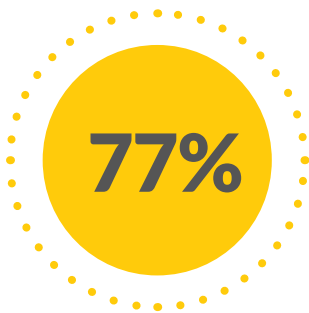


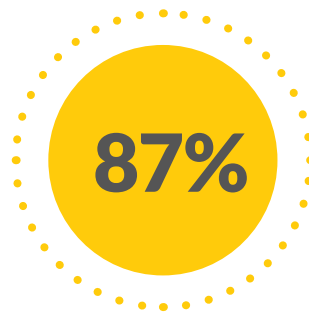
Role of **Cognitive Science** in Designing **Modern Workplace Learning**



These are some stats on modern workplace learning and employee engagement:



77% of L&D experts believe that personalized training is necessary for employee engagement.



Gallup research found that globally 87% of employees are not engaged at work.

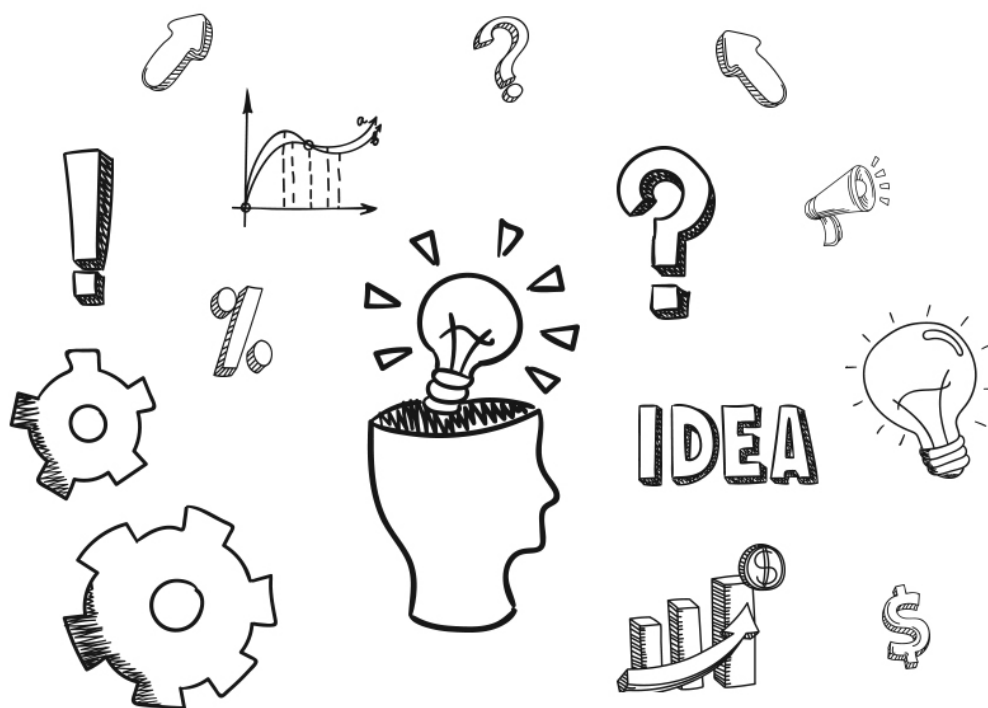


According to Deloitte's research on the modern learner, an average employee can only devote 1 percent of their work week to professional development. In a 40-hour work week, that's only 24 minutes a week or 4.8 minutes a day.

That final statistic is a worrying fact. With less than 30 minutes to dedicate on focused learning at the workplace; how can L&D teams ensure that those 30 minutes offer the best training possible? In this eBook we look at how cognitive science can be used to create eLearning course content that engages learners and fosters organizational development.

