look for the performance-support tools when necessary. It is important to note here that there is no need to include extraneous information or theory in the simulation – just the method of how to do the task correctly. Once the doer knows this, if they have the requisite performance support, they can then do the task in real life.

Once that is done, turn your attention to the 'consequential' group of tasks. Again, the triggers are important here: if the triggers are systemic, you can still rely on performance support as the environment will not allow for the incorrect completion of the task. Tasks with intrinsic triggers may require simulation and practice to ensure that the doer is carrying them out correctly.

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Already, by following this method, you would have cut the amount of 'formal' training down drastically and decreased the time away from work. However, the tasks left over fall into the consequential group with an extrinsic trigger. These are tasks where you don't want to let people jump straight in as errors could be catastrophic. Tasks here will require the knowledge base and theory. You may want to look into e-learning, classroom and virtual lead instruction before practice and simulation and finally support on the job.

Key

Inconsequential >

Making an error in this task will be hard to rectify and is hazardous or has a negative impact on the entire process or business.

Consequential >

Making an error in this task will be easy to rectify and the consequences of the error are not hazardous and will have a negligible negative impact on the entire process or business.

TRIGGER

SYSTEMIC

The system or environment 'knows' a task is not being completed properly and prevents or alerts the doer.

INTRINSIC

The doer knows they are doing a task wrong/can't do a task because they are not getting the desired outcome.

EXTRINSIC

Later in the workflow, process or the final product shows there is problem with a task and alerts the doer retrospectively.

Design learning in this order

WORKFLOW >	Task 1 >	Task 2 >	Task 3 >	Task 4 >	Task 5 >	Task 6 >
Learning by doing	✓		✓			
Performance Support/resources	✓	✓	✓	✓	✓	✓
Practice/simulation (in a safe space)				✓	✓	✓
Formal learning (classroom, eLearning etc.)						✓
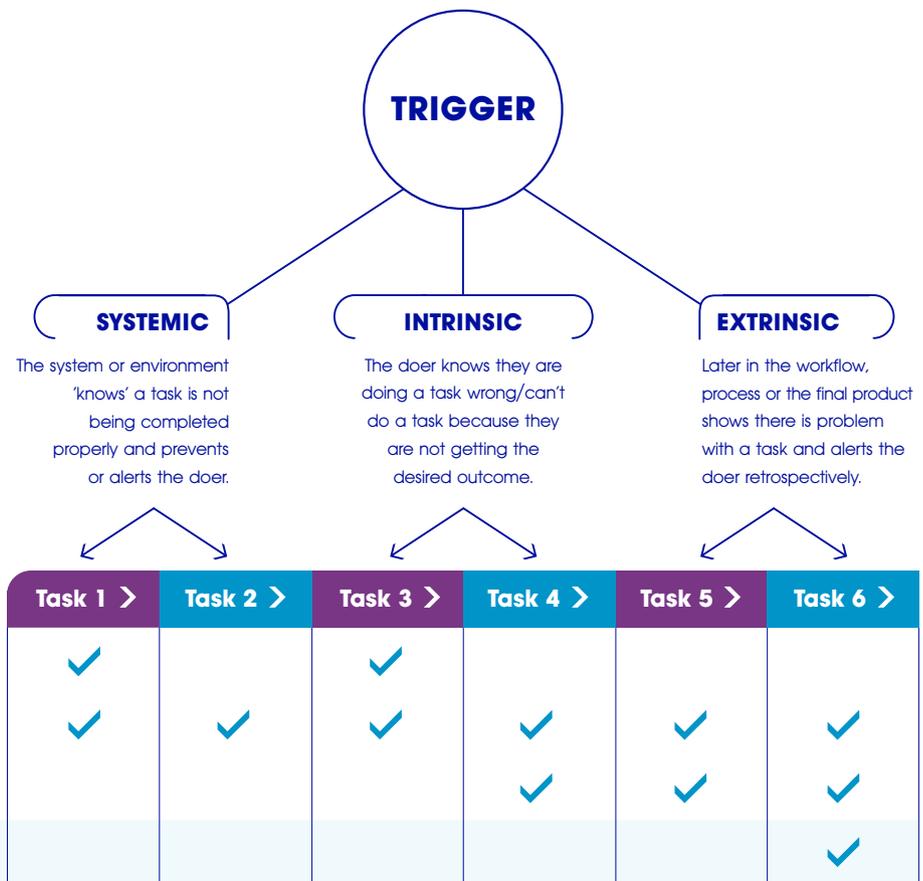
Delivering learning using the task-based learning model

One of the key features of task-based learning is how it is delivered. With traditional learning design, all the effort is put into delivering a learning event before the task is attempted. As described above, this is often ineffective due to low transference. Supporting the learner **before, during** and **after** the task is far more effective[15] and that is what task-based learning aims to do. The amount of learning content and support at each of these stages will depend on both the complexity of the task and consequence of failure. Simple tasks may not require upfront 'formal' learning or simulation as a job aid when doing the task in real life may suffice. However, a complex and important task will require formal learning and practice before attempting it, as well as support during the task and feedback afterwards.

