VIRTUAL IT TRAINING LABS

FROM THE LEARNER'S PERSPECTIVE

cloudshare

CONTENTS

INTRODUCTION TO VIRTUAL TRAINING LABS

In IT training, as with other learning topics common in modern organizations, there has been a long-standing preference for instructor-led, classroom-based, face-to-face training, usually referred to as ILT. This is the pedagogical model of most higher education institutions, and accordingly, this is the model adopted by most companies. A virtual training lab environment (VTLE), on the other hand, effectively allows a learning and development (L&D) function to jettison many of the restrictions associated with classroom training, permitting more flexibility and support for learners through features such as an instructor console, the ability for learners to exchange chat messages, virtual "over-the-shoulder" assistance and so on. Most importantly, IT learners are able to engage with training in an environment that mirrors their actual job.

From a training outcomes perspective, the use of VTLEs allows learners to work in a realistic, hands-on training environment. These environments are particularly suited to IT training applications, whether instructor-led or self-paced courses, for employee and customer education, or technical certifications. Identical elements theory, which is based on classical conditioning research, tells us that when both the training task and the on-the-job task are the same, transfer is much more likely to occur and lead to performance impacts.[1] This is the same logic that applies to flight simulators in the aviation industry and surgical simulators in the medical industry. To quote one of the respondents in the current study, the performance benefits of a VTLE come from "the experience of working in an almost-the-same environment." While simulators for advanced airplanes and medical equipment still require students to travel to a specific location, the advantage of VTLEs is that students can learn in real-world environment from any location. From the

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[1] Goldstein, I. L., & Ford, J. K. (2002). *Training in organizations: Needs assessment, development, and evaluation*. Wadsworth: Belmont, CA.

perspective of the organization, why *wouldn't* greater fidelity between the training environment and the work context be a priority?

On the other hand, how do learners feel about all of this? Do they like using VTLEs? Discussions of resources, performance outcomes and their ilk are wasted words if learners are resistant to engaging with forms of training outside of a physical classroom. To examine the issues concerning the use of VTLEs in greater detail, Training Industry, Inc. and CloudShare, Inc. conducted a study to examine how learners feel about the use of virtual lab environments for IT training. In the second quarter of 2017, 256 respondents from an array of different industries completed a confidential survey reporting their organizations' use of virtual labs to deliver training and their perceptions about the impacts of virtual labs for IT training.

COMPARING VIRTUAL TRAINING LABS TO ILT

In general, the results of this research show that learners understand the advantages of VTLEs and how such training environments can contribute to their performance. In this section, we'll review how IT learners responded to a set of measurement scales that examined their perceptions of VTLEs compared to traditional classroom training. To further explore IT learners' dispositions toward VTLEs, measurement scales were adapted from the acceptance and use of technology theory, also known as UTAUT.[2]

To begin with, a majority of IT learners agreed that the use of VTLEs is both enjoyable and natural. As seen in Figure 1, 71 percent of learners found it enjoyable, with 25 percent strongly agreeing with that statement, and 71 percent see the use of lab environments as natural, with 23 percent strongly agreeing. Although two-thirds of learners agreed that using VTLEs has become common, it's notable that 20 percent of learners disagreed with the notion that using VTLEs is a habit; is it because they don't have the resources to use them, because some learners really don't like them or some other reason? (We'll return to this idea in the next section.) Taking all these results together, we can conclude that IT learners are comfortable with the idea of using VTLEs, but something appears to be holding them back from seeing it as a regular, habitual part of IT training.

Figure 1. Comfort/Habit

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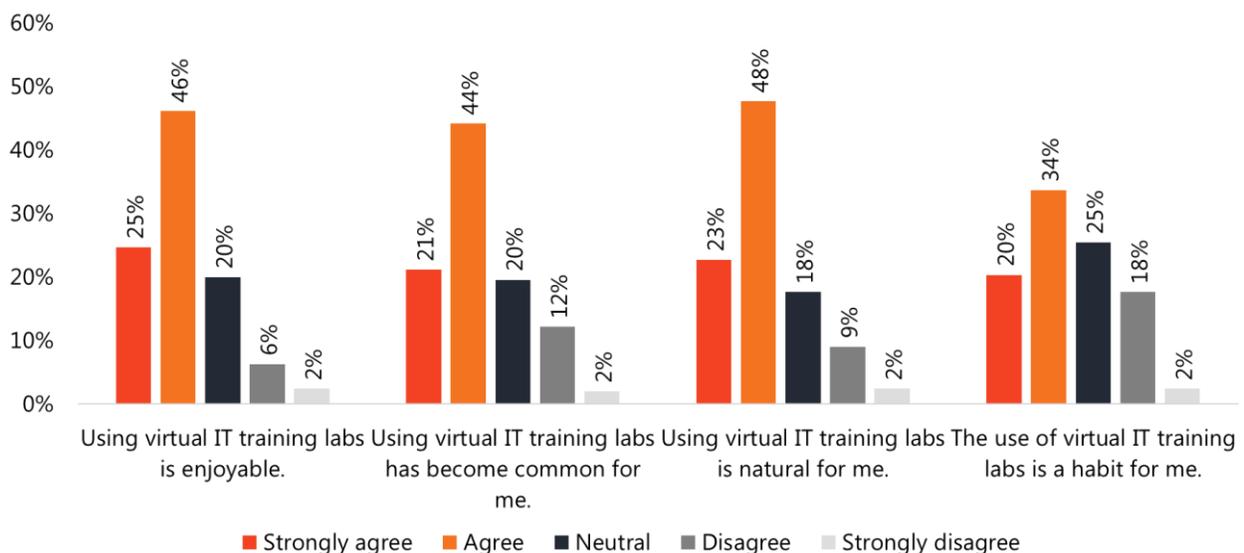
[2] Gerhart, N., Peak. D. A., & Prybutok, V. R. (2015). Searching for new answers: The application of task-technology fit to e-textbook usage. *Decision Sciences Journal of Innovative Education, 13*(1), 91-111.

Next, learners were asked about whether they believe using VTLEs would be likely to have an impact on their performance. As shown in Figure 2, two-thirds of learners agreed that using VTLEs rather than traditional classroom training methods helps them achieve what's important to them, helps them accomplish their goals faster, and has a tangible and positive impact on their performance.