A QUICK INTRODUCTION TO COGNITIVE SCIENCE

A simple definition of Cognitive Science is – “The scientific study of the mind and its processes.” This is different from Psychology in the aspect that Cognitive Science focuses on the computations that enable the brain to work. Unlike Neuroscience that is focused more on the structure of the brain and its evolutionary history; Cognitive Science focuses on how the brain processes information.



A longer definition of [Cognitive Science](#) as explained by the Massachusetts Institute of Technology’s Department of Brain and Cognitive Sciences read as follows – **“Cognitive science is the scientific study of the human mind. It is a highly interdisciplinary field, combining ideas and methods from psychology, computer science, linguistics, philosophy, and neuroscience. The broad goal of cognitive science is to characterize the nature of human knowledge – its forms and content – and how that knowledge is used, processed, and acquired.”**

COGNITIVE SCIENCE IN LEARNING

[Daniel Willingham](#) is a highly respected cognitive scientist who studied at Harvard. He wrote an interestingly titled book - ***“Why Don’t Students Like School?”*** The book offers some interesting insights into the principles of learning and teaching. The author lists down nine principles and explains them. We are citing seven principles here that are associated with learning.

- 1 Factual knowledge precedes skill.
- 2 Memory is the residue of thought.
- 3 We understand new things in the context of what we already know.
- 4 Proficiency requires practice.
- 5 Cognition is fundamentally different early and late in training.
- 6 People are more alike than different in how we learn.
- 7 Intelligence can be changed through sustained hard work.

On analyzing the principles stated above we learn more about the fascinating process of learning. Learning is not just memorizing stuff from books and writing exams. Learning has multiple facets influencing it – the learner, the subject matter, the teacher, the learning delivery medium, and the need for the learner to acquire learning or a new skill. So how can we use the principles of cognitive science outside the school or university classroom and create effective workplace learning? We examine the topic in detail in the subsequent paragraphs.

THE LINK BETWEEN SOCIAL COGNITIVE THEORY AND WORKPLACE LEARNING

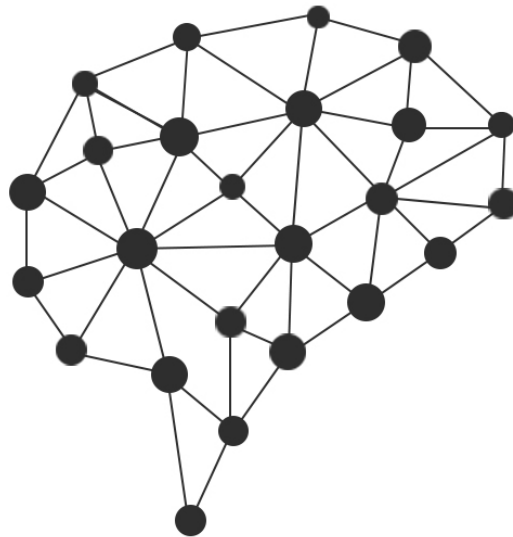
Social Cognitive Theory is a learning theory that examines the links between thoughts, emotions, and feelings and the actual process of learning. There is a growing focus on applying this theory in schools to help young students learn better. The theory is also increasingly being used in corporate learning to offer employees a better learning experience. The focus is on how each individual learns and reacts to specific topics. Do learners react the same way to a specific subject or topic when learning alone or learning in a group? Over the years psychologists and learning scientists have sought to find answers to this pressing question and determine an ideal path to create and deploy learning that interests learners both as individuals and a group.



Why do you think that the same training program that a group of employees attended creates a different impact on each learner? One learner may find the training program useful and engaging while another learner may find it to be boring and pointless.

