

**Strategies for the implementation of learning
technologies in organizations**

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Abstract

Many organizations' performance and survival challenges require dynamic capabilities and tools to accelerate the acquisition of those capabilities.

Organizations continuously look at their learning strategies as a key factor in preparing their human capital for rapid changes and demands. Learning Technologies are positioned as an enabler that provides different learning opportunities, which is why they are so important. Designing strategies for implementing learning technologies in organizations is hard to overview.

Only a few contributions address technology as crucial in accelerating performance, innovation, and competitiveness. The present research will focus on the strategic implementation of learning technologies.

The approach we chose to solve this problem is to develop guidelines that support the strategy for implementing technology in the learning field. The approach will allow us to relate the strategy with the challenges and the impact the organization is expected to achieve.

Keywords: *Learning Organizations, Learning Culture, Learning Technologies, Learning & Development*

Resumo

Os desafios relativos ao desempenho e sobrevivência de muitas organizações requerem capacidades dinâmicas e ferramentas que acelerem a aquisição dessas mesmas capacidades.

As organizações precisam de considerar continuamente as suas estratégias de aprendizagem como um fator chave na preparação do seu capital humano e para fazer face as rápidas mudanças e exigências. As tecnologias proporcionam diferentes oportunidades de aprendizagem, mas a verdade é que a conceção de estratégias para a implementação de tecnologias de aprendizagem nas organizações ainda não está suficientemente explorada.

Apenas alguns contributos abordam a tecnologia como um ponto crucial para acelerar o desempenho, a inovação e a competitividade. A investigação que apresentamos irá focar esta área de implementação estratégica das tecnologias de aprendizagem.

A abordagem que escolhemos para este problema é desenvolver orientações que apoiem a estratégia de implementação de tecnologias no campo da aprendizagem. Isto permitir-nos-á relacionar a estratégia de implementação da tecnologia, com os desafios das organizações e o impacto que a organização ambiciona atingir.

Palavras-chave: *Organizações de Aprendizagem, Cultura de Aprendizagem, Tecnologias de Aprendizagem, Aprendizagem & Desenvolvimento*

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List of Abbreviations

AR - Augmented Reality

ATS - Applicant tracking systems

CEO - Chief Executive Officer

CLO – Chief Learning Officer

COMDEX - COMputer Dealers' Exhibition

ESN - Enterprise Social Network

HCM - Human Capital Management

HR - Human Resources

HRMS - Human Resources Management Softwares

HRO - High-reliability organizations

ICT - Information and Communication Technology

IT - Information Technology

KMS – Knowledge Management System

L&D - Learning & Development

LCMS - Learning Content Management Systems

LMS - Learning Management System

LTIF - Learning Technologies Implementation Framework

LXP - Learning Experience Platform

MOOC - Massive Open Online Courses

NGLE - Next Gen Learning Environment

PEAK - Portal for Education and Advancement of Knowledge

PICOC - Analysis where Population, Intervention, Comparison, Outcomes and Context

Q&A - Questions and Answers

RQ - Research Questions

SF - Strategic formulation

SI - Strategy implementation

SLP - Social learning platform

SLR - Systematic Literature Review

TEELE - Technology-enriched and enabled learning environment

TQM - Total Quality Management

TXP - Talent Experience Platform

VR - Virtual Reality

1 Introduction

Organizations face challenges while adapting to their environment to sustain their survival or increase their influence (Alamsyah & Peranginangin, 2014). Businesses “*reinvented*” the work model during the pandemic, and we are not returning to the past. Hybrid, remote, and contract work are now mainstream, and companies are adjusting old models accordingly (Bersin, 2022).

There is increasing acceptance that for employees to keep up with constant change and for businesses to stay relevant, learning and development must move to the heart of the business. Organizations must go through a learning transformation to realize this vision. They continuously look at their learning strategies as a key factor in preparing their human capital for rapid changes and demands (Aberdour, 2016).

Suppose organizations want to fulfill organizational learning and knowledge management functions. In that case, they must establish structures, processes, and strategies to enhance learning behaviours at the individual, team, and organizational levels to foster a learning environment or culture where people are encouraged to engage in continuous learning. The outcomes of their learning activities are managed and used to attain sustainable competitive advantage (Ruel et al., 2021).

Learning strategies are not oblivious to the technology's evolution. As Kelly Palmer (CLO – Chief Learning Officer at Degreed) mentioned, “*In the past five years, the world of work has dramatically changed, and technology plays a huge part*” (“Career Advice from Kelly Palmer: Chief Learning Officer, Degreed,” 2020).

