

# LEARNING SCIENCE FOR L&D

The Facts and Figures That Matter for Your Training Program



# CONTENTS

Chapter 1: Why is Employee Training Important? The Data That Makes a Case for Learning.....	3
Chapter 2: How Should We Conduct Training?.....	9
Chapter 3: Who Should Be Involved in Training?.....	15
Chapter 4: How Can We Reinforce Training to Improve Learning Retention?.....	18
Improving Your Organization's Training Processes.....	22
Recommended Resources.....	23
Sources.....	24

When it comes to learning and development advice, there's a lot of information floating around the internet. A google query for "how to reinforce training" yields 64 million results... While "improve employee training" yields 245 million results.

With that amount of information, it can be difficult to parse through source after source to find data and strategies that will impact your organization.

To combat this information overload, we've put together everything you need to know about the science of learning in this ebook. We'll look at research on the topic and give you some analysis that hopefully you can apply to your organization in very practical ways.

Ideally, you should be able to identify a learning-related challenge in your organization, look to this ebook, and find out what the science or research says.

Because this is a research-heavy topic, we'll be linking to lots of sources – our interpretation is based off of the research conclusions, but if you feel compelled, we encourage you to check out the research for yourself to find even more insights!

Here's a summary of what we'll cover:

## **Chapter 1:** Why Is Employee Training Important? The Data That Makes a Case for Learning

We start right off by answering “why.” Why is training important? Why do you need it at your organization? We'll look at some statistics and research that make a compelling case for employee training.

## **Chapter 2:** How Should We Conduct Training?

After answering “why,” we move on to “how.” We'll take a look at which methods of training deliver the best results (according to science), how you can identify employee training needs, how you can engage your employees in learning, how you can make sure learning is retained, and of course, how you can use data to measure the success of your training program.

## **Chapter 3:** Who Should Be Involved in Training?

This is a big question organizations face, and often, program managers or HR departments of one are left feeling isolated as they endeavor to bring impactful training to the workplace. In reality, effective training requires commitment from many people. In this chapter, we'll look at how the best training programs leverage an organization's leadership, management, and training experts to deliver learning effectively.

## **Chapter 4:** How Can We Reinforce Training to Improve Learning Retention?

In this chapter, we'll look at research on memory retention and what you can do to ensure your employees' learning is retained over time and applied on the job.

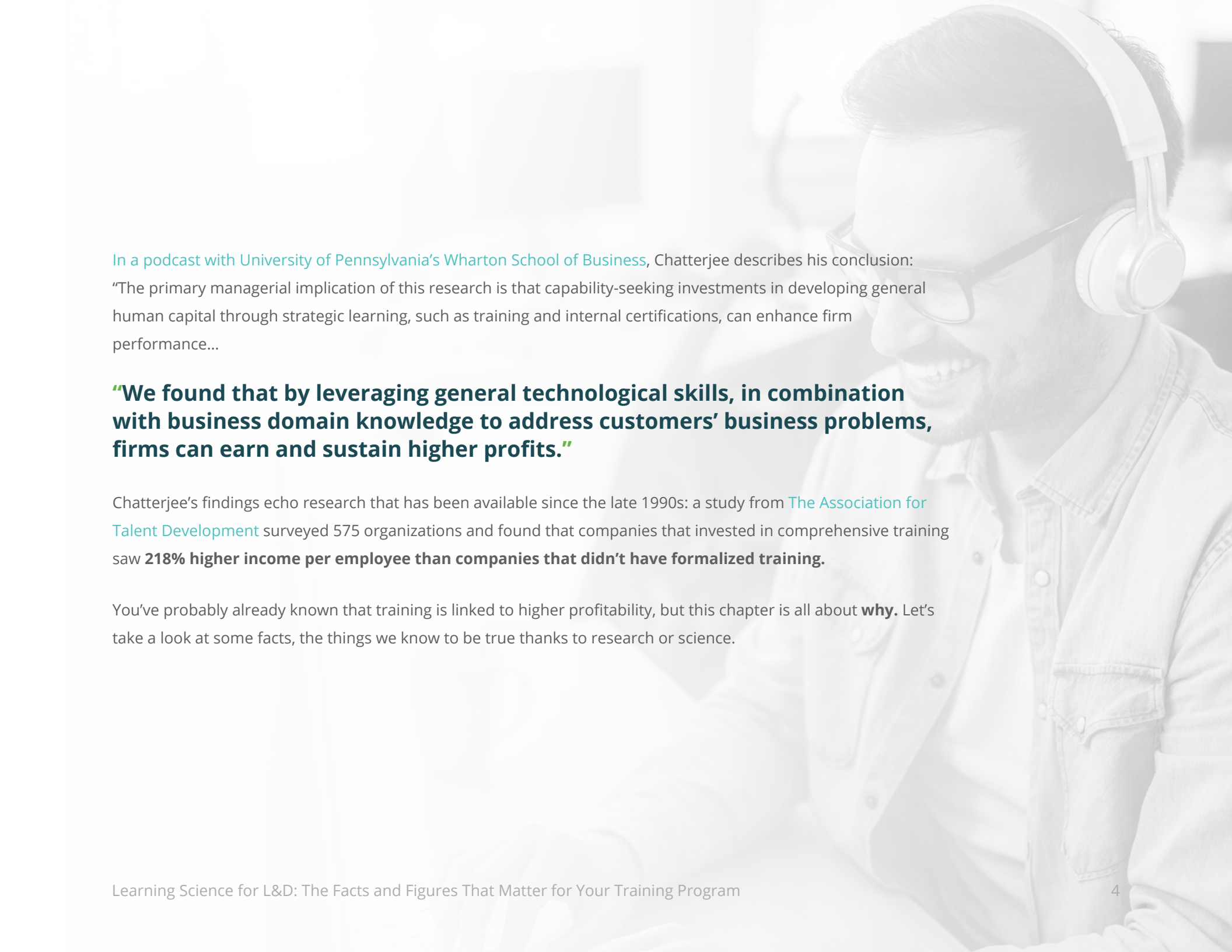
## Chapter 1: Why Is Employee Training Important? The Data That Makes a Case for Learning