MAPPING INTELLIGENCE AND THE ABILITY TO LEARN

An early study in mapping efficiency of learning and learner intelligence was done in Paris in the early 1900s by Alfred Binet and Henri Simon. They wanted to develop a framework to which could identify students who were expected to be better learners from students who were expected to be slower learners. They went on to develop the first intelligence test which consisted of a wide variety of questions that included the ability to name objects, define words, draw pictures, complete sentences, compare items, and construct sentences. Robert Sternberg a famous psychologist proposed the idea of multiple intelligences and stated that ***“People may display more or less analytical intelligence, creative intelligence, and practical intelligence.”*** In a research study published by Tarasova, Volf, & Razoumnikova, in 2010, an interesting theory



was proposed. ***“The brain areas that are associated with convergent thinking, thinking that is directed toward finding the correct answer to a given problem, are different from those associated with divergent thinking, the ability to generate many different ideas for or solutions to a single problem.”*** Hence it is evident that different people learn differently and there is no defined formula to state how one person can learn better than another. To read in detail on this topic [visit this webpage](#).

SELF-BELIEF AND LEARNING

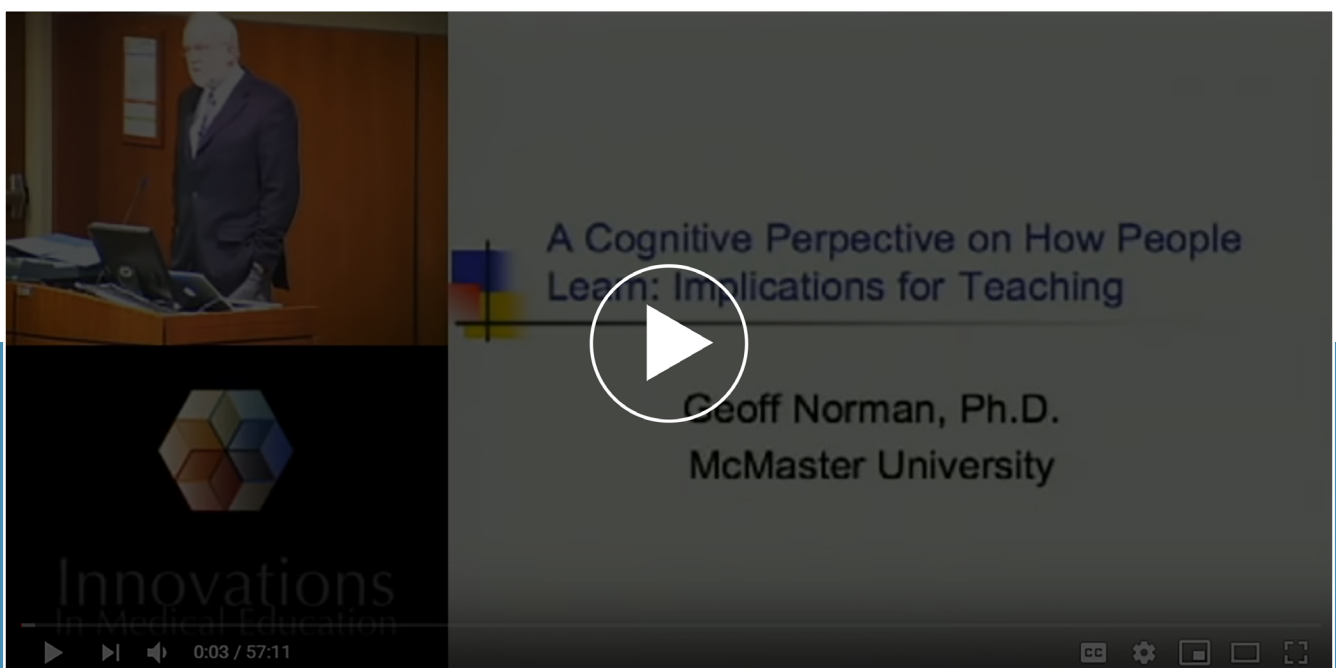
“Self-belief” or **“Self-efficacy”** is an integral part of social cognitive theory. If the employee or the learner believes that he/she can learn a new skill and work better; then this idea manifests in the learner’s thought process. This mindset allows the learner to complete the learning program successfully and acquire new skills. In a way, this is a manifestation of the power of positive thinking and taps into the innate curiosity of the human mind to learn something new and prosper. This is the challenge that cognitive science aims to solve. To offer ideas and a framework to create learning solutions that can help learners. Ideally, any learning program or training content should allow the learner to:

