



An Epic White Paper

Learning design and e-learning

What is learning design?

Why have learning design?

Three 'universal truths' about learning

The psychological theories behind learning

Selecting the most appropriate
psychological theory for learning design

Choosing your learning model for learning design

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What is learning design?

'I can't see the point. We invest tens of thousands of pounds in training programmes. Half the people don't complete it. Most go back to their job and nothing changes. Question them about what they learnt, and they'll struggle.'

These are comments often heard in organisations investing in training (though not from Epic clients, needless to say).

While there are many factors which impact on whether training is perceived as successful or not, perhaps the most important is whether it generates improved performance. How can you guarantee this? Well, of course, cast-iron guarantees are hard to come by in anything involving human beings, but one thing is certain: without good learning design your chances of achieving that much-desired performance improvement decrease significantly.

David Merrill (2001) argues that learning from a given programme will be 'facilitated in direct proportion to its implementation of first principles of instruction.' These first principles are the core elements that must be implemented in an instructional model to create effective learning. If they are omitted, poorly implemented or mismanaged, the implication is clear. Learning will not happen. And no learning - no performance improvement.

Learning design is what brings order to information chaos, ensuring you don't give your audience a mishmash of messages, in a willynilly fashion. It tailors content to the psychological and affective needs of the audience, optimising the effectiveness of that content in producing learning experiences. And if learning is successful, performance will improve. As they say on the other side of the Atlantic, it's a no-brainer. So, if you are going to invest in training, can you risk leaving the outcome to chance by skimping on learning design?

If you've read about training or work in the field, you will have come across a plethora of terms relating to the field of design. We call it learning design (LD). Others talk of interactive design, instructional design, learning models or interactive strategies. Different people favour different terms; however, the important thing that all these approaches share is one unifying principle: maximising the benefit and impact of learning by creating the right conditions for learning; selecting the right learning model for the right learning content and audience. The right learning model, grounded in a judicious application of psychological theory, creates emotional engagement; sequences messages with the right interactions and reflections, in the right form at the right time; allows for the assessment of learning effectiveness, and gives ample opportunities for the transfer of knowledge to where it is most likely to be applied.

Learning design is a critical activity in creating effective learning, across the board. However, it is particularly important in e-learning where you only have one shot at success.

In face-to-face training, the best trainers use their guile to adapt their content to their audience on the fly. They'll adapt their content to the profile of the audience, chop and change exercises and re-order where necessary. E-learning is a solo activity which affords no such luxury. The design has to be spot-on to hook the learners, sustain their engagement, create valuable learning and carry them through to the end. If it fails in any of these, learners switch off. The moment is lost; the learning dissipated. And with that, performance won't improve.

This white paper outlines Epic's approach to learning design. It is not intended to be a comprehensive and dispassionate survey of the field, so much as a description of how principles of LD are applied in practical circumstances. In it we describe how we go about maximising our clients' return on investment in learning through the use of sound learning design.

In the paper, you will find out about:

- How we define learning design
- Where learning design fits into the training development cycle
- Five principles of 'good learning'
- Psychological theories which underpin our learning models
- Our recommendations for applying practical LD models to create effective learning with different subject matter

Three universal truths about learning

So what is our starting point? In this paper, we discuss learning design for adults. All our thinking is based on three more or less universally accepted truths about learning:

1. **Adults learn differently from children.** There is general agreement that this is true. Andragogy, the science of adult learning, shows that there are valid approaches which are specifically valuable when designing learning for adults. These include a focus on learner-centred design, layering knowledge development, signposting throughout content, and making strong emotional connections between learning content and the application of that knowledge.
2. **Individuals learn differently at different times with different content and different motivations.** There has been plenty of interesting work from Piaget to Honey and Mumford on the way different people learn. This paper doesn't discuss learning styles, but we believe that all learning should be designed to embrace a range of content styles wherever possible, to accommodate personal preferences.
3. **Learning can be accelerated and retention improved through the application of specific techniques and strategies** (including some more extreme theories from Lozanov which suggest alcohol and music are great

learning aids!). In our learning design we use diagnostic tools, information layering and quick reference tools to accelerate learning. We use colour theory, image, text, audio combinations and gaming theory to improve retention.

So, in answer to the question posed at the beginning of this chapter, we offer the following working definition: Learning design is all about designing the right learning for the right audience, catering for different learning styles and maximising the opportunities for effective learning.

Why have learning design?

Learning design isn't simply about stringing a sequence of content together to impart knowledge and skills. In fact that's probably a good definition of poor training. Good training blends the application of the psychology of learning with the science of instructional design.

Learning design offers a blueprint for writers of training to shape learning content, whatever the subject matter, and create the conditions for improved performance and effective transfer of knowledge. Good training is about addressing performance needs: good training defines and meets learning objectives effectively. Effective learning design helps create engagement, and leads to emotional and intellectual connection with content to build practical, valuable skills which can be immediately applied in relevant situations.

In business terms, learning design is a critical factor in assuring a good return on investment in learning. It ensures that performance gaps are adequately met and learning is sustained throughout the duration of a learning event.

What if you don't do it (and lots of training designers don't)? In e-learning, often the consequence is a string of electronic pages, inferior in all ways to a book or manual. All the tricks great trainers pull to bring people back into the learning, from humour to rewards, via swift adaptation of content, are unavailable. There are no two ways about it; the design has to be right first time to meet the needs of a diverse audience. When no or poor learning design occurs, there is inadequate consideration of the cognitive and emotional dimensions to learning. Concepts are not ordered to build knowledge. Learners are confronted with a confusing morass of information. They struggle to make mental representations of the knowledge or skills they are developing.

And what of different types of learning? Can the same recipe be applied for leadership skills as for product

knowledge? Can a process be trained in the same way as a soft skill? We believe not. Successful LD selects and tailors the learning model to the most appropriate form for the audience and the content type.

The concept of learning design

Some training developers have worked to very simplistic models of learning. Typically these present material and test it in a repetitive cycle. The cooking recipe is a good analogy here. Try to cook something challenging with only a simple set of ingredients (or content) and the result will be hit and miss. You may get lucky and cook the perfect soufflé. Or you may end up with a messy, inedible and ultimately useless concoction.