If employee training is valuable to a business, it must be profitable to a business in some way. Its value is really as simple as that, and there's little need to explore benefits that aren't linked to profitability in some way.

There are several ways that employee training can increase profitability, and we'll take a look at those in more detail. But for our first stat you should remember (and freely share with your leadership team), we'll take a look at [research conducted by Joydeep Chatterjee](#), a senior fellow at the Mack Institute for Innovation Management, about employee training and profitability.

The study analyzed a leading IT company headquartered in Bangalore, India, and looked at more than 340 software projects staffed by more than 5,500 employees from 2005 to 2008.

The company decided to invest in employee training, and Chatterjee tracked the firm's growth following the investment.



In a podcast with [University of Pennsylvania's Wharton School of Business](#), Chatterjee describes his conclusion: "The primary managerial implication of this research is that capability-seeking investments in developing general human capital through strategic learning, such as training and internal certifications, can enhance firm performance..."

**"We found that by leveraging general technological skills, in combination with business domain knowledge to address customers' business problems, firms can earn and sustain higher profits."**

Chatterjee's findings echo research that has been available since the late 1990s: a study from [The Association for Talent Development](#) surveyed 575 organizations and found that companies that invested in comprehensive training saw **218% higher income per employee than companies that didn't have formalized training.**

You've probably already known that training is linked to higher profitability, but this chapter is all about **why**. Let's take a look at some facts, the things we know to be true thanks to research or science.

## Fact #1: Training Increases Employee Retention

A 2013 study in the [Global Journal of Management and Business Research](#) set out to determine the effect of training on employee retention. By analyzing variables like whether training took place, what type of training took place, and how long training lasted, the researchers looked to discover concrete information that would shed some light on the relationship between training and retention.

The information that the study gathered is important:

First, the study revealed that the duration of training affects how employees perceive its effectiveness. Don't worry too much about this **for now**. We're going to really dig into length of training and its effectiveness later, but for now, just remember that the **length of training is an important variable for determining the success of the training event**.

The second important conclusion **revealed that when employees are rewarded for undergoing training, about 70% of them agree that it increases their loyalty to an organization**.



## **Fact #2:** Employee Turnover Is Expensive

A report from the [Center for American Progress](#) performed a meta-analysis of 11 different research papers and discovered that in most cases, the cost of replacing an employee who earns \$75,000 or less is about 20% of their salary.

In practical terms, if you have 100 employees who earn an average of \$50,000, a 20% turnover rate would cost your organization \$200,000!