Figure 2. Performance Expectancy
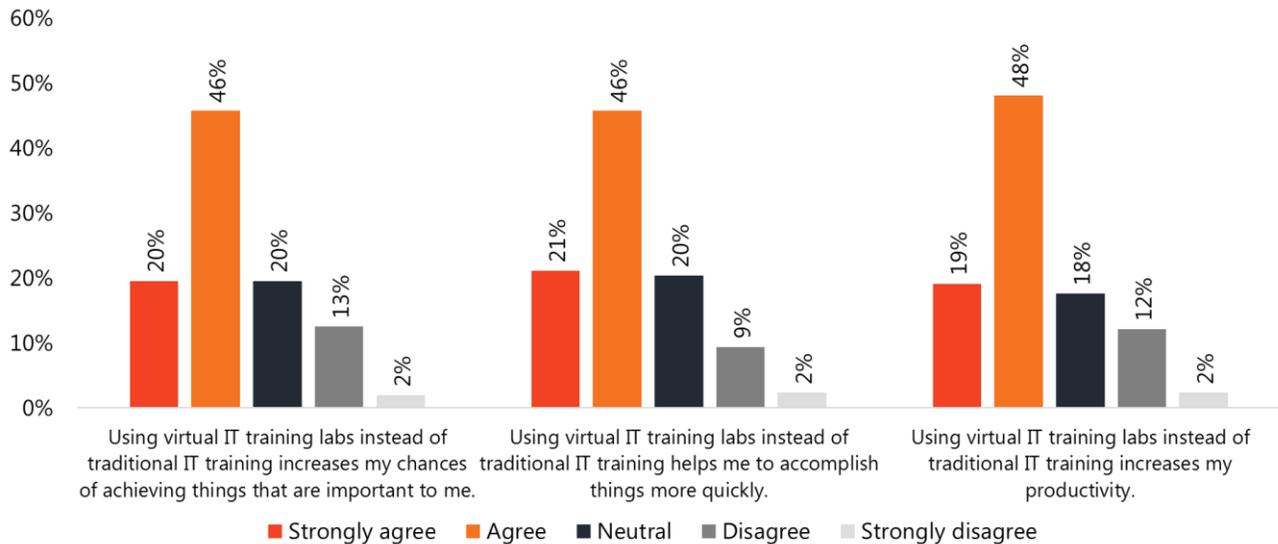
Similarly, more than half of IT learners agreed that training labs are more useful in supporting day-to-day job tasks, as well as increasing the perceived depth and quality of IT learning initiatives.

Figure 3. Performance Expectancy
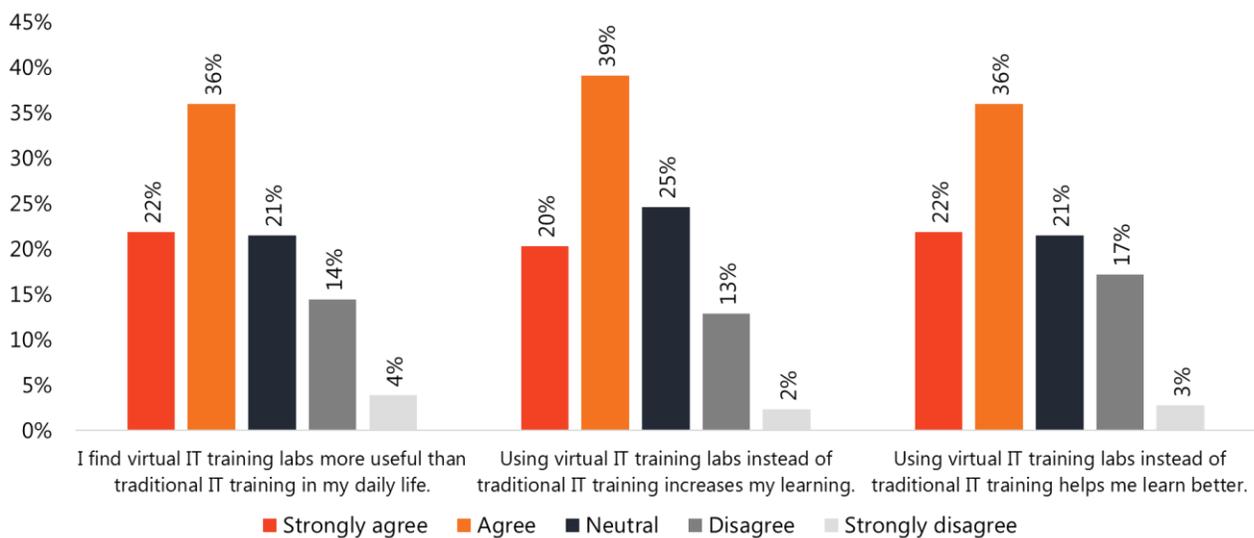
Taken together, the results of Figures 2 and 3 suggest that the majority of learners see VTLEs as having a strong impact on learning outcomes and an even stronger impact on performance outcomes. All virtual training environments are not the same, obviously, so learners were next asked about their perceptions of using a more general VTLE compared to a VTLE that has been tailored to the desired training outcome. As shown below in Figure 4, IT learners generally agreed that compared to general lab environments, specialized VTLEs have a stronger impact on their job performance, provide a more enjoyable and easier learning experience when acquiring IT skills, are seen as more relevant to job tasks, and also give learners more confidence in the training.