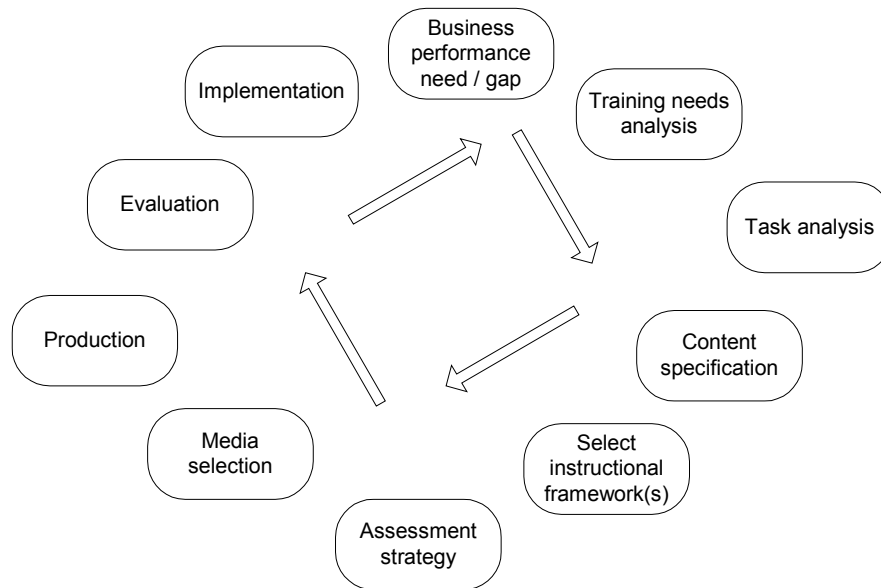
Following the recipe through, applying an order and checking what assumptions and prior knowledge exists before you embark on the more challenging elements is far more likely to breed success.

It is the same with creating learning. Your instinct and experience may inform how you order and structure learning. It also may turn out something that suits you but is inedible for other people, who have different tastes and needs. If you have a choice of recipes which you can apply appropriately and consistently for different meals and individuals' needs, you are much more likely to create success with the majority of the users of your recipes. The key is applying the right recipe for the right meal. By exercising judgement, you will be able to assemble the right learning model (recipe) for the right content (ingredients) to create effective learning for your audience (happy eaters.)

The place of learning design in the training development cycle

But what is success when talking about learning in a training context? You have to get down to fundamentals here. Why create training in the first place? Learning

design is not an activity which can be undertaken in isolation. It sits within the training development cycle, taking its place among the activities of understanding performance gaps, identifying training needs, creating learning (through the application of good learning design), validating learning, assessing the impact on performance and implementing learning.



A typical training development cycle

Most training measures success in terms of the experience of the user. But that tells you little other than the training is perceived to be useful and enjoyable. Even measuring retention of knowledge does not go far enough. In reality the most important measure is impact on staff performance and the bottom line.

Most organisations use Kirkpatrick's model to measure success in terms of user experience and immediate retention of knowledge or skills, however few organisations assess impact in the short and medium term on the business. Whatever your strategy for evaluation, the impact of your training will be strongly influenced by

learning design, but only an evaluation effort over an extended period will reveal the full effectiveness of a piece of learning's design.

These and other issues touching on learning design are covered in the following Epic white papers:

- Psychology of e-learning
- Motivation in e-learning
- Collaboration in e-learning
- Accessibility and e-learning
- Evaluation and e-learning
- Blended learning

(See p43 for a full listing of the range)

A brief history of the psychological theories behind learning

Investment in research into learning really took off in the post war period. In the new social order that was created out of wartime cataclysm, the role of education and learning as a transformational influence on society was recognised by policy makers and thought leaders. Harold Wilson's vision for the Open University 'forged out of the white heat of technology', encapsulates the new inclusive social agenda for learning. On the back of these changes, educational research sought to explore new ways to engage learners to meet the increasingly understood diversity of their needs.

In more recent years, there have been seismic shifts in the economic structure of the developed world which have also impacted on the training industry. Globalisation of markets has led to the rise of multinational organisations, which need to train with consistency across diverse countries and cultures. The increasing virtualisation of many products and processes has foregrounded the importance of 'human capital' (or 'intellectual capital') in creating and sustaining value within an organisation. Training has been recognised as an important change enabler in organisations striving to remain competitive.

As a result the culture has, broadly speaking, shifted from single hit learning and training (the university/apprenticeship model) to continuous skills development to meet the shifting needs of individuals and businesses. In that sense, the market economy has come to skills development too. Today we talk about learning organisations, those which adapt and shift their proposition and as a consequence help their staff shift their skills proposition too. Research into training people for these changing environments has moved forward. It is from this perspective that we approach this review of learning design, to see how it can effectively improve training.

During this period, three main schools of psychology research have strongly influenced learning design. These are:

- Behaviourism
- Cognitive theory
- Constructivism.

They all feature in current training development at Epic, and in the work of many HR and training departments too. So what are the characteristics of each psychological theory?

Behaviourism and learning

Behaviourism was the predominant theory of instruction which persisted well into the nineteen sixties. The roots of Behaviourism go back to Pavlov and his experimentation with conditioned responses in animals. Thorndike, Watson and Skinner added to this work and applied it to human psychology. Skinner's view was that learning was best achieved when the desired behaviours from the learning programme were created through repeated and reinforced approximations of that behaviour.

Advantages of behaviourist approaches:

- Learning is defined in clear goals
- Automatic responses to stimulus can be learned

Disadvantages of behaviourist approaches:

- If the appropriate stimulus for a given response is absent, the behaviour may not occur
- There is no holistic knowledge or mental representation of models or knowledge (e.g. if a process is taught using a behavioural approach, and there is any systems failure, learners will not necessarily have the skills to interpret or adapt to the situation)

Cognitivism and learning

When Noam Chomsky challenged the behaviourist position in the late sixties there was a big swing towards learner-centred designed and Cognitive models of learning. Where Behaviourists had been focused on the potential and effects of the teacher on modelling behaviour, Cognitive theorists came to examine what the learner's impact on their own learning could be.