Retaining good employees provides instant savings, increasing your company's profitability.

## **Fact #3:** Companies with Good Sales Training Close More Deals

A study by [Hubspot](#) surveyed 287 sales professionals in business-to-business roles, hoping to identify a relationship between sales training and deals closed.

Hubspot writes:

"The survey results indicate that respondents at companies with more effective training programs have higher win rates, higher levels of job satisfaction, and faster ramp-up time for new hires."

The conclusion is straightforward, and little analysis is needed: sales training leads to more deals closed.



## **Fact #4:** Profit Is Calculated by Subtracting Expenses from Revenue

Because profit is a formula, increasing the value of variables that increase the outcome, and decreasing the value of variables that decrease the outcome, **will maximize your profits.**

Training, which science tells us decreases the costs of doing business and increases the revenue, can increase profitability when done correctly.

That leads us to the next question: **how do we increase profitability through training?**

We'll get to that next, but first let's recap what we've learned in chapter one.

## Chapter 1 Key Takeaways

In this chapter, we wanted to discuss *why* you should be training your employees. Here are some key facts to keep in mind:

- Training is linked to profitability. Many studies agree on this, and some show that profitability increases by as much as 218% per employee in organizations with strong training programs.
- Training is proven to reduce employee turnover, which is costly – reducing the costs of turnover will improve your profitability.
- Companies with great sales training close more deals.

These takeaways are what research tells us about the benefits of training. The caveat here is that training must be effective, and that can be challenging. That's why we're going to spend the next chapter understanding what science tells us about *how* we conduct our training.

## Chapter 2: How Should We Conduct Training?

There's no shortage of opinions out there about how we should be conducting training, but what does the science tell us?

Remember when we said earlier that **duration matters** when it comes to learning effectiveness? That's true, and that's why we advocate for microlearning in many cases.

**Microlearning is training content strategically broken down into chunks.** We want to make sure that after reading this ebook, you never have to ask “why,” so we're going to go in-depth and explain why microlearning works so effectively with the human brain.

A study published in [Science of Learning by Nature Partner Journals](#) proved something that seems fairly obvious: **our brains are better at learning something new if you can link it back to something you already know.**

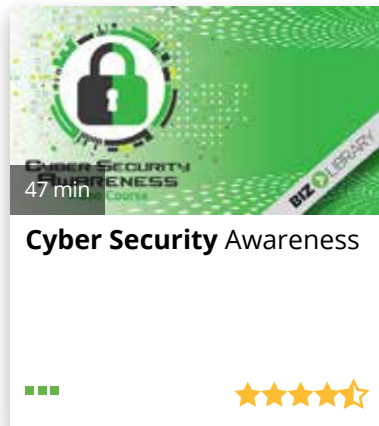
The study is a little more complex than that, but essentially it proves what neuroscientists call the AB-AC inference paradigm.

This paradigm shows that when participants learn an association between A and B, and that association is complemented between A and C, the association for both variables is strengthened.

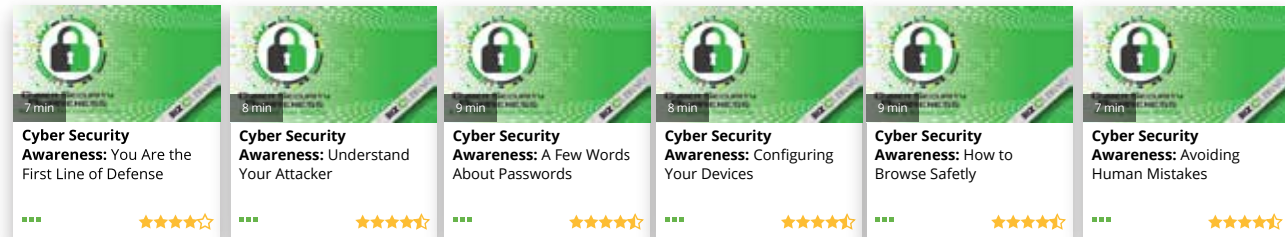
That means learners can remember, retain, and apply new knowledge better if they can see how information and specific skills are linked to something they've learned previously.

This is exactly how microlearning works: it takes a large subject, breaks it into chunks, and then builds upon each sub-topic – foundational information and skills first, then getting more specific and nuanced as the learner advances.