Figure 4. Lab/Environment Specialization
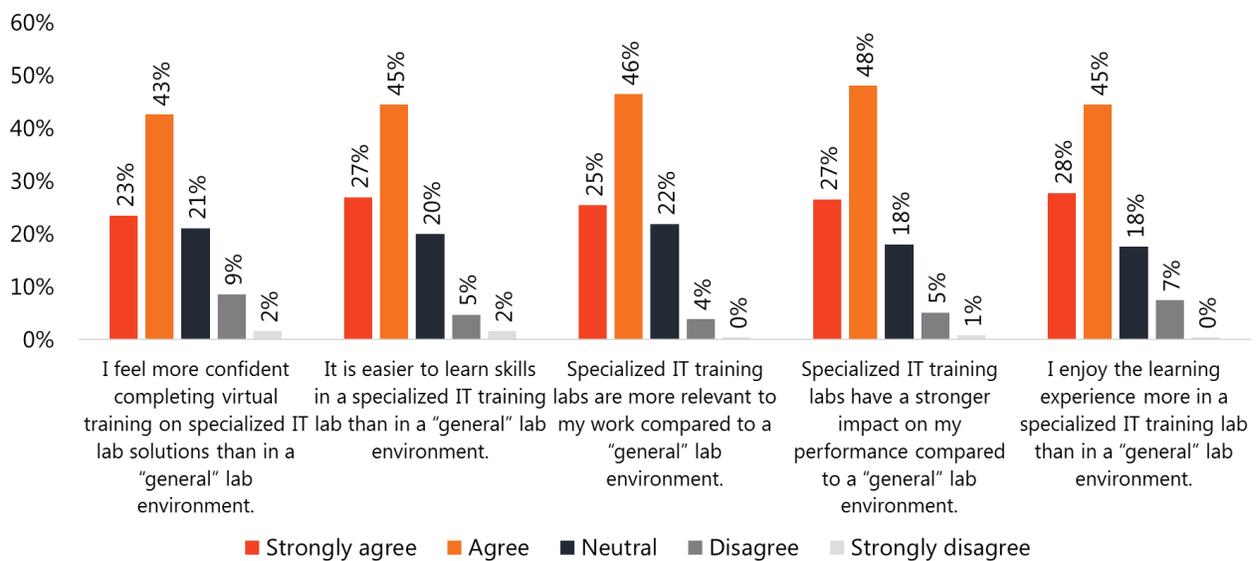
In order to determine just how common the use of virtual training labs is, respondents to this research were asked about their past experience with VTLEs. Whereas 73 percent indicated that they have used a VTLE before for IT training, only 36 percent of the respondents indicated they have used one in the past 12 months. This aligns with and helps explain the fact that, as noted earlier, 20 percent of IT learners don't use VTLEs on a regular basis. What might be holding back the adoption of VTLEs? In the next section, we'll explore some of the results that help explain why VTLEs are not a ubiquitous part of IT training.

ADOPTION OF VIRTUAL TRAINING LABS

The question of why more learners aren't using VTLEs has many possible answers. Is it a matter of access? Are the features common to VTLEs simply not sufficient to support learning? We asked learners to respond to another series of measures concerning their adoption of technology in order to probe this issue further.[3]

To begin with, we can say that adoption is very seldom due to a perceived lack of access to technology. As shown in Figure 5, 75 percent or more of learners agreed that they have access to the hardware, software, knowledge and resources needed to use VTLEs. Of particular note is the very low proportion of disagreement for any issues of access or preparation.
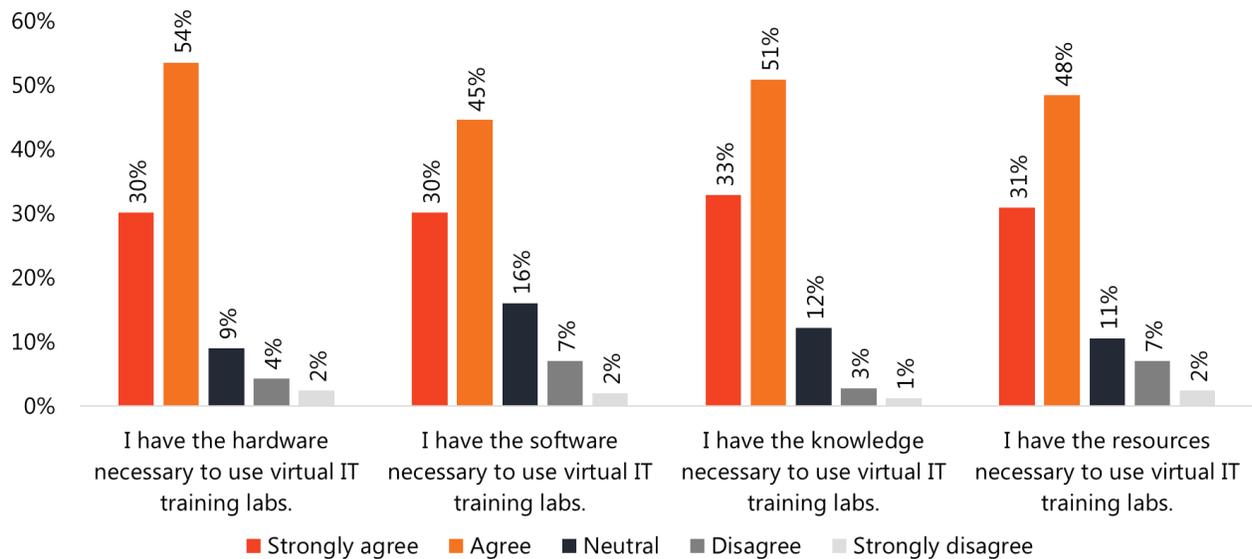
Figure 5. Facilitating Conditions

Figure 6 displays learners' responses to comparative questions about the functionalities of VTLEs. IT learners agreed that compared to traditional classroom training, the functionalities of VTLEs are adequate, appropriate and helpful. However, only one-fifth of learners strongly agreed with these items, which could be driven in part by fewer learners having recent experience with lab environments.

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[3] Gerhart, N., Peak. D. A., & Prybutok, V. R. (2015). Searching for new answers: The application of task-technology fit to e-textbook usage. *Decision Sciences Journal of Innovative Education, 13*(1), 91-111.