Behaviourism did not effectively explain social behaviours. Experiments showed that not all behaviours which had been reinforced in subjects were displayed.

Cognitive theorists challenged the Behaviourist orthodoxy by viewing "learning as involving the acquisition or reorganisation of the Cognitive structures through which humans process and store information" (Good and Brophy 1990.)

According to Cognitive theorists, individuals create knowledge structures called schema. They process information through three different models:

- The sensory register - where information is received by the senses
- Short term memory - where information is stored for brief periods
- Long term memory - where information is stored for longer periods

A number of effects can be applied to the internalisation of data to help embed information into long-term memory, which is the goal of all instruction. (These effects include tasks commonly seen in instruction such as practice, transfer, knowledge schemas, mnemonics.)

Advantages of Cognitive approaches:

- Learning is defined in terms of consistent behaviours achieved through embedding of knowledge and skills in to long term memory

Disadvantages of Cognitive approaches:

- Learners may learn a particular way to perform a task, but it might not be the best way for them

Constructivism and learning

Interest has more recently shifted to Constructivism. Constructivists believe that, 'learners construct their own reality or at least interpret it based upon their perceptions and experiences, so an individual's knowledge is a function of one's prior experiences, mental structures, and beliefs that are used to interpret objects and events' (Jonasson, 1991). With Constructivism, learning designers have concentrated on how learners build their own representations of knowledge and meaning through mental processing. Taken to an extreme, this notion that individuals have their own representation of reality, potentially at odds with others', would lead to intellectual anarchy. Constructivists explain the absence of anarchy by the notion that through a process of social negotiation we construct a shared reality.

Merrill summarises the assumptions of Constructivism as:

- Knowledge is constructed from experience
- Learning is a personal interpretation of the world
- Learning is an active process in which meaning is developed on the basis of experience
- Conceptual growth comes from the negotiation of meaning, the sharing of multiple perspectives and the changing of our internal representations through collaborative learning
- Learning should be situated in realistic settings; testing should be integrated with the task and not a separate activity

(Merrill 1990)

Advantages of Constructivist approaches:

- As learners are able to interpret a range of different realities, they are more likely to be able to deal with real life situations. With enhanced problem solving skills, knowledge can be applied more effectively to new situations and challenges. (E.g. this approach could be good for complex problem solving or soft skills.)

Disadvantages of Constructivist approaches:

- Where a common approach to a task is required, individualistic approaches would not be appropriate

Selecting the most appropriate psychological theory for learning design

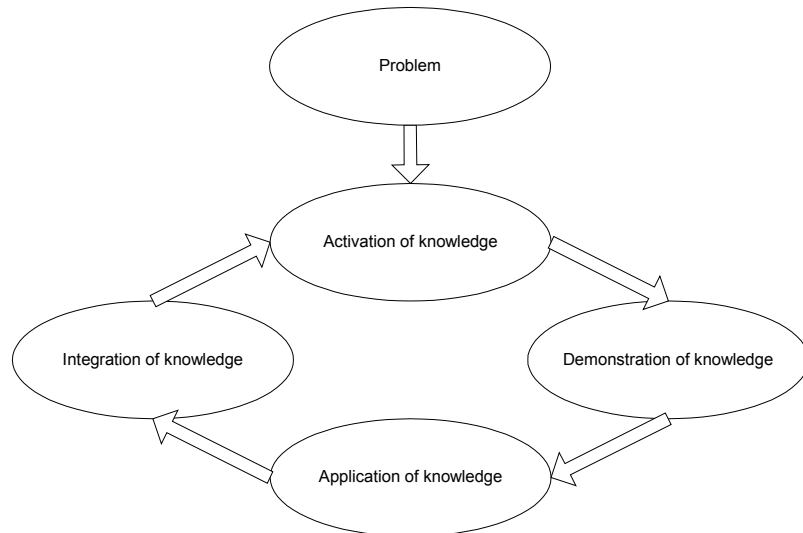
Predictably there is no clear answer here. We don't have a magic formula for picking the right theory on which to base an LD model. The most important factors we take into account at Epic are to understand what the business objective is, who our audience for learning is, what their need is and what the subject matter is. We then select, adapt and often combine them, to design effective learning sequences.

Ertmer and Newby (1993) put this selection of approaches in terms of a learning continuum. We select behavioural approaches where learners bring very little transferable prior knowledge to their learning. Simple strategies which require low amounts of processing can be the most effective in these circumstances. We often treat systems skills for new entrant staff in this way.

For tasks that require higher levels of processing we select Cognitive approaches. Knowledge and skills which require holistic understanding of schemas or processes are effectively dealt with through this approach.

Where we are producing learning for which high levels of cognitive processing are required, such as social negotiation or situated learning, we have found that a Constructivist approach can be highly successful.

The five components of 'good learning'



Five components of 'good learning.'

Although current instructional approaches vary according to their underpinning theory, there are some common underlying principles which we believe unify the majority of current approaches. We have synthesised them as 5 components of 'good learning':

1. Solve real world problems - The learning is grounded, not abstract from the environment and tasks that learners perform in their role or life.
2. Activate prior knowledge as a pre-cursor to undertaking new learning - Knowledge is seen as the progressive building of layers. Each piece of new knowledge builds on existing knowledge and connects with it.
3. Take on board new knowledge through demonstration and worked examples - Seeing how knowledge is applied brings it to life.

4. Try out new learning by applying it - Opportunities to learn by doing embed learning emotionally and cognitively.

5. Integrate learning into the learner's own world of experience - The connection between the learning and one's own frame of experience is made explicit by learners re-framing knowledge in their own language.

Creating good learning – choosing an approach

So how can the principles of instruction be addressed effectively when designing training?

In our approach, the most important step is to create a framework in which tasks and activities can be appropriately structured to create good learning. This framework should be adapted for different content types.

Epic uses three different instructional models. In the remaining pages of this paper, we review each of these and show how they can be used with different types of learning, categorised by subject matter.

The models are:

- Roger Schank's **Goal-Based Scenarios**
- Robert Gagné's **Nine Steps of Instruction**
- Epic's **Learn/Apply model**

Why these three approaches?