Take a look at this training video, from [The BizLibrary Collection](#).



As you can see, this is a 47-minute video course – hardly what we’d call microlearning. However, this course is available in separate, short videos:



As you can see here, **each video builds on the previous one**, making microlearning a great way to implement the effects of the AB-AC inference paradigm.

In addition to the AB-AC inference paradigm, there’s another keyword we’ve been using throughout this chapter: chunking.

**Chunking** is simply when larger content is broken into smaller chunks, [eLearning Industry](#) does a great job of providing a visual for chunking.

Here's an example of content that hasn't been chunked:

Geography is unique in bridging the social sciences (human geography) with the natural sciences (physical geography). Human geography concerns the understanding of the dynamics of cultures, societies and economies and physical geography concerns the understanding of the dynamics of physical landscapes and the environment.

Here's the same content, after it's been chunked:

Geography bridges social sciences with natural sciences.

- Social sciences (human geography)
  - Cultures
  - Societies
  - Economies
- Natural sciences (physical geography)
  - Landscapes
  - Environment

It's clear why chunking is helpful, and for **video-based training**, microlearning is the best way to go.

Now we want to take a minute and confess something to you, dear reader.

We **love** video-based training. In fact, we love it so much, that we have one of the world's largest, and some would say finest, [collection of training videos](#).

But science tells us -and it hurts us to say- that video training alone isn't enough. Research has shown that **delivering training through multiple modalities** is the most effective way to train.

First, a study published by the [University of Iowa](#) found that students in blended classes performed better.

The study showed convincing results:

“Greater than 95 percent of students enrolled in the blended course section earned course grades [of] C- or higher, compared with 82 percent in the large lecture sections and 81 percent in the online sections.”

Furthermore, a 2019 Training Industry study looked at learner preferences and hypothesized that teaching learners according to their preferences would lead to better training application, and improved performance from employees.

What they found was that when learners were taught [according to their preferences](#), they were much more likely to remember and apply what they learned.

The study, whose author appeared on [The BizLibrary Podcast](#), also made a fairly obvious, but easy-to-miss conclusion: when you teach through multiple modalities, **you are more likely to use a modality that aligns with a learner’s preference.**

That may be one of the reasons blended learning is so effective. Mixing classroom and online learning blends modalities, giving learners more opportunities to learn according to their preferences.

**Blended learning** should be leveraged in your organization, as most research suggests it’s the most effective way to teach a concept.

Okay, so how should we implement blended learning?

Great question!

A 2003 report from NIIT introduced three models to blended learning:

Model	Why You Would Use It	How You Should Use It - Examples
Skill-Driven Model	To learn specific skills needed for a given job. For instance, if you want to train employees how to deliver better customer service via the telephone, you would use this model to teach phone skills.	Demonstrate desired behaviors through online training, and open up discussions and simulations in face-to-face settings.
Attitude-Driven Model	This content deals with developing new attitudes and behaviors. This is commonly used for training soft skills - for instance, when you want to teach your employees how to apply their grit during tough situations.	Deliver microlearning modules that incrementally introduce concepts of a new skill, and then encourage discussion in a classroom setting to discuss these skills. Invite collaboration by assigning group projects, and even leverage your digital space by allowing discussions to carry on online.
Competency-Driven Model	To capture knowledge about a complex skill, one that is best learned through interactions with experts.	Leverage your online technology to create a knowledge repository, assign mentorships, and invite job-shadowing in your organization.

This chart is a **fantastic** place to start as you begin determining how you should deliver training.

You've made it through chapter two! Next, we're going to discuss leadership and management involvement in employee training, but first, let's review our key takeaways from chapter two.



## Chapter 2 Key Takeaways

- How to train revolves around blended learning – while we advocate for in-person and online video, any way you can blend your learning through multiple modalities is best!
- If you choose video-based learning, science tells us that microlearning is the way to go. It's the most effective form of video to boost learning retention and help employees apply training on-the-job.
- Your training strategy should be based on what you're teaching. When in doubt, feel free to refer to the chart from NIIT!



## Chapter 3: Who Should Be Involved in Training?

Building an effective training program that delivers meaningful results to an organization is not a job for one person, regardless of how big your training department is.