Figure 6. Functional Fit
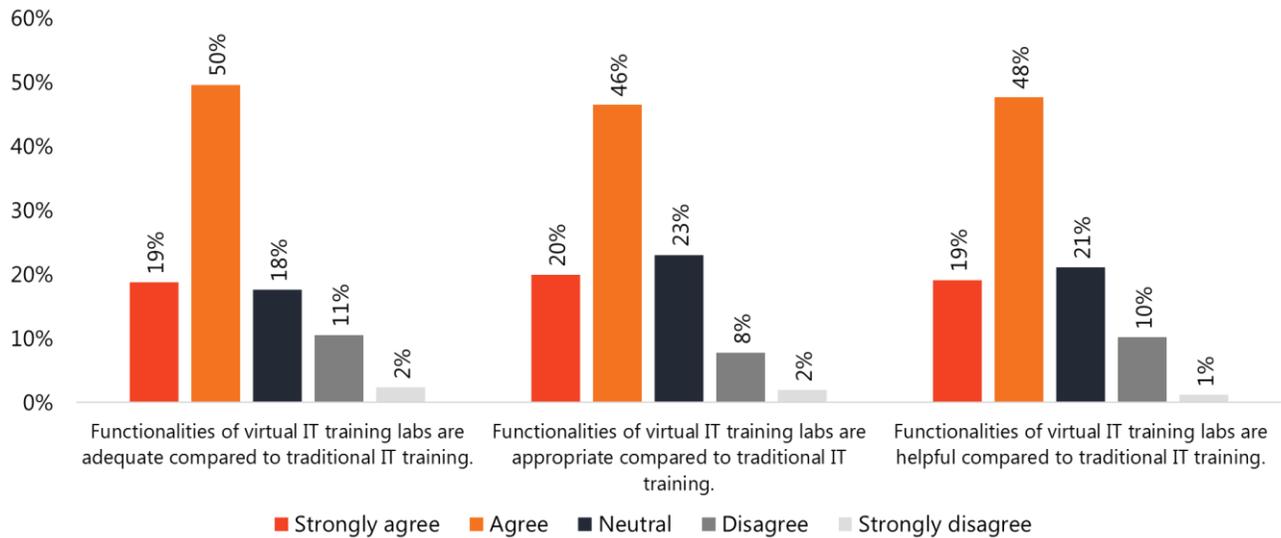
Though there is likely an experiential component, it may be that some learners are simply not apprised of the continuum of features potentially available to them. For the results presented in Figure 7, learners were asked to indicate which VTLE-related features they felt were essential for learning IT skills. With the exception of integrating the VTLE with other software systems and customizing its appearance, nearly all features were endorsed as important by close to half of learners.

Figure 7. Essential Virtual Training Features for IT Learning
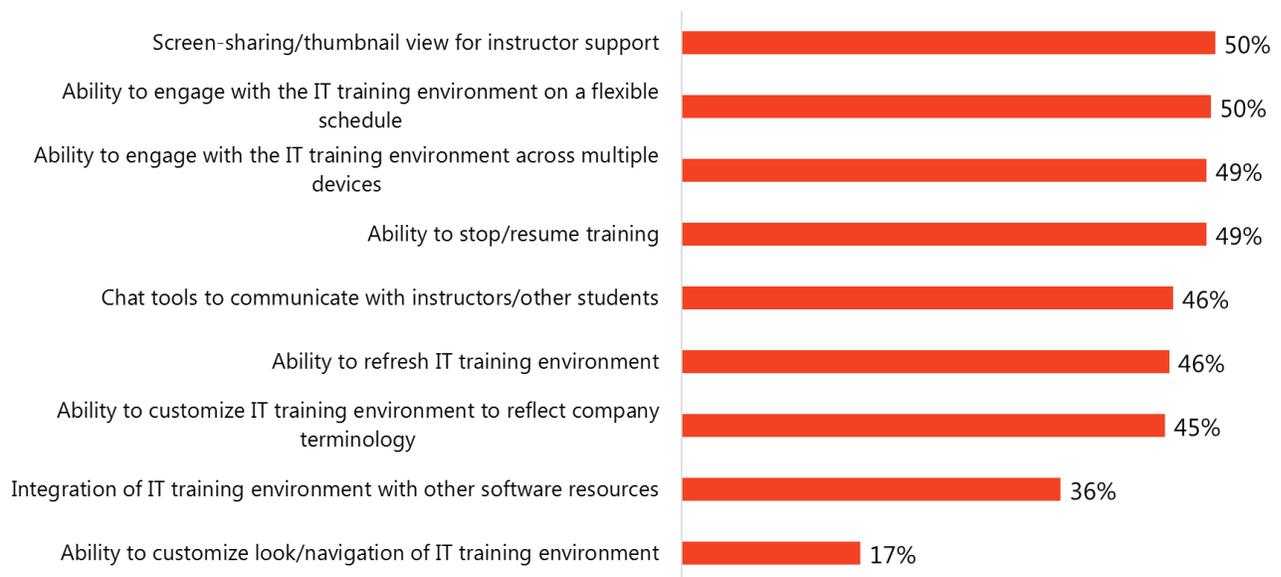
Given that features such as those listed in Figure 7 are common in current VTLEs, adoption may be a matter of awareness of the range of uses to which such a feature set could be applied for training. Consequently, learners were asked to rate the effectiveness of VTLEs for various purposes. As seen in Figure 8, self-paced IT training was endorsed most often (78 percent "extremely effective" and "very effective" ratings combined), followed by using VTLEs to support virtual instructor-led (vILT) sessions (72 percent), IT certifications (72 percent), and microlearning (69 percent). With the exception of self-paced IT training, however, only one-fourth of learners rated VTLEs as "extremely effective," demonstrating some hesitation that may be due to past experiences with feature-poor lab environments. What should be noted is that the proportion of "not effective" ratings for any given purpose never crested 2 percent. Said another way, around *98 percent* of learners felt that VTLEs are at least somewhat effective for IT training in a variety of shapes and sizes.