If you research learning design models, you will find a plethora. There are probably more than sixty documented theories, each with their champions and doubters. It is no easy task to work your way through this maze of approaches, and when you do, you'll find that the overlaps and similarities make them difficult to distinguish. For every article in support, you'll find at least one to challenge.

Rather than explore this complex range of LD models in this paper, we have restricted ourselves to the three on which we've staked our claim above. Two are well documented and researched. The third is our own adaptation. With our experience and track record of success, we believe our choice is an important 'line in the sand' in the debate around learning models. Gagné and Schank are widely used and endorsed. They have

longevity and credibility, and above all, we believe they are critical in making effective learning programmes. Our own approach builds on these important models and enhances them. However, we select the three approaches according to the subject matter, audience and performance required.

Roger Schank's thinking has been widely acknowledged as being at the forefront of learning design. The use of case-based reasoning is grounded in the Constructivist school, with elements of Cognitive approaches. It offers a rich and engaging method for a wide range of content types, though it can feel too unordered for learners who require a lot of structure in their learning.

Gagné's nine-step model is perhaps the most quoted and recognised learning model for training in general. The cognitive-behaviourist approach is well-grounded in theory and can easily be adapted to e-learning. It offers a clear pathway and structure through learning activities, although it can often prove too linear and rigid in circumstances where a more exploratory, learner-controlled approach is required.

So if these two models are well supported, why has Epic developed its own Learn/Apply model? We believe both Schank and Gagné provide an excellent basis for creating good learning. But sticking to one or the other can be limiting when producing some complex learning activities which may include both underpinning knowledge development (well addressed by Gagné) and the need for rich application tasks (well supported by Schank). Epic's solution is to produce a dual model which allows for both types of learning. This is a particularly powerful model when allied to diagnostic tests, because learners can be signposted to the content most appropriate to their level of knowledge and skills. In this way, someone scoring well on the diagnostic may be able to demonstrate competency by tackling the application tasks straight off, without having to plough through the underpinning

knowledge sections. If they struggle, they are signposted to the theory sections.

If not, their training is accelerated. Learners who need more structure and underpinning knowledge can work systematically through knowledge sections. For both, signposting and remediation opportunities are primary – if you get it wrong, you always have somewhere to go back to. And if you get it right, you get a either strong closure or a signpost to the next learning event.

We believe this model gives the best of both worlds – a well-structured cognitive approach based on Gagné and a highly engaging, practical approach based on Schank. Incidentally, this model also works well in terms of learning style preferences. Learners with a stronger preference as theorists and reflectors will tackle the knowledge elements first. Activists and pragmatists will focus on the application tasks.

In making our selection of models, we've considered also the types of content most commonly dealt with in e-learning. These are:

- Induction
- Process knowledge
- Technical knowledge
- Systems skills
- Softskills
- Product knowledge

Induction

General induction (i.e. not role specific) is the provision of a whole host of information targeted at new starters in an organisation. It is worthy of a separate category because it brings together learning of different types (procedural, technical, systems, soft and product) in a single category of learning. It is targeted at an audience with a very specific need – to be proficient in the language and environment of the organisation they are joining.

Process knowledge

Process knowledge is about how an organisation runs its business. This knowledge can be relevant to both external and internal clients. Examples include business processes and human resource functions such as appraisal.

Technical knowledge

Technical knowledge is held by expert practitioners and allows them to fulfil their professional responsibilities. Examples included calculating taxes, auditing customer application forms, or providing accountancy services; science based operations; engineering; programming; technical design. This domain may also include fault finding.

Systems skills

Systems skills are those used by employees to operate software systems within the business. Computer operated processes, customer terminals and electronic point of sale systems come under this category.

Softskills

Softskills are the personal and managerial skills that drive performance in an organisation. Leadership, coaching, performance development, assertiveness, decision making and problem solving are all examples of softskills.

Product knowledge

Product knowledge is core job related knowledge for key staff in organisations. This knowledge allows them to sell effectively or to serve customers appropriately.

A rating of instructional design approaches against content types

While we endorse all three models explored in this paper, we attempt here to score them on a four-star scale for suitability against content types
(4 stars = highly suitable; 1 star = not suitable)

	Schank's Goal-Based Scenarios	Gagné's 9 Steps of Instruction	Epic's Learn/Apply model
Induction	* The goal-based approach is probably too open for induction which requires structure and significant support for learners.	**** The structured flow of Gagné provides a logical learning path for induction	*** The Epic model provides a structured path and also offers opportunities for the application of learning where relevant.
Process knowledge (basic level) Technical knowledge (basic level) Systems skills (basic level)	** Goal-based scenarios can be intimidating for learners at entry level.	*** Works well for basic level process – builds knowledge progressively and relates it to personal experience	**** Allows for the layering of knowledge and skills in the Learn sections. Gives opportunities for the transfer of knowledge in the Apply sections.
Process knowledge (intermediate and advanced level) Technical knowledge (intermediate and advanced level) Systems skills (intermediate and advanced level)	*** Can have a lot of value where the process is already partially understood or can be quickly learnt throughout supporting material. May be inappropriate for complex process where no deep knowledge can be assumed. Suits people already performing part of the task.	** Works well for higher levels of process knowledge by building layers of understanding. Can fall down on application of knowledge and transfer, where connections are inadequately made.	**** Ideal for building deep understanding of process and then following up with opportunities for application. For more confident learners, they can try the application tasks first.

(continues...)