- Focus attention on the core learning topic
- Minimize cognitive load and learn without any strain
- Recollect existing knowledge, relate to new training, and learn new concepts
- Retrieve new knowledge when required and apply it to solve problems

It is important that the person who designs the eLearning training content is fully aware of the actual requirements of the learners and their skills. By knowing what exactly the learner wants and having a clear idea of the learning outcomes or goals, the learning experience designer creates a learning program that is of value and engages the learners. Saga Briggs makes some interesting points in this [article published on the Open Colleges website](#). Quoting her article below:

“Research suggests that academic performance in general is related to one’s perceived self-efficacy. Taylor, Locke, Lee, and Gist (1984) demonstrated that academic staff members with higher self-efficacy produced more scientific material. Tuckman and Sexton (1992) suggest that students with higher self-efficacy are better at searching for new solutions and are more persistent at working on difficult tasks, whereas people with low self-efficacy give up more easily when dealing with difficult tasks and cannot concentrate on tasks as well.”

The whole process of learning and the way people approach the task of learning new skills is fascinating. Learning and understanding learning is strongly influenced by the learner's need to learn and excel. If we can understand what we are learning in terms of pre-existing knowledge, better learning, and retention, it results in efficient transfer of new knowledge. Learning can be defined as the transfer of knowledge from a source to a destination – or from a teacher to a student. Learning stagnates when it's not applied. We sharpen our skills and knowledge when we practice what we have learnt. These are just some of the thoughts explored in [this video](#) featuring Geoff Norman Ph.D. from McMaster University on a cognitive perspective on how people learn.