Figure 8. Applicability of Virtual Labs/Environments
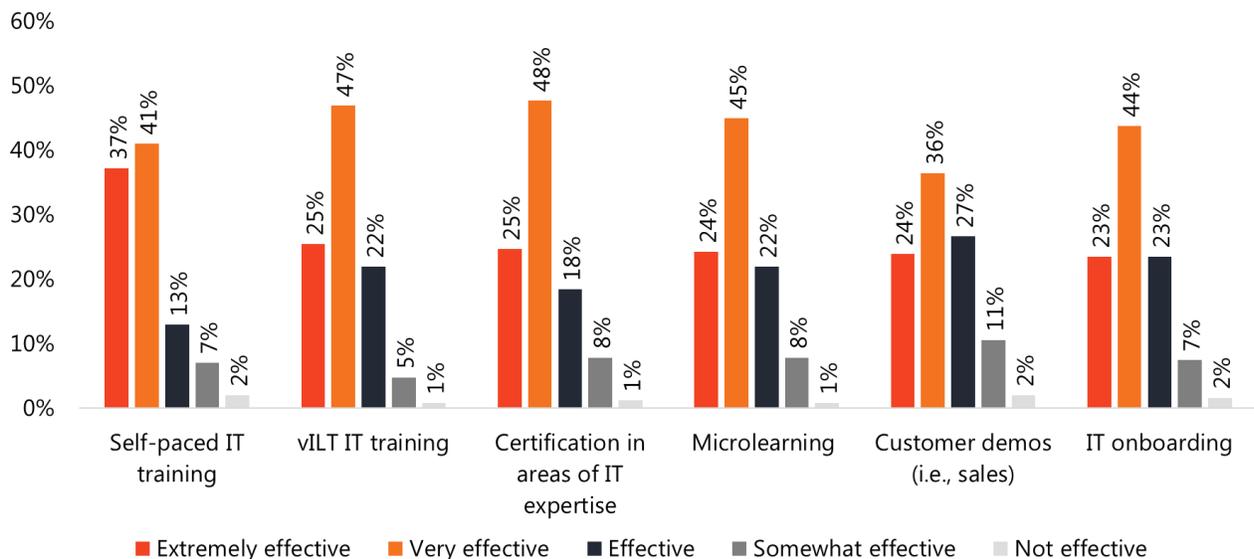
So why aren't more learners exposed to VTLEs? The results of this research suggest it may be that the learning market simply isn't educated about the features and tools currently available in such environments, that companies are not well acquainted with the potential applications of VTLEs, or some combination of the two. Whatever the underlying reason for current levels of adoption, however, learners did identify a number of positive benefits to VTLEs that they felt made them a good fit for IT training, as we'll explore in the next section.

ADVANTAGES OF VIRTUAL TRAINING LABS

To qualitatively explore the experiences of IT learners, respondents were asked to share their opinions about the main advantages of learning technical IT skills within a VTLE. Among the comments we received, several themes emerged concerning the pace, fidelity, resources and reach of VTLEs.

First, learners praised the individualized learning pace afforded by VTLEs, citing the ability to spend more time on content areas as needed:

> *"Self-paced for learners at different technical levels. It also helps to get the learner in the software exploring and learning hands-on. Important to make sure they have access to a live person to validate their learning and/or answer questions."*
> – HR specialist, banking/finance industry

> *"The ability to go at your own pace and not worrying about whether your classmates are being held back if you're not getting it."* – IT manager, banking/finance industry

> *"It offers so much more flexibility as you can take it when you want, you can take it at your own pace and spend more time in certain areas as needed."* – IT manager, technology industry

> *"Self-paced, targeted training and you don't waste time having to deal with uninterested others in the class asking inappropriate or needless questions."* – IT manager, banking/finance industry

Learners also noted the training benefits of a high-fidelity practice environment:

> *"It feels like hands-on stuff and you can go through the actual motions."* – IT manager, health care industry

> *"I like the approach of using a virtual lab, because it is easy to correct a mistake and you have the ability to try multiple times before doing something that might affect hundreds of people."* – IT manager, non-profit industry

> *"The best advantage is that you can do training without any effect on real data or software."* – IT analyst, education industry

> *"Seeing it, to believe that you are doing hands-on work, so that you have a greater understanding of the software that is being used."* – IT manager, consumer goods industry

Costs are a constant area of focus in L&D initiatives, and learners noted the ways VTLEs save personnel and facility costs:

> *"Train at the time that is best for me, reduced cost to company – no travel expense for students or teachers."* – R&D analyst, government industry

> *"Allows for more flexible scheduling, no need to set aside time in the middle of the workday for it."* – IT specialist, education industry

> *"Can be done remotely saving time and money, simplifies complex problems/situations, suitable for different learning styles."* – IT instructional designer, government industry

Other learners noted the ability to harness the expertise of trainers from other locations to provide the most substantive training possible:

> *"You can learn a wider range of technical skills from people across the globe. The timing is also more flexible in case you miss a training session."* – L&D executive, banking/finance industry

> *"Excellent tool, can already be learned from different specialists in real time even if they are not present physically, and acquires greater knowledge within the company to perform the work."* – IT manager, technology industry

> *"You can learn more topics without the instructor needing to be physically present in a location."* – IT executive, banking/finance industry

We would be remiss to suggest all the comments received were entirely positive. That said, the range of sentiments ranged from lukewarm to emphatic, as illustrated by the contrasting remarks shown below from two IT managers:

> *"It can be good in some isolated areas, but I do not think it is great for all facets of the IT arena."* – IT manager, technology industry

> *"Cloud-based training with virtual labs is the next step in today's modern workplace … It's very important."* – IT manager, technology industry

Taken together, the comments suggest that VTLEs are attractive to learners primarily because of how they permit a rich learning experience from any location and maximize the ability of each learner to engage with IT training.

CONCLUSIONS

From the preceding sections of this report, we've learned that the majority of learners see VTLEs as having an impact on their job outcomes and being suited to a variety of different IT training objectives, from self-paced learning to onboarding. As noted in the previous pages, only 36 percent of the respondents indicated they have used a VTLE in the past 12 months. To investigate the relationships between VTLE experience and learner perceptions, a series of analysis of variance (ANOVA) tests were conducted to test for group differences. The findings demonstrated that compared to learners with no experience with VTLEs in the past 12 months, learners who have used virtual labs were significantly different in that they are more likely to:

- See VTLEs as a better fit for IT learning than traditional training methods[4]
- Prefer using VTLEs over other training modalities[5]
- Expect their performance to change post-training[6]

Our research found that the majority of learners prefer VTLEs to traditional IT training methods. That number rises to 74 percent among those who have used virtual labs in the past year, compared to 55 percent among those who have not, as shown in Figure 9. This difference between learners was statistically significant.[7]