	Schank's Goal-Based Scenarios	Gagné's 9 Steps of Instruction	Epic's Learn/Apply model
Product knowledge	<p>***</p> <p>Can be a powerful model where the product knowledge needs to be situated in the context of how it is sold or supported. Suits an exploratory, action-based approach to learning. It can intimidate learners who prefer to understand the ins and outs before applying their knowledge.</p>	<p>***</p> <p>A comprehensive model for developing core knowledge. The model can be over-stretched when making meaningful connections between the knowledge and how it relates to performance expected of the learner.</p>	<p>****</p> <p>Ideal for building core knowledge. The Learn approach is well suited to learners who want to know the detail before applying it. For action-oriented learners, knowledge can be applied directly with strong signposts back to supporting content.</p>
Softskills	<p>****</p> <p>The immersive, action-oriented model of Goal-Based Scenarios is ideal for trying out and learning about softskills and behaviours.</p>	<p>**</p> <p>Good for explaining the theories and modelling skills. Gagné is less effective in providing a framework for the skills to be put into action.</p>	<p>****</p> <p>Allows for action-oriented learning through the Apply approach. Supports this with strong theoretical knowledge and modelling through the Learn approach.</p>

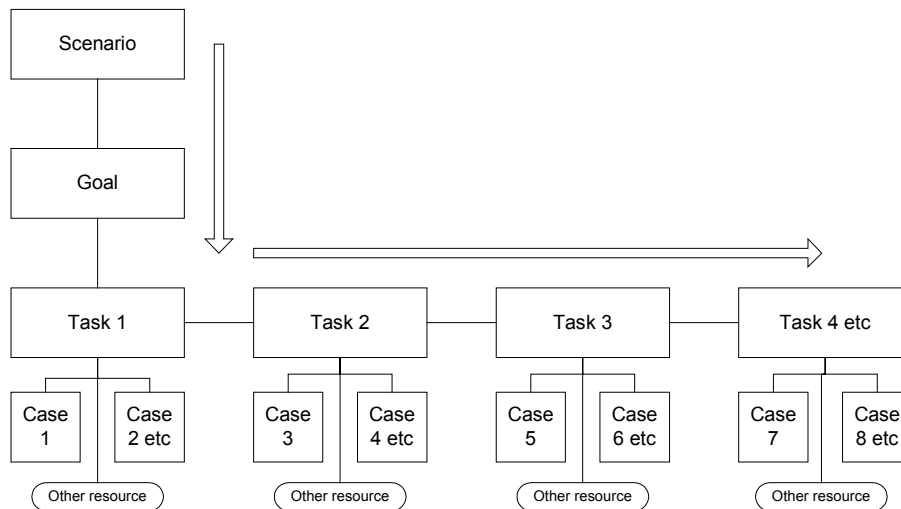
So what is behind our three theories?

Schank's Goal-Based Scenarios (Cognitive/Constructivist approach)

The Goal-Based Scenario is the term used by Roger Schank to describe his approach for 'learning by doing'. This approach dates from the late 1990s and is based on a constructivist and cognitive theoretical approach. Learners pursue a goal by practising pre-identified skills and knowledge. The approach is built on the concept of case-based reasoning. In case-based reasoning, the theory is that memory and learning are enhanced by their placement in cases or stories. When a learner activates their knowledge and applies it, they do so by drawing on the cases stored in their memory and drawing analogies with it. Learners index their knowledge in memory and either consciously or unconsciously retrieve cases as they need them.

For learning designers, this approach poses both opportunities and challenges. A well-written goal based scenario will be a rich learning experience, which draws in learners through engaging storylines and scenarios. However, a demanding and complex set of operations may stretch the learning designer's ability to create plausible extended scenarios. Instead, a set of disjointed micro scenarios may be required to meet all the learning objectives and could stretch the realism of the scenario. There are twelve different elements in Schank's model (see diagram over).

The elements of Schank's model



Typical structure of a topic following a goal-based scenario

Stage	Activities
Pre-learning definition and planning	The first five steps relate mainly to setting expectations and allowing learners to orientate themselves for the learning.
1. Goals	The goals are the desired end state for the sequence of learning. These equate best to overall aims for the programme of learning. Although this information may not appear explicitly in the sequence of learning, it should be identified and documented by the learning designer, because it is a mark against which success can be judged.
2. Expectations	The end goals are described in terms of their final outcome.
3. Plans	The plan is the route the learner will take to get to the end goal.
4. Expectations Failures	When the results don't match expectations, the learner will reflect and learn about the causes for failure.
5. Explanations	The explanation the learner receives for failure will be indexed in memory by the learner in store for future learning.

(continues...)

Typical structure of a topic following a goal-based scenario (cont.)

Stage	Activities
Learning activities	The following steps all relate to the participation in the goal based scenario.
6. Learning goals	<p>The learning goals are the skills sets or knowledge that the learner needs to develop in order to be able to perform a role or task. Schank differentiates between two types of knowledge:</p> <ul style="list-style-type: none"> ▪ Process knowledge – the practice of the skills needed to attain the goal ▪ Content knowledge – the information required to attain the goal
7. Mission	The mission is a realistic set of activities that a learner will perform in pursuit of a goal. The mission must be relevant, motivating and meaningful.
8. Cover story	The cover story is the linking narrative in which the learning tasks are situated. The story is to be developed through the learning sequence.
9. Role	The role is the part the learner plays in the scenario in order to practise the skills and achieve the goals.
10. Scenario operations	The scenario operations are all the activities the learner performs in order to meet the requirements of the mission.
11. Resources	The resources are all the supporting information required to be able to perform the tasks in the mission. These can take the form of case studies, further stories, fact sheets or coaching content.
12. Feedback	<p>Feedback is essential as it allows the learner to index their cases into memory. The three approaches to feedback that Schank proposes are:</p> <ul style="list-style-type: none"> ▪ Feedback about the consequence of actions – the learner sees the impact of negative actions and learns from them ▪ Feedback through coaching – an expert supports learners and provides feedback and support ▪ Feedback through exemplar and case study – learners can read other cases and stories which relate to success in learning

Examples of a learning-by-doing approach

Epic has produced a major piece of learning for a global auditing company. The approach taken is firmly grounded in a learning-by-doing approach. Learners are presented with a number of scenarios in which goals must be accomplished. Each goal is based on a case and set of questions. Learners must respond correctly in order to be able to move to the next goal in the scenario.

Where learners are unable to complete a question set correctly, they are signposted to a range of supporting resources, ranging from coaching sections to hint sheets and background information.

Where learners are already competent they can demonstrate this competent performance by finishing the scenario without any recourse to the supporting resources. In effect the scenario acts as both diagnostic and assessment, saving wasted time on non-relevant learning.