The learning organizations should devise a technology-based mechanism for their organizational learning development. For better production of organizational learning, different databases and knowledge management systems should be developed to capture, store, disseminate, and share organizational knowledge and experiences among knowledge workers (Kang et al., 2021).

There are, however, challenges. The corporate learning industry becomes much more massive every day. More than \$280 billion is spent on training, upskilling, and professional certification programs. Many billions of dollars are spent on collaborative learning platforms, content, skills tech, and industry solutions. (Bersin, 2021). According to the SierraCedar report, companies often have ten different platforms for learning, and overall spending on Human Resources (HR) technology is several thousand dollars per employee per year (often more than is spent on training and enablement). Furthermore, companies must ensure a positive return on these investments (Bersin, 2021).

The world of educational technology in the twenty-first century remains filled with caveats, concerns, and various unknowns. Some raise cautionary flags over the cost justifiability of different technologies, tools and applications. Others sound alarms over their practical implications. Still, others ask whose needs are being served and for what purposes they adopt or integrate a particular technology tool or application into our instruction (Bonk & Wiley, 2020).

Organizations can sometimes feel they have not achieved the planned benefits from their investment in technology. While it is easy to point the finger at technology, it is not software which is the problem but how it has been implemented (Miller, 2014).

One KPMG study into project failure concluded that only 7% of project failure was due to hardware and software issues. The study mentioned that 17% was due to failure to define project objectives, 20% was attributable to poor communications, 32% to poor project management and 17% to poor management in the transition of issues (Miller, 2014).

Technology adoption and strategy renewal need to emerge in parallel and inform one another. An organization cannot devise a new strategy without assessing the real potential of new technologies and its ability to acquire the necessary skills and resources. Conversely, it cannot adopt every new piece of digital technology without a strategic plan to leverage it (Bughin et al., 2019).

Therefore, strategy implementation (SI) is a critical component of why some organizations outperform others, as even a well-formulated strategy cannot guarantee success until it is effectively implemented. SI differs from strategic formulation (SF); while SF is related to planning and decision-making, SI is the translation into reality of that strategic intention (Tawse & Tabesh, 2021).

In this research, we will focus on the SI of learning technologies. The approach we chose to solve this problem is to develop a framework that supports the strategy for implementing technology in the learning field. The approach will allow us to relate the strategy with the challenges faced, the technology selection, and the impact the organization is expected to achieve. The document is structured as follows:

- **Section 1**, the Introduction, where we present the frame of this research: the relevance of the topic and the objectives;
- **Section 2** introduces the conceptual theories on the key definitions: the deep dive into the way how we learn at work, the concept of learning organizations, the learning technologies definition and what we meant by learning technologies implementation;
- **Section 3** presents a Systematic Literature Review (SLR) to analyze the research problem;

- **Section 4** proceeds with the Research Methodology used. The research question is presented, followed by the process scheme. Afterwards, we deep dive into the research methodology;
- **Section 5** presents the Learning Technologies Implementation Framework (LTIF);
- **Section 6** is the last part of this research and presents the main conclusion, the main limitations and future works.

2 State of the art

2.1 How we learn at work

According to Malcolm Knowles, andragogy is the art and science of adult learning. Thus, andragogy refers to any form of adult learning (Kearsley & Knowles, 2010). Knowles (1984) added 5 assumptions about the characteristics of adult learners:

- Self-concept (as a person matures, his/her self-concept moves to a self-directed human being);
- Adult learner experience (as a person matures, he/she accumulates a growing reservoir of experience that becomes an increasing resource for learning);
- Readiness to learn (becomes oriented increasingly to the developmental tasks of his/her social roles);
- Orientation to learning (immediacy of application and towards problem centeredness);
- Motivation to learn (the motivation to learn is internal).

Based on these characteristics, Knowles (1984) added that, for learning to succeed, adults need: to be involved in the planning and evaluation of their learning, to experiment, and the learning needs to have immediate relevance and impact in their job.

Bob Mosher and Conrad Gottfredson identified 5 moments of learning needs: when people learn something new for the first time, when they expand what they already learned, need to apply what they learned, when problems arise or when they need to learn a new way to do things. In a nutshell, these 5 moments happen to learn new things, to apply, solve or change (Gottfredson and Mosher, 2011).

In the course "*Learning How to Learn: Powerful mental tools to help you master tough subjects by Deep Teaching Solutions*" (Oakley, 2016), Professor Barbara Oakley mentions that when we are learning something new, especially something more difficult, our mind needs to be able to go back and forth between the two different learning modes: the focusing (when we concentrate intently on something trying to learn or to understand) and the diffusing mode (when we look at things broadly from a very different, big-picture perspective, making new neural connections travelling along new pathways). In the same course, the importance of the practices is highlighted. The more abstract something is, the more important it is to practice bringing those ideas into reality and creating neural patterns.