Figure 9. VTLE Use

Virtual Lab Experience, N =93 ■ *No experience, N =163*

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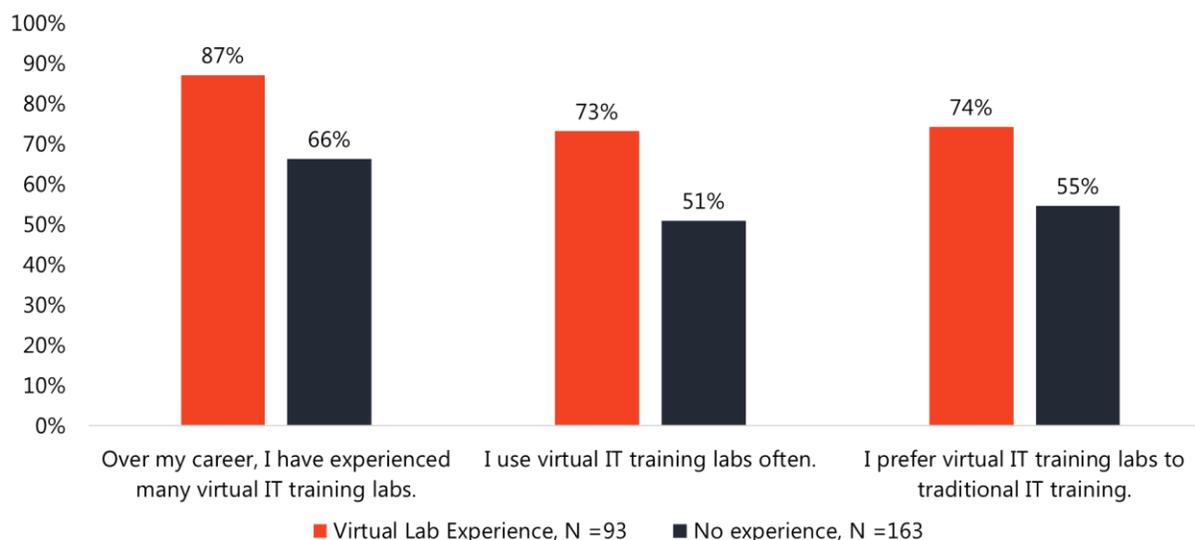
[4] $F(1,254) = 15.02$, $p < .001$); average score, 5pt scale: 3.98 (virtual lab experience) vs. 3.55 (no recent experience)
[5] $F(1,252) = 15.27$, $p < .001$); average score, 5pt scale: 3.97 (virtual lab experience) vs. 3.37 (no recent experience)
[6] $F(1,254) = 17.35$, $p < .001$); average score, 5pt scale: 3.94 (virtual lab experience) vs. 3.45 (no recent experience)
[7] $F(1,254) = 7.92$, $p = .005$); average score, 5pt scale: 3.81 (virtual lab experience) vs. 3.36 (no recent experience)

There are good reasons for organizations conducting IT training to heed the implications of these differences, not only for the perceived performance gains and better match to learner preferences, but also for improving general IT training effectiveness. Notably, two-thirds (67 percent) of recent users of virtual lab environments rated their companies' IT training as "always effective" or "almost always effective," compared to less than half (46 percent) of respondents without recent VTLE experience, as shown in Figure 10.

Figure 10. Overall IT Training Effectiveness
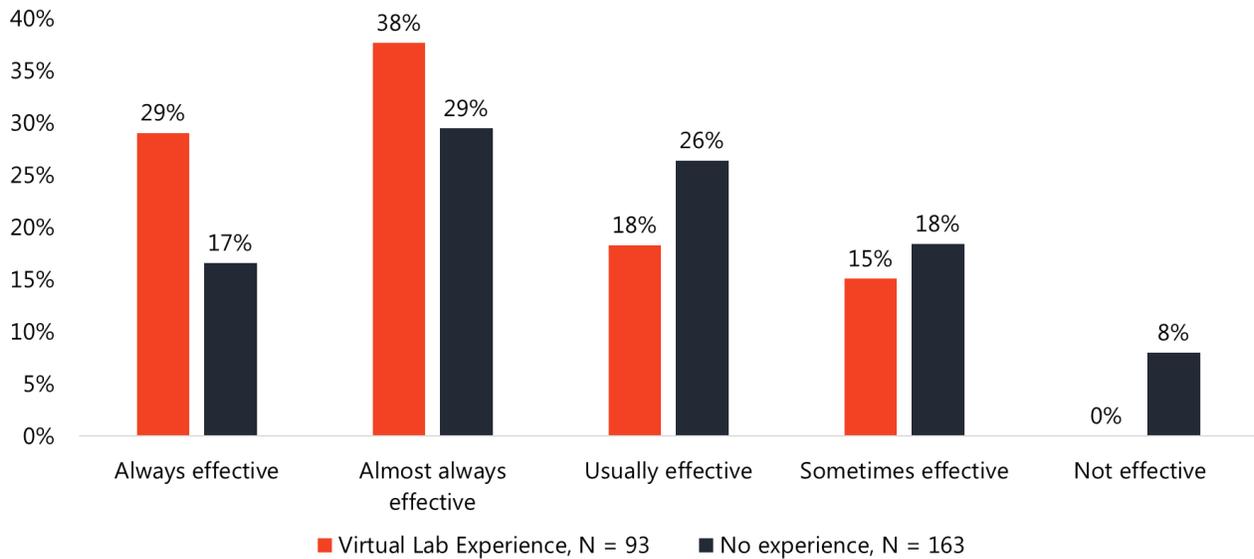
These results do not necessarily suggest that simply adding a VTLE to an L&D portfolio will boost overall training effectiveness, but it does suggest that, when coupled with our other findings, there is a clear pattern of benefits associated with using VTLEs. When the comments described in the previous section of this report are taken into account, the driving force for why IT learners prefer VTLEs appears to be one of greater efficiency and effectiveness for learning training content.