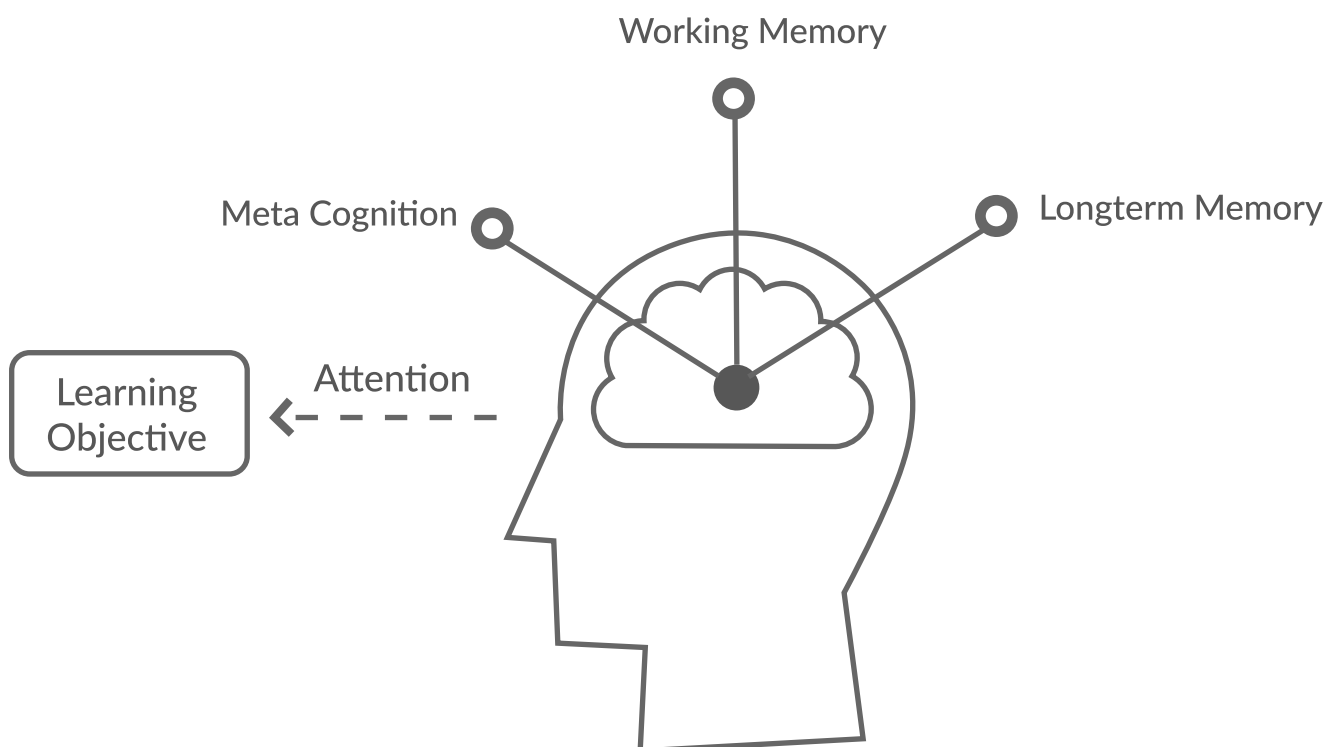


COGNITIVE PROCESSES INVOLVED IN LEARNING

[Cognitive science research](#) overwhelmingly proves that engaging active recall, fostering metacognition, and spaced repetition can drastically improve your L&D effectiveness.

R.C. Clark in his classic book “*Building Expertise: Cognitive methods for training and performance improvement*” lists some key processes involved in learning:

- Attention
- Rehearsal in working memory
- Retrieval from long-term memory
- Metacognitive monitoring



To put this in the context of eLearning Design, a learning experience designer uses animation or cites a story at the beginning of the program to grab the attention of the learner. Then a basic assessment is used to test the learner's knowledge on the topic. Anecdotes and information are shared via videos or interactive elements to retrieve information from the learner's mind. By spaced repetition and using visual cues, the core concepts are thrust upon the learner, and metacognition serves as the operating mechanism for learning.

DESIGNING ENGAGING WORKPLACE LEARNING

Either by design or without realizing it we create eLearning influenced by cognitive science. Cognitive science gives us tips to create learning that leaves an impact on the learners' minds. What is the purpose of any workplace learning program? The employee on completion of the program learns a new skill or enhances/updates his existing skills in sync with the latest trends in the subject topic. Ideally, the employee should be able to apply these skills to the tasks assigned to him/her and work with greater efficiency to get work done faster and better. This remains the core purpose of workplace learning. To create a learning environment and culture that fosters employee and organizational growth in a positive manner.

A FRAMEWORK TO DETERMINE LEARNER REQUIREMENTS

Every learning experience designer insists on having clarity on learning outcomes and learner goals. It is based on this crucial data and the analysis of the target or learner audience that the eLearning course design is initiated. Each eLearning organization has its own set of questions or training needs analysis that is offered to the client to fill and help the instructional designers get clarity when working on the storyboard. In this section, we list down some questions that you can use as a basic framework to determine learner requirements.

List of Questions

- Who is going to take up the eLearning program?
- What is the core purpose of the program?
- What are three key takeaways and learning objectives of the program?
- What is the budget and key delivery date? (This is more from an operational perspective and to ensure that the designers don't go overboard with their visualizations)
- Are the learners already aware of the subject of the program?
- Will the program be offered as customized individual learning programs?
- Will the program be offered as a generic training workshop to a group of diverse learners?
- How will the eLearning program be deployed?
- What benefits does the organization expect from its employees once they complete the program?
- Do you have a system in place to collect and integrate learner feedback?

A FRAMEWORK TO DETERMINE LEARNER REQUIREMENTS

An ideal workplace learning program places the learners or employees at the center of the learning cosystem. Once the relevant programs are assigned to the learners; the system be it an LXP or LMS should offer a customized, unique, and personalized learning experience to the learners. Here's how to go about it!