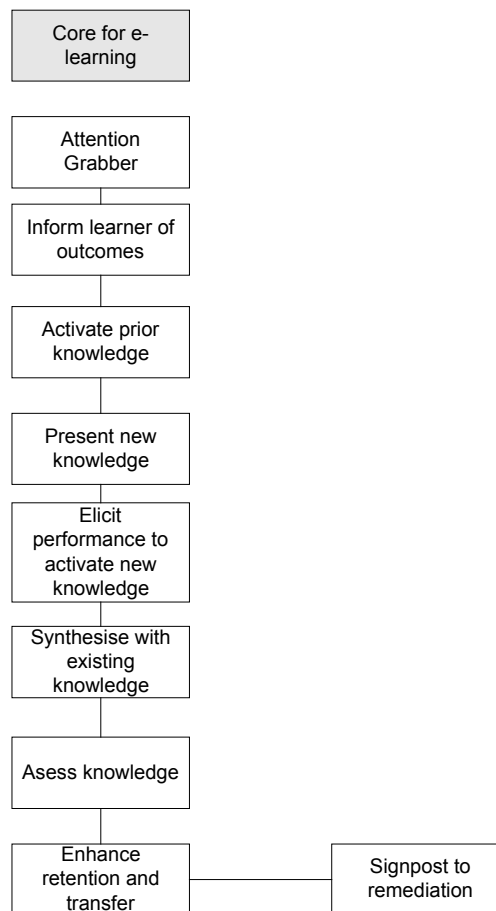
Scenarios, goals and tasks have been carefully researched to emulate as closely as possible the working style and patterns of the target audience. A sophisticated messaging system is used to introduce realism into tasks, including information, unexpected events and re-adjustments of the scenario to stretch the learner.

In an award-winning programme developed for the public sector, Epic produced a video simulation which exemplifies the learning-by-doing approach. Learners conduct interviews with clients some of whom are potentially defrauding the state. Learners repeat the scenario until it is successfully completed. This approach (a mix of Cognitivism and Constructivism) allows learners to build appropriate response sets to given scenarios. The feedback learners receive is the lynchpin of the learning model. Where learners perform poorly, scenarios come to a premature halt. Remedial feedback is given with either signposting to tutorial content or an opportunity to revisit the scenario.

Gagné's Nine Steps of Instruction (Cognitive/Behavioural approach)

This is one of the most commonly used instructional models in e-learning. Robert Gagné's work dates from the 1960s but is still widely used and supported in the learning industry. His model derives from the cognitive and behavioural schools of theory, and the elements for activities he proposes can be combined to create any type of training. It applies particularly well to most types of e-learning, including induction, procedural knowledge, technical knowledge, softskills and product knowledge.

Gagné's model presents practical elements which can be ordered to create effective e-learning.



A typical flow for learning based on Gagné’s Nine Steps.

Step	Activity
1. Gain attention	<p>Devices are used to stimulate interest. In e-learning, these might include an animated sequence or video, a question or game, presenting a problem or telling a story. These devices are crucial because they allow users to make an emotional connection with the learning experience prior to encountering any new knowledge.</p> <p>Process example for gaining attention</p> <p>In a programme on high-performance coaching for an FMCG, Epic’s design team worked with their client to create an engaging learning sequence. The team developed a series of myth busters as devices to gain attention. These challenged preconceptions about both the change programme and the e-learning and enabled users to tune into key issues around the content.</p> <p>Softskills learning example for gaining attention</p> <p>For a high profile leadership programme aimed at senior civil servants, Epic designed a menu page that mirrored the users’ desktop. Rather than a dry and linear list of topics, the menu comprised a number of items such as scraps of paper, notes, news articles which emulated an in-tray to grab their attention.</p>
2. Inform the learner of the objectives and outcomes of the learning	<p>An important step in learning is building a mental representation of the pathway through the knowledge that you will take. Often objectives are presented in a dry and off-putting way. Signposting to key learning points using accessible language (statements or questions and answers) is a much less intimidating format that the traditional ‘by the end of this session you will be able to...’ format of many training events.</p> <p>Product knowledge example for informing learners about objectives and outcomes</p> <p>We have worked with many clients to find alternative ways of presenting objectives in learning. In a programme for a healthcare provider, we developed a simple interactive screen in which a graphical representation of the key content map was brought to life as a clickable graphic displaying the detailed learning points for each area. This visual metaphor was commonly used in the business’s briefings to show linkages between key concepts.</p>

A typical flow based on Gagné's Nine Steps (cont.)

Step	Activity
3. Stimulate recall of prior knowledge	<p>People tend to build layers of knowledge and make connections between new knowledge and existing knowledge. Recalling knowledge (whether it's from a previous chunk of training or prior experience) is a valuable way of creating openness to the presentation of new knowledge.</p> <p>Process example for recalling prior knowledge</p> <p>Activating prior knowledge can be done very effectively through the use of short anecdote. In a programme on high performance coaching, Epic used short anecdotes to engage learners to reflect on and document parallels within their own experience. This technique has proved effective to connect learner's experience with the subject matter to be presented. It also allows them to make an emotional connection between their own experiences and the subject matter they are learning.</p>
4. Present material	<p>The information or new knowledge is presented using the full range of strategies and tasks available (e.g. visual, auditory, kinaesthetic engagement.)</p>
5. Provide guidance for learning	<p>Throughout the learning sequence there should be clear instruction about how to tackle the content most appropriately.</p> <p>Technical knowledge example for providing learning guidance</p> <p>One great strength of e-learning is the possibility of interweaving guidance with content. In a major programme for a global audit and consultancy firm, we developed a model which was based on a powerful narrative thread. Interwoven in the content are many different forms of advice and guidance in the form of hints; coaching sequences; audio notes; detailed manuals; FAQs etc.</p>

A typical flow based on Gagné's Nine Steps (cont.)