Further, there were only slight differences in the preconditions for using VTLEs across groups, as shown in Figure 11. This figure shows the combined proportions of "strongly agree" and "agree" responses to the same questions summarized in Figure 5. As shown in Figure 11, learners at companies that have not used a VTLE in the past 12 months were not drastically lacking in any area, save for some that may be missing the software resources for VTLEs.
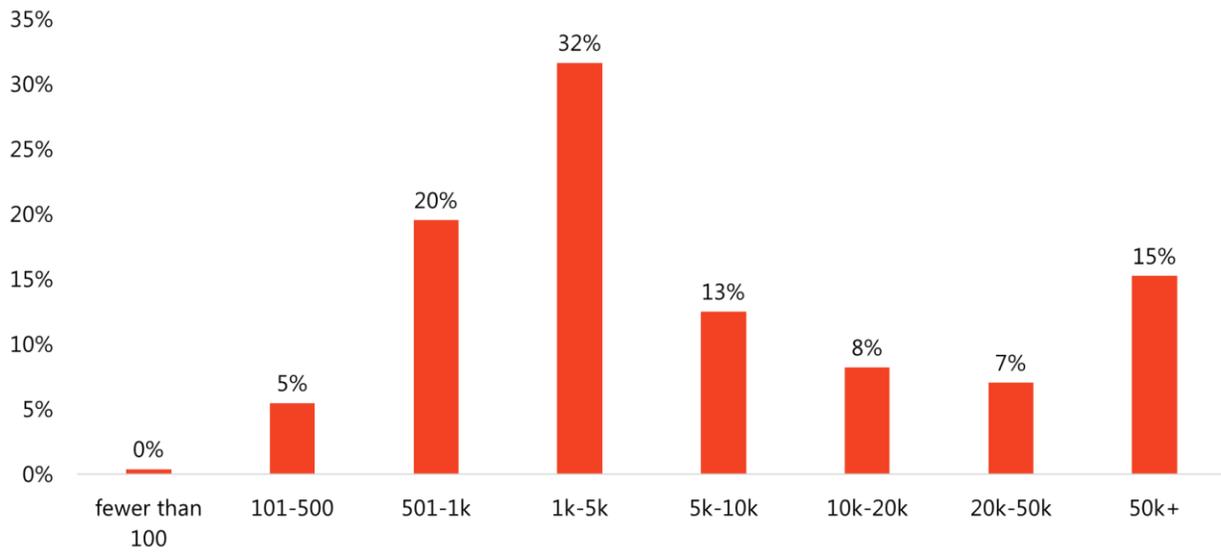
Figure 11. Facilitating Conditions
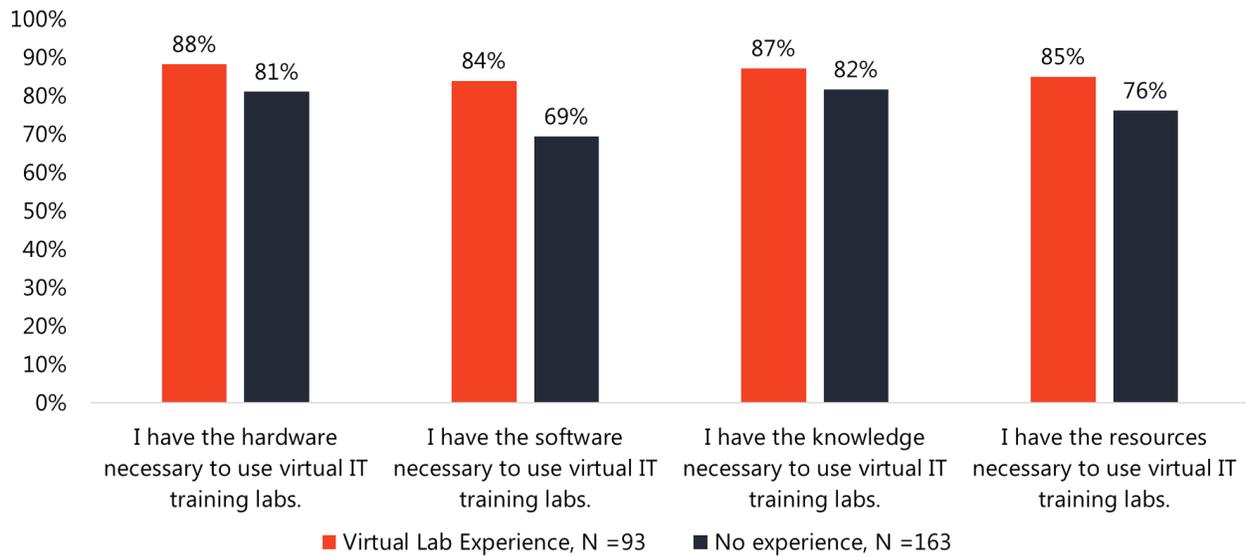
In the introduction to this report, we noted the differences commonly associated with classroom training versus VTLEs and the well-documented advantages of a more authentic learning environment, which leads to a higher likelihood of knowledge and skills transfer on the job. In the course of describing the results of this research, we have shown that IT learners see great benefit to training in a realistic, hands-on virtual environment that includes features designed with training objectives in mind. To this end, IT departments and IT-related organizations that still prefer classroom training should consider the advantages providing IT training with real-world environments similar to the examples of pilot and surgeon training mentioned in the introduction. Are the considerations for why VTLEs haven't been adopted worth the risks and potential consequences of ineffective training?
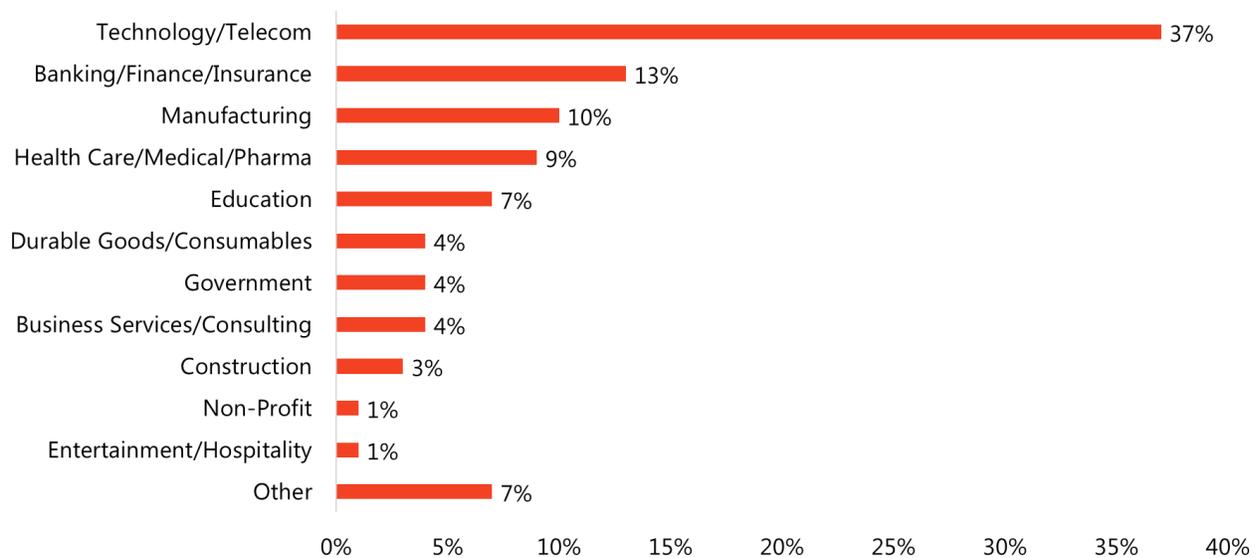
STUDY DEMOGRAPHICS