### Involve Managers at Every Level

A [Macrothink Institute](#) research summary dedicated a conclusion to the manager's role in training, writing:

"... line managers should adopt a focused approach towards TNA [training need analysis] and **remain fully involved in making policy decisions for training, being in line with HR.** They must accept their responsibility in this area as front liners when compared with HR managers because they are also accountable to their reports for the training and development, being immediate employee-contacts."

From this conclusion, we can take away two things: when you build a training strategy, you should involve managers, and seek their input. Secondly, managers are accountable to their reports for the training and development.

This means that at some level, managers must be actively developing their reports, having a hand in their learning. This means that ideally, **HR and L&D isn't always conducting training, but rather helping managers facilitate training, providing tools and suggestions.**

So the first "who" in "who should be involved in training" is **the manager.**



## Involve Your Organization's Leaders

The importance of leadership buy-in is well-known throughout L&D circles, but the science on it is hard to find. We can draw conclusions about it, however, from our own collected data.

At BizLibrary, we implement an algorithm that measures the strength of a client's training program, measuring several variables. Clients with the strongest training program all have leadership buy-in rated "strong" or higher, while clients with the training programs with the most room for improvement have leadership buy-in rated "weak."

While this isn't a formal study, we feel comfortable saying that **leadership should be involved in your training – a leader who champions your program helps your employees understand that learning and development is important in your organization.**

## Involve Employees and Their Feedback

Finally, the employee should be involved in their own development. A study from 1998 provided some pretty compelling information about the role of 360 feedback in training.

A sample of 60 middle managers and their teams participated in an experiment: one group was given training through a seminar about how to receive and interpret feedback they received from peers, subordinates, and superiors.

Unsurprisingly, the study discovered that more often than not, **involving employees in the feedback process improved the results of training through testing.**

Program managers should **never** try to tackle employee training on their own. Upskilling employees takes a team effort, and science tells us that **the most effective way to train employees is to involve multiple training leaders.**

Before we get to some more research on learning science in the next chapter, let's review the key takeaways from chapter three.

## Chapter 3 Key Takeaways

- Managers should be involved in training, both in strategy and implementation.
- The best training programs have strong leadership buy-in.
- When applicable, involve the learner through 360 feedback.

## Chapter 4: How Can We Reinforce Training to Improve Learning Retention?

Chapter three reviewed studies that suggest involving managers in the training strategy will yield better results – this implies that developing a training strategy is important, and it is.

Because training is a process and not an event, developing a strategy and identifying business objectives is only the beginning, and **learning should continue after the training event.**

That's because of a phenomenon first identified by German psychologist Herman Ebbinghaus.

Ebbinghaus studied learning retention and created a model showing the rate at which we forget things we've recently learned. What he discovered is that within about 48 hours of learning something new, we forget about 60% of what we've learned.

Retention continues to drop over time – within a week, we're likely to have lost around 90% of what was learned, **unless the learning is reinforced after the training event.**

This research was expanded on by [Dr. Henry Roediger](#), at Washington University in St. Louis.

Dr. Roediger created a study where he invited university students to examine a series of photographs, and try to remember as many of them as they could.

Following the event, Dr. Roediger created three groups of students. He dismissed one group, quizzed another group by asking them to write down as many photographs as they could, and finally, the third group was quizzed three times over what they learned.

The students were then invited back to the lab a week later to test over the contents of the photographs.

The results speak for themselves:

Dependent Variable	Group 1: No Quizzing	Group 2: One Quiz	Group 3: Three Quizzes
Average number of photos recalled	17.4	23.3	31.8

These numbers are pretty convincing – **quizzing employees after a training event increases retention and helps overcome Ebbinghaus' forgetting curve.**

One thing to keep in mind about this experiment is that group three, the group that performed at the highest level, was quizzed three times in a row.

Since the forgetting curve occurs over time, time is the trigger event that causes us to forget. So, if testing increases retention, would **testing over time overcome the forgetting curve even more effectively?**