Adaptive and Personalized Lessons:

Each learner or employee is unique. They may work with the same designation and may have similar years of work experience. But their learning profiles

are different. Hence it is important to create a customized, adaptive learning path that is tuned to the intelligence of the learner. To explain this in a simple manner, learning should be structured like an adaptive GMAT test that becomes harder or easier with each successive question based on the student's right or wrong answer to the preceding question. Adaptive and instant feedback with learning nudges makes workplace learning and training effective and helpful.

The Audio-Visual Learning Experience:

L&D research has proven that workplace learning solutions that blend videos within the learning framework with a definite purpose; score higher than plain slide-based, text-heavy eLearning programs. In recent years, podcasts have grown in popularity and are an incredible source of information. See if your eLearning program can benefit from links to relevant podcasts and integrate them accordingly. Videos be it animated or featuring real people and scenarios can play a key role in disseminating knowledge.

Gamification:

Here are some stats from [Talent LMS's 2019 Gamification at Work Survey](#):

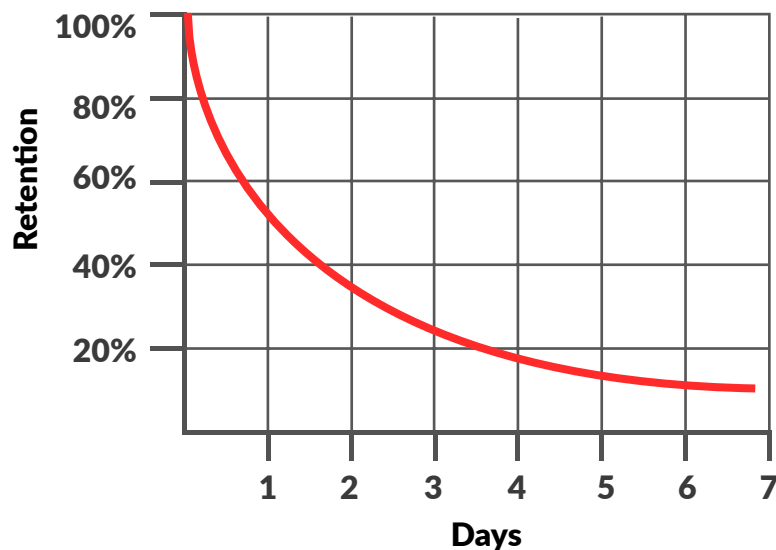
- 89% believe they'd be more productive if their work was more gamified.
- 83% of those who receive gamified training feel motivated, while 61% of those who receive non-gamified training feel bored and unproductive.
- 33% would like more game-like features in their employee training software.

Unsurprisingly, the use of interactive elements and [learning objectives-based games](#) continues to be a significant element of workplace learning design. Use games that genuinely add value to the learning and do not use them as place-holders or just for the sake of compliance.

Learning Nuggets and Spaced Learning:

The Ebbinghaus' Forgetting Curve is one of the most important discoveries linked to memory and learning. The forgetting curve shows how a memory of new information decays in the brain, with the fastest drop occurring after 20 minutes and the curve leveling off after a day. To quote Ebbinghaus ***"Left to itself every mental content gradually loses its capacity for being revived, or at least suffers loss in this regard under the influence of time."***

The Ebbinghaus' Forgetting Curve



In this [detailed post on the much-loved Farnam Street Blog](#) – we learn how the spacing effect or spaced learning plays a key role in learning.

Microlearning, bite-sized learning, or learning nuggets – whatever name you choose to use, it is a proven fact that the attention deficit challenge can be addressed by using small learning chunks that are deployed at regular intervals. Spaced learning improves retention of learning and also improves the course completion rate.