Figures 12 through 15 provide context on the 256 survey respondents who participated in this research. These figures summarize the companies the respondents represent and the functional areas/departments supported by their roles within the organization.
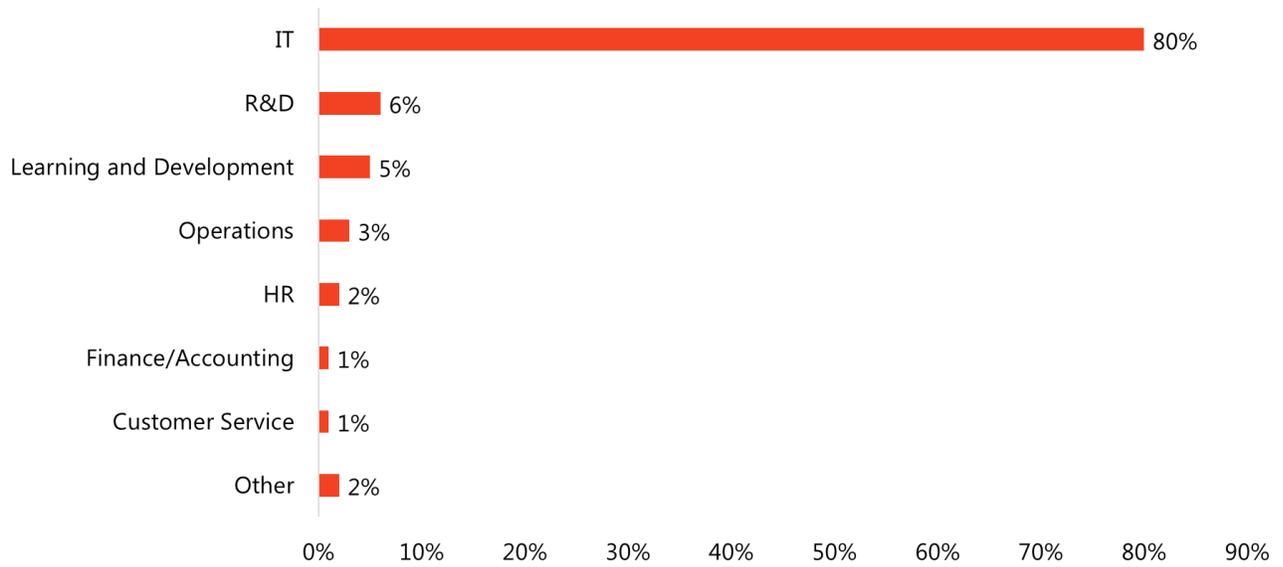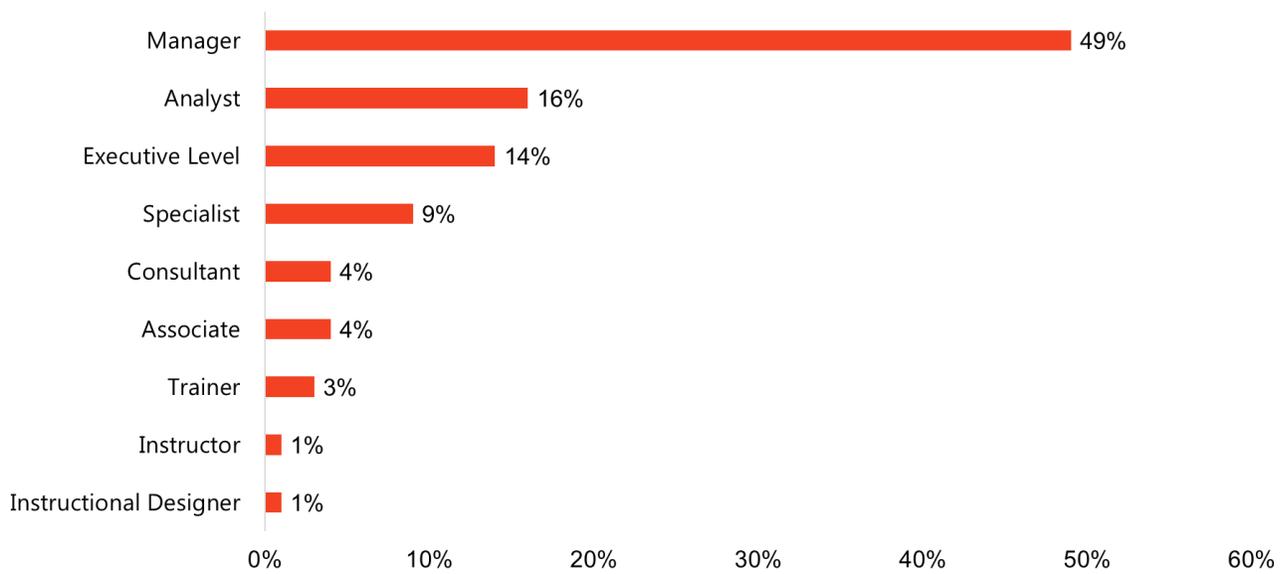
Figure 12. Organizational Size

Figure 13. Industries Represented

Figure 14. Functional Areas/Departments Represented

IT	80%
R&D	6%
Learning and Development	5%
Operations	3%
HR	2%
Finance/Accounting	1%
Customer Service	1%
Other	2%

Figure 15. Job Roles Represented

Manager	49%
Analyst	16%
Executive Level	14%
Specialist	9%
Consultant	4%
Associate	4%
Trainer	3%
Instructor	1%
Instructional Designer	1%

ABOUT THIS RESEARCH

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