Taking this as a baseline, we can conclude that Organizations and HR practitioners need to move from conventional learning to more practical learning, innovative and informal learning

which makes employees productive, engaged, and responsible and ensures the organisation's longevity (Sharma & Goyal, 2021).

The 70:20:10 framework is a perspective on the different ways of learning at work that connects with the need for practice. Most of what we learn comes to us via experience, a smaller part from other people, and the minority from structured courses and programs. It's a game-changer for professionals that need to work in opportunities for safe practice, group work, and experiential rather than just the standard delivery (formal learning) (Taylor, 2019).

The leading proponent of the 70:20:10 framework, Charles Jennings, pointed out that this is for thinking and action and therefore to change rather than a rigid model about numbers (Taylor, 2019).

The 70:20:10 model recognizes the existence and importance of Informal Learning. Informal Learning at the workplace is self-directed learning or learning from one's own experience, which happens outside formal learning or structured training (Sharma & Goyal, 2021). Jay Cross, the author of "*Informal Learning*", described Informal Learning as "*the unofficial, unscheduled, impromptu way most people learn to do their jobs*" (Cross, 2006).

Blended Learning is the realization of the 70:20:10 model. It is more than simply delivering information; it is also about practice, reflection, and applying relevant knowledge and skills to work context (Taylor, 2019). It is a hybrid approach that combines the same learning strategy for formal and informal learning.

Continuous Learning is a recent approach that reflects the complex way adults learn and emphasizes the approach taken to foster learning in an organization. It is about the connection between the business priorities and the learner experience.

Mallon and Johson define continuous learning as structuring resources, expectations, and learning culture in such a way as to encourage employees to learn continuously throughout their tenure with the organization (Johson, 2014, cited by Taylor, 2019).

The approach goes beyond the L&D (Learning & Development) and puts learning in the organization's center: the Learning Organization (detailed in the next subsection).

2.2 Learning Organization and Learning Culture

The concept of a learning organization is not a new one. It flourished in the 1990s, stimulated by Peter M. Senge's "*The Fifth Discipline*" and countless other publications, workshops, and websites.

Peter Senge defines learning organizations as places “*where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning how to learn together*” (1990, p. 1). Peter Senge has mentioned the following characteristic of a learning organization:

- shared vision (the common goal);
- system thinking (analysis correlated and not done individually);
- team learning (learning of the whole team rather than the learning of an individual);
- personal mastery (an employee puts efforts into learning so that he can bridge the gap between his knowledge and skills and the knowledge and skills required for the task at hand)
- mental models (what employees think about the organization and its goals).

David Garvin defined Learning Organization as “*an organization skilled at creating, acquiring, and transferring knowledge, and at modifying its behavior to reflect new knowledge and insights*” (Garvin, 1998).

A learning culture is an environment that demonstrates and encourages individual and organizational learning, where gaining and sharing knowledge is prioritized, valued, and rewarded. It becomes part of the organisation's ecosystem (Trovas, 2022).

In organizational learning cultures, team members have the time and space to continually grow their knowledge and develop new skills. The learning aims to improve employee performance and support personal and professional growth (Tenney, 2022).

Nowadays, more and more organizations are willing to become learning organizations because they need to continuously adapt and learn new skills and processes to stay ahead of the competition. It is vital to emphasize learning, which is tuned with the organization's goals (Bhasin, 2021).

Because learning is essential for employees to develop new skills and find fulfilment in their work, companies that foster a learning culture and offer development opportunities are laying the groundwork for long-term success with a team of engaged employees who do their jobs well. A learning culture is a particularly important element of sustainable success in business because it positively impacts strategy, innovation, employee engagement, employee retention, and many other elements of an organization (Tenney, 2022).

An example of how successful organizations can be when leveraging learning culture is Microsoft: Microsoft has evolved from a stagnating, siloed business into an economic juggernaut in which staff are empowered to succeed. When Mr Nadella was named Chief

Executive Officer (CEO) in 2014, he knew that the company had become siloed, with divisions pulling in different directions or actively competing. The company's stock price is five times higher than when Mr Nadella took charge, and Microsoft's market capitalisation has passed a trillion dollars. Culture has changed too. JP Courtois, who leads the firm's sales and marketing operations, says: "*The culture at Microsoft has changed from 'know-it-all' to 'learn-it-all'.*" Mr Nadella set out to introduce a growth mindset to Microsoft. The need for a growth mindset is advertised on posters on the company campus, reiterated by managers at the start of meetings and are part of how employees are evaluated. It is a shift from the previous command-and-control model towards a culture of learning and coaching that empowers staff. It fits with the new Microsoft mission statement: "*to empower every person and every organization on the planet to achieve more.*"(Adecco, 2022).