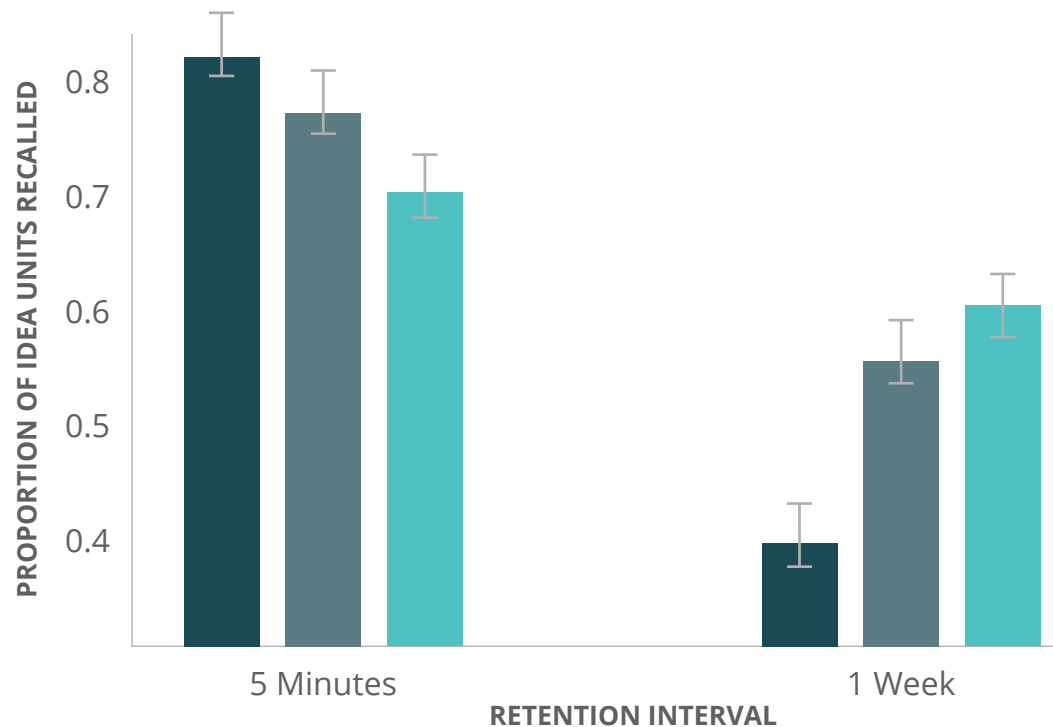
Dr. Roediger once again comes to the rescue and answers this question for us in a later experiment.

Dr. Roediger and Dr. Jeffrey Karpicke conducted a similar experiment as the previous one, where three groups of students looked at photographs.

Then, one group was allowed to study the photos three more times, another group studied two more times before being tested, and the final group was tested three times without additional studying. The researchers looked at the memory retention of all three groups after five minutes, and then again after one week had passed.

Once again, the results are compelling:

- Study, study, study, study (SSSS)
- Study, study, study, test (SSST)
- Study, test, test, test (STTT)



With built-in reinforcement boosters, The BizLibrary Collection makes it simple to help employees retain what they learn. See how our online content library can improve your training results!

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The results show that while cramming might pay off in the short term, the group that was tested three times was able to recall 65% of what they learned a week later, which beats Ebbinghaus' forgetting curve by a significant 25%!

**The science is clear that testing learners after a training event extends the learning process and allows them to retain more information, which is critical for them to apply it on the job!**

Training is a process, which means how you train is determined by where your learners are within the training process. To fill out that entire process, your over-arching strategy should involve a planning stage, the training event(s), and post-training reinforcement.

## Chapter 4 Key Takeaways

- Without reinforcement, the majority of training is forgotten within a matter of days.
- Quizzes and tests are highly effective for helping employees retain more information.
- Cramming only works for a short time – testing to improve learning retention should be spaced out over time.

## Improve Your Organization's Training Processes

We want to reiterate that you're welcome to use this ebook as a reference guide, and check in on the science you need depending on where you are in the training process.

Learning science is always evolving, and we'll be updating this ebook when new and interesting research is published.

For now, this science represents a fairly comprehensive look at the things you need to know to be the most effective training manager you can be.

**We love to share the science of learning because we're passionate about helping companies bring out the best in their employees through effective employee training.**

Since 1996, we've been innovating in the learning and development technology industry, bringing high-quality online training to organizations, along with a strategic partnership to increase the effectiveness of our clients' training programs. Our active client success managers work with you to ensure your training program can deliver on desired outcomes, helping you achieve the best results possible.

If you'd like to learn more about BizLibrary, we're always happy to chat. You can reach out to us anytime through our website. If you're ready to see how our online learning solutions can help your organization improve training, simply request a demo!

[REQUEST A DEMO](#)





## Recommended Resources



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