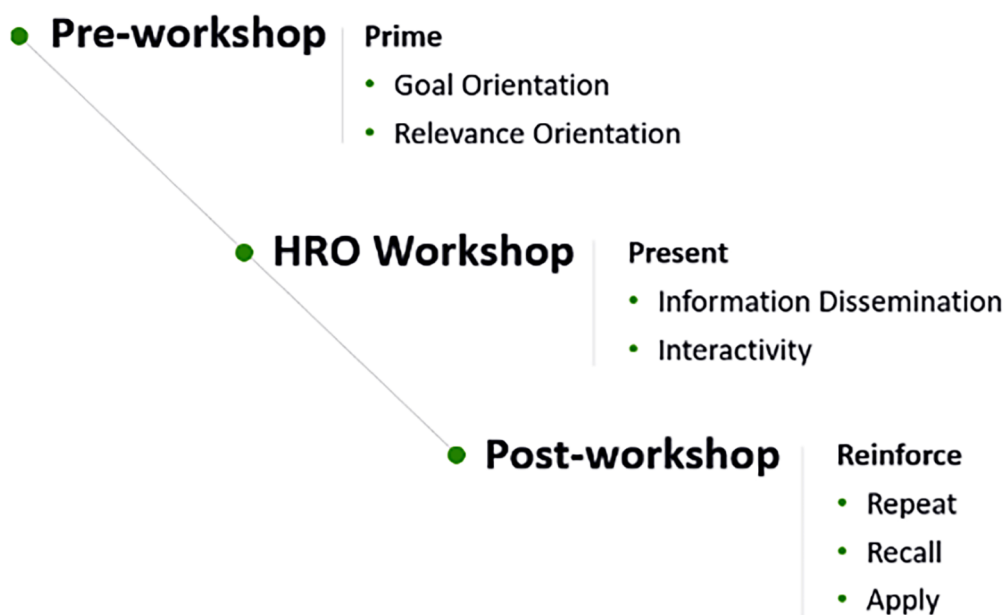
UX or Learner Experience

The user experience or in this case the learner experience is an integral part of modern workplace learning. People do not just want to click 'Next' and complete the course in a hurry. They want a memorable learning experience that they can cherish. A [Gartner study](#) states that “By 2022, 70% of white-collar workers will interact with conversational platforms on a daily basis.”

Be it by [using chatbots to motivate the learner](#) to start the next module, or on-screen or mobile-based notifications and reminders, everyone cares for a better design and enhanced learning journey. So do focus on the learner experience and create a memorable workplace learning program. Hence we observe that cognitive science can play an important role in the design of modern workplace learning.

CASE STUDY

Here's an example of a project where Origin designed an eLearning program based on principles of cognitive science. A leading healthcare consulting group that helped hospital chains implement a High Reliability organization (HRO) framework wanted to deploy a new training plan. The client wanted to integrate an existing two-day HRO workshop into new training plan and institutionalize change effectively. Origin recommended the following structure that focuses on spaced learning and recall of information with clear objectives.



The orientation program that laid out the key objectives was followed by the existing two-day HRO Workshop. Feedback was collected using a survey form. The post-workshop learning was an interesting project. This involved the delivery of microlearning modules over a six-month period with one topic every week from a pool of 25 HRO topics. Four different components were developed for each HRO topic and rolled out in this order:

1. Day – 1 High Reliability Concept
2. Day – 2 Expert Video

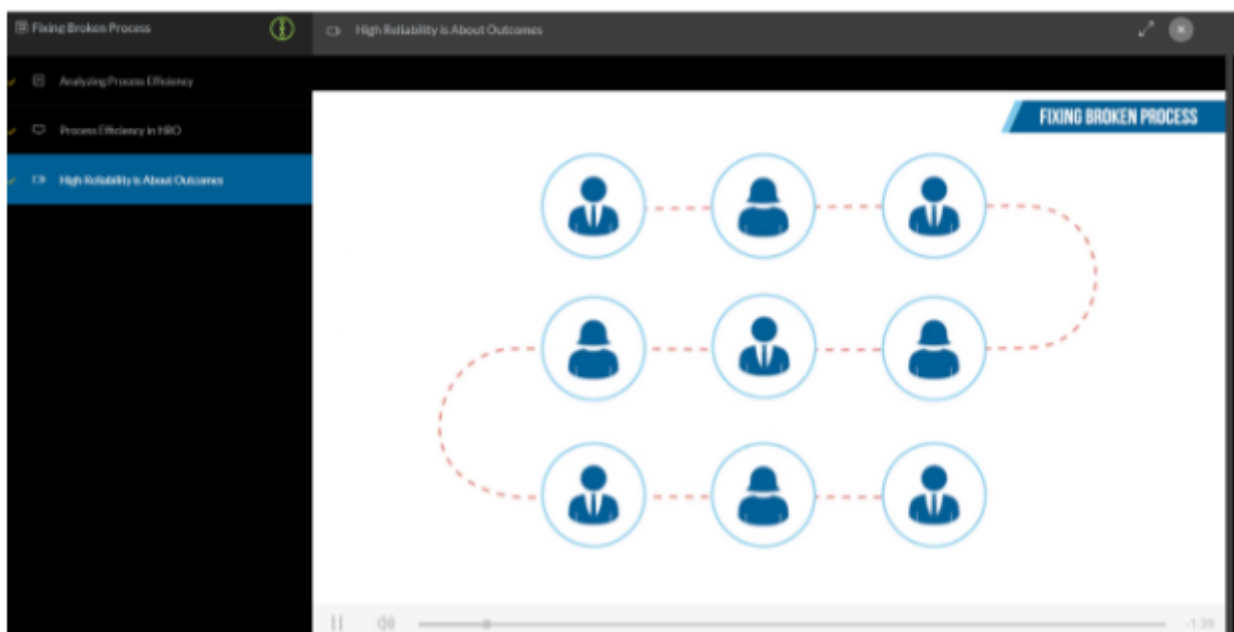
3. Day – 3 Check Your Understanding

4. Day – 5 Retrospect



Some screenshots from the training program:

HRO Concept Explainer Animated Video



Expert View Video Provided by the Client



Scenario-Based Assessments



Which characteristics of an HRO does this best illustrate?
(Select all that apply.)

☒ Preoccupation with failure
 ☐ Commitment to resilience
 ☐ Sensitivity to operations
 ☒ Deference to expertise
 ☐ Reluctance to simplify

This activity is complete.
Thanks for participating!

← PREV

Retrospect to Reinforce Learning

High Reliability: The Path to Zero...

Path to Zero Errors
 Promise of High Reliability
 High Reliability During a Crisis
 HRO Characteristics

Review the safety practices at your hospital and rate your organization on a scale of 1-5 (Low - High) for the following HRO characteristics.

Preoccupation with failure *

1 2 3 4 5

Low ☐ ☐ ☐ ☐ ☐ High

Commitment to resilience *

1 2 3 4 5

Low ☐ ☐ ☐ ☐ ☐ High

Sensitivity to operations *

1 2 3 4 5

Low ☐ ☐ ☐ ☐ ☐ High

Deference to expertise *

1 2 3 4 5

Low ☐ ☐ ☐ ☐ ☐ High

The project was a big success and the client was able to standardize their training plans. They reported savings in training costs and were able to onboard more hospitals with the new training.

CONCLUSION

We hope that you found this eBook on “*Using Cognitive Science to Design Engaging Workplace Learning*” useful. Cognitive Science has evolved tremendously in the last two decades with researchers focusing on what drives people to learn better and faster. Newer research on how learning can be simplified to standardize learning in schools and colleges opens new possibilities. We have tried to keep this eBook focused on using principles of cognitive science to design better workplace learning. Remember an organization that fosters employee learning and motivates its employees to learn will have happier employees. Happier employees with a positive frame of mind will work towards organizational goals and help the organization meet its business targets. So there is a definite correlation between happy employees, a positive learning culture, and organizational development. If you have more points to share or recommend or would like to collaborate with Origin for a customized, cognitive-science enabled eLearning program, write to info@originlearning.com.

Additional Reading and References:

- [NCBI](#)
- [Farnam Street](#)
- [Gartner](#)
- [Open Colleges](#)

Contact Us

+1 817 917 1282

info@originlearning.com

www.originlearning.com