However, for the majority of organizations, the ideal of the learning organization has not yet been realized. Over the past two decades, organizational research has revealed three broad factors essential for organizational learning and adaptability: a supportive learning environment, concrete learning processes and practices, and leadership behavior that provides reinforcement. (Garvin et al.2008)

The capabilities and habits of people who exhibit a culture of learning are (Barry, 2022):

- a growth mindset (never see themselves as the finished product, they are always learning);
- curiosity (have a passion for learning and personal development);
- abundance mindset (see learning opportunities everywhere, even in failure);
- fearlessness (are not scared of struggling with new ideas or being wrong);
- generosity (are compelled to share their learning with others);
- openness (build mutual trust and respect people with diverse opinions, helping them learn from others).

Learning in the flow of work happens when learning becomes embedded into the employee's workflow and enhances the performance of the individual. An integrated HR tech stack supports the learning in the flow of work. It infuses microlearning into the system employees use daily, enabling convenient, individualized learning journeys. Learning is more efficient and effective when content is relevant, targeted to each employee's job and delivered at the moment of impact, leading to better employee performance and organizational outcomes. Learning Technologies provide us with new ways to combine learning in a blended and continuous way, by creating different learning opportunities. (QStream,2022)(further details follow in the 2.3 subsections).

2.3 Learning Technologies

What is learning? Learning is an action for individuals and organizations to develop new knowledge, skills, and abilities. Learning is a cognitively, emotionally, and socially constructive process. This speaks to the complexity of the learning processes and experiences to attain the desirable individual or organizational learning outcomes (Coursera "Learning Technologies", 2020). What is technology? Technology is defined as the application of the sciences to the objectives of industry, business, government systems, and human endeavours (Swanson & Holton, 2009).

There are different definitions of learning technologies. Dr David Huang in the course "*Learning Technologies Foundations and Applications*" from the University of Illinois at Urbana-Champaign, has situated learning technologies as:

- the applications, like video enablement and asynchronous discussion forums. These are connected to e-learning programs and bring more added value to the learning experience;
- the technology-enriched and enabled learning environment (TEELE) can be authoring tools (creating digital content: articulate storyline or adobe captivate). (Coursera "Learning Technologies", 2020)

The book "*Implementation of Learning Technologies*" (Taylor, 2017) defines Learning Technology and the application of technology to enhance teaching, learning and assessment. In this definition, Learning Technology includes computer-based learning and multimedia materials and the use of networks and communications systems to support learning. In both definitions, the training & development programs are at the center of the definition, and learning technologies are an incorporated feature or system that aims to increase the pedagogy of the learning program.

We can observe the same connection (learning technologies with digital content) in Donald H. Taylor's book "*Learning Technologies in the Workplace*". In the COMDEX (an abbreviation of COMputer Dealers' EXhibition) information technology of November 1999, Cisco's John Chambers introduced the term 'e-learning' to the general public. (Chapter 2, pag2).

The Internet and the need for learning and technology were the best combinations. Organizations look at it as the perfect proposition: learning technology (eLearning) could deliver training faster and cheaper.

Despite this message for several years, organisations nowadays seek more than a faster and cheaper replication of classroom training. They need learning technologies that connect with how we learn at work. Organizations need technologies to learn in the flow of work, with the opportunity to practice and the learner at the center of the experience (Taylor, 2017).

The learning technology layer is full of different acronyms, tools, and platforms, and the enormous market for training and learning tools is fragmented. Today, there are more than 200 Learning Management Systems (LMS) vendors, more than 30 Learning Experience Platforms (LXP) vendors, and thousands of vendors who build collaboration tools, mobile learning tools, content development tools, and analytics tools. (Roughly 12% of the \$240 billion corporate training market is spent on tools) (Taylor, 2017).

For the research, we will narrow the concept of Learning Technologies to the usual learning platforms and applications used by organizations and some of the market trends we can observe. The Learning Platforms considered are:

Learning Management System (LMS)

Without considering the epitome of the LMS, no discussion of learning technologies would be complete. An LMS is a software application or web-based technology used to plan, implement and assess a specific learning process. (Taylor, 2017, p.57).

It is used for eLearning practices and, in its most common form, consists of two elements: a server that performs the base functionality and a user interface that instructors, learners and administrators operate. (Brush, 2019). LMS are used to track, record, and report learning data. An LMS delivers and manages all types of content, including video, courses, and documents (Cooke, 2021).

Usually, instructional designers use a learning content management system to handle all activities related