Step	Activity
6. Elicit performance	<p data-bbox="614 311 1310 371">Use the knowledge or skills in practice through tasks or activities.</p> <p data-bbox="614 434 1251 495">Systems and procedural skills example for eliciting performance</p> <p data-bbox="614 530 1321 875">In our simulation training designed to train frontline customer service staff to add more value to business customers and increase cross-selling, learners were given the opportunity to practise their interviewing skills. We did this through high impact video and audio branching scenarios which allowed learners to try out different responses in a risk-free environment. Appropriate behaviours were, however, reinforced by introducing a gaming element. Where inappropriate responses were given, learners were thrown out of the simulation with strong feedback messages.</p>
7. Provide feedback	<p data-bbox="614 918 1254 1010">Guidance is given to show if performance has been effective, to signpost to remedial activities and to reward good performance.</p> <p data-bbox="614 1048 1297 1108">Systems, soft and process skills example for providing feedback</p> <p data-bbox="614 1144 1326 1489">Epic developed a short sales training simulation for a high street bank to help front-line staff integrate systems skills with customer service and sales skills. These scenarios were light hearted in tone and offered as closure for the systems training. Learners could explore different branches of responses to give to clients in a variety of service scenarios, over four stages. At the end of each scenario they were given explicit scores and feedback relating to their performance at each of four stages. As a consequence they were able to retry the scenario and modify their responses accordingly.</p>

A typical flow based on Gagné’s Nine Steps (cont.)

Step	Activity
8. Assess performance	<p>Measurement of performance is a complex issue. E-learning is very good for measuring reaction to learning and early retention of knowledge. Organisations are rarely geared to measure longer term retention, performance improvement and impact on the bottom line (Kirkpatrick levels 3 and 4). The resources required to measure at these levels and the difficulty of attributing change to the single factor of training make the value of the data collection questionable.</p> <p>Process skills examples for eliciting performance</p> <p>For a major telecoms supplier, Epic has developed a programme on competition law. All users must pass the final test, however, this test is primarily about retention of knowledge relating to law and business process. It is more of a challenge to demonstrate competent application of knowledge using the Gagné model.</p> <p>For another company in the same sector, we have developed a programme focused on the development and application of technical and procedural knowledge. Learners are given the opportunity to apply their knowledge through scenarios which model real activity. Success is measured through how effectively data-based decisions are taken. The activity also allows learners to apply knowledge in a risk-free environment.</p> <p>Induction example for eliciting performance</p> <p>In a programme for a major FMCG food manufacturer Epic developed a series of simple end-of-topic games. These were used to enable recall of key brands and values in the organisation.</p>

A typical flow based on Gagné's Nine Steps (cont.)

Step	Activity
9. Enhance retention and transfer	<p data-bbox="616 311 1310 405">Show parallel applications of the content; give opportunities to try it out. Summarise the content that has been presented.</p> <p data-bbox="616 443 1326 472">Softskills example for enhancing retention and transfer</p> <p data-bbox="616 506 1326 819">For a well known training company, we developed richly interactive video-based e-learning, primarily focusing on softskills. The programme had a number of 'pause for thought' moments built in, at which learners were encouraged to reflect on their practice, behaviours and attitudes. At the end of each module, learners were also invited to document their actions from the learning. They planned what approaches, changes in behaviour and tools they would take to real world situations they would be dealing with in their workplace.</p>

Epic's Learn and Apply model

Epic's own instructional model builds on Cognitive and Constructivist approaches. In simple terms it provides a flexible method for developing content which allows knowledge and skills to be developed and applied through realistic tasks.

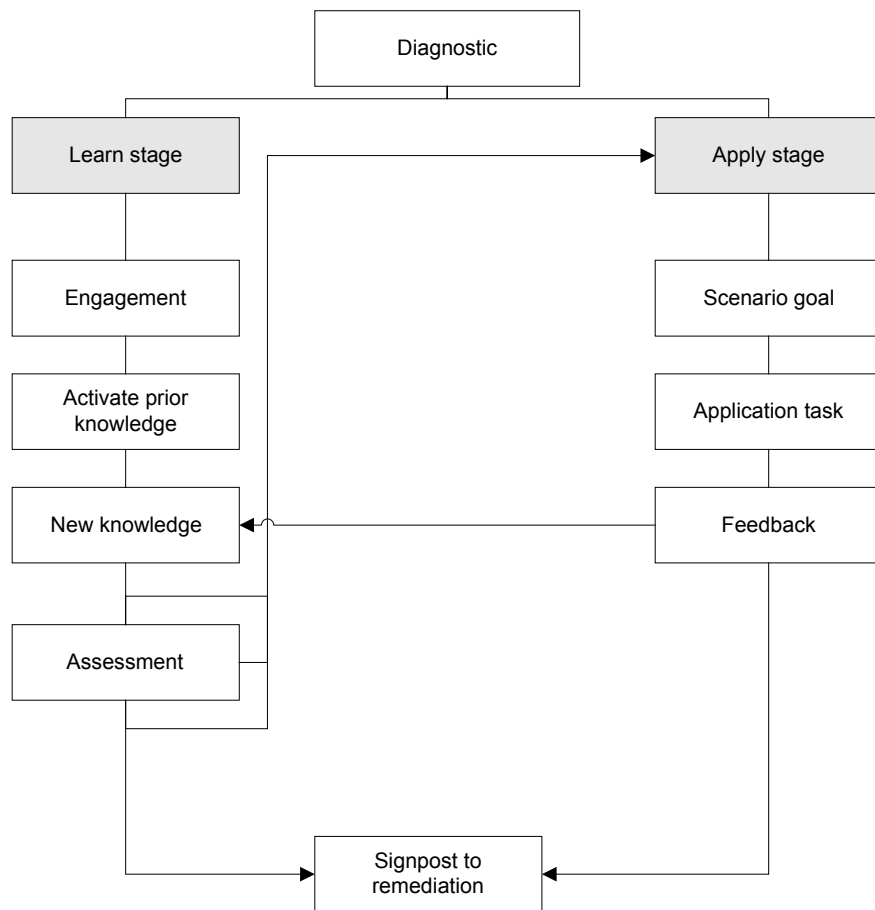
The two stages of Epic's model are **Learn** and **Apply**. The **Learn** stage is about building knowledge, skills and understanding through theory, example and modelling in order to be able to perform a task (see table).