For task-based learning to be effective, it needs to be delivered near, both in space and time, to where the actual task is taking place. This means that a good understanding of the environment in which the learner is working is needed. Ideally the learning and resources will be accessible through software which the learner is already using (Learning Management Systems are often unsuitable as the people don't generally use them as part of their day-to-day lives). Things like Slack, MS Teams or SharePoint tend to work better if the learners are already using them. If the job is in a physical location rather than online, QR codes with links to relevant resources may work best. Alternatively, if there is no access to mobile devices at the point of application, posters may be the best option. While the delivery method may depend on your learners' habits and working environment, the structure of how you deliver the learning should be broadly the same.

15. Andy Jefferson, Calhoun W. Wick, and Roy V. H. Pollock (2006) The Six Disciplines of Breakthrough Learning: How to Turn Training and Development Into Business Results ,Wiley.

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Before

The learner should be presented with any formal learning and practice that is necessary shortly before they are going to carry out the task. This should always be accompanied by practice and simulation. Once the learner has a good understanding of the concepts, they can move on to the 'in the workflow' resources. In this case, it could be an overview of the task and where it fits within a larger process or workflow and a checklist of things required to complete the task correctly.

During

During the task, the learner will need access to resources and job aids which will help them to solve specific problems in the workflow. If they are new to the task, they may need to have a 'buddy' shadow to coach them through it the first few times.

After

After completing the task, it is important for a learner to receive feedback on how they did and what they should be aiming to do differently in the future. Depending on the nature of the task, there could also be a checklist to ensure that everything has been completed correctly.
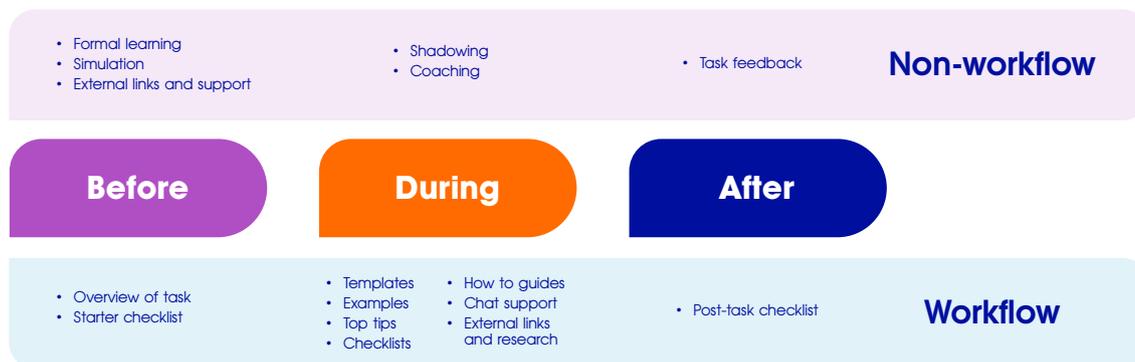

While you want to push as much of the training into the workflow as possible, in some cases – especially when a learner is new to the subject – it will be necessary to cover related concepts and practice outside of the workflow.

SUMMARY

Following this method has multiple advantages: it reduces the amount and cost of formal training while increasing productivity. It will also reduce the learning time required to achieve successful performance. However, it is important to note that it is not suitable for every situation and blending task-based learning with other forms of scheduled and unscheduled learning are often the best way to cover all areas from both a performance and regulatory perspective.

Every organisation is different and requires a unique learning strategy to boost performance. That said, in the pharma and life sciences industry, process driven and regulated functions like supply chain and manufacturing and R&D have a particular set of challenges which can benefit from task-based learning design. This can help break the cycle of delivering time consuming, content heavy courses in order to satisfy regulators while leaving employees with little support when carrying out their actual job. If done correctly task-based learning design will allow you to implement a learning strategy that focusses on performance while reducing risk and exposure to regulators.

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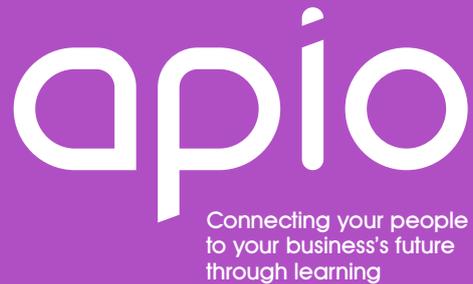
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