Learn stage	Activities
Diagnostic (optional but recommended)	This stage allows learners to: <ul style="list-style-type: none"> ▪ prioritise learning ▪ bypass content in which they are already competent It also creates benchmarking data for the evaluation of learning effectiveness.
Pre-instructional activities	This stage: <ul style="list-style-type: none"> ▪ gains the learner's attention ▪ creates emotional engagement with the content ▪ activates prior knowledge ▪ signposts the content which is to be presented
Knowledge and skills development	This stage: <ul style="list-style-type: none"> ▪ builds core knowledge and skills through presentation, elaboration and exemplification ▪ uses real world scenarios and case studies to connect knowledge and skills with the performance required
Assessment of learning	This stage requires the user to demonstrate their understanding and initial retention of knowledge. Summative assessment is used in the form of: <ul style="list-style-type: none"> ▪ simple knowledge retention tasks (quizzes) ▪ knowledge discrimination ▪ application of knowledge to task or scenario ▪ application of knowledge to a case ▪ analysis or synthesis of information relating to knowledge and skills development
Follow up and remediation	The final stage: <ul style="list-style-type: none"> ▪ reinforces knowledge and skills ▪ signposts further learning opportunities ▪ indicates pathways to be taken for remediation

The **apply** stage of the learning is about putting into use the skills that have been the goal for the learning.

The stages of the application phase of the model are as follows:

Apply stage	Focus
Diagnostic	This stage: <ul style="list-style-type: none"> ▪ allows learners to prioritise learning ▪ allows learners to bypass content in which they are already competent ▪ creates benchmarking data for the evaluation of the effectiveness of learning
Pre-instructional activities	These activities are used to: <ul style="list-style-type: none"> ▪ gain the learner’s attention ▪ create emotional engagement with the content ▪ set goals and expectations for the task
Learning through application	This stage allows the application of knowledge and skills through the completion of tasks. It can be either assessed or non-assessed. Learning through application can take the form of: <ul style="list-style-type: none"> ▪ Making connections between the knowledge and skills development and case studies ▪ Making connections between personal experience and knowledge and skills development ▪ Carrying out specified activities relating to prescribed knowledge and skills to meet learning goals through a case study or scenario ▪ Answering questions about a case study or scenario ▪ Synthesising or analysing information given in a case study or scenario
Knowledge and skills development	If, through the completion of the learning through application phase, the learner requires remedial learning, they are signposted to content in the Knowledge stage.
Follow up and remediation	The final stage: <ul style="list-style-type: none"> ▪ Consolidates information the user has been given ▪ Signposts to further learning opportunities (on- or offline) ▪ Indicates pathways to be taken if content is not well understood



Typical structure of a knowledge / application model

Example uses of Epic’s Knowledge/Application Model

Epic has produced a number of programmes using the Knowledge / Application model.

For a major high street bank, Epic applied this model to a large-scale blended leadership programme. Learners were able to use e-learning as part of a wider, personalised programme to develop leadership skills. The e-learning content was based on a number of well-known management theories. Learners managed themselves the order in which they completed content, either undertaking the knowledge development first, or attempting the application tasks first and then

subsequently being signposted back to the underpinning knowledge.

The first stage of any learning was either a diagnostic or self-reflection piece to create engagement, make emotional connections with the content and to build on prior knowledge. Learners then moved on to key knowledge and skills development, introduced through scenarios, case-studies and theories

Having completed the underpinning 'learn' stage of the programme, learners moved into the apply stage where the knowledge and skills were tried out through scenario or case-study-based tasks.

A follow-up section signposted learners to remedial activities (including reference to online support and managers) or to supporting resources in the form of web links, articles or further learning objects.

For a multinational FMCG company, Epic has used a similar model to develop category management skills. Learners undertake an initial diagnostic which helps them identify a core learning pathway. Depending on their knowledge, experience and preferences for learning, they can then chose to follow an initial knowledge development approach or dive straight into an Apply section.

The result is rich set of learning opportunities connected directly to the job performance required. The application topics are intimately connected to the tasks job-holders do on a day to day basis and allows them to perform these in a safe environment.

Learners can choose whether they go directly to the Apply sections or work systematically through the Learn content. As the material is technically complex, this model provides a highly supported route for less experienced learners. Scenarios are used to bring the technical content to life.

In the Apply section, rich case-based learning emulates the real world end to end tasks that learners perform in their everyday role. The result is enhanced retention and transfer and an invaluable performance support resource into which learners can dip when they need.

Final thoughts

In this paper, we have reviewed why it is essential to apply learning design to the creation of learning. Without instructional frameworks, developing effective learning can become a hit and miss affair. Applying the five principles of 'good learning' is an excellent starting point. Effective learning is most often created when learners:

- solve real world problems
- activate their prior knowledge as a pre-cursor to undertaking new learning
- take on board new knowledge through demonstration and worked examples
- try out new learning by applying it
- integrate the learning into the learner's own world of experience

Learning design theories are generally divided into three broad areas: Behavioural, Cognitive and Constructivist approaches. Each of these has a place in the training curriculum, depending on the subject matter treated. However, Behavioural approaches tend to be valid only for a narrow set of learning needs.

The key is analysing the performance need, content and target audience. Only with a clear knowledge of these can you select and apply the appropriate instructional framework.

When investing in training, you want to maximise the chances of success for learners to improve their performance. While this is in the hands of a number of factors, some of which you may not be able to control (including personal motivations and aptitudes, environment, support and resources) getting the instructional approach right remains a critical factor for performance improvement. It can make the difference between learning which is poorly understood and quickly

forgotten and learning which makes a significant impact on the individual and the organisation.

At Epic, we have focused on two well received and documented learning approaches (Gagné and Schank) and in good learning fashion, synthesised them to create our own Learn/Apply model. Different content requires different approaches. We believe there is a role in learning for all three, but where the content level is suitable, the Epic model can be a major contributor to creating dynamic, learner-centred training which leads to successful learning. And if you are going to invest in a new programme, that has to be a win.

A closing thought. If we set such store by learning design, why does it remain a relatively unrecognised skill in the industry? The reality is that few training courses exist in the UK for this skillset, and even fewer focused on e-learning. But these skills are critical in getting a successful outcome for your investment in training. If you are commissioning e-learning or evaluating it, why not ask your suppliers about their credentials in learning design? Their response should play a significant part in your decision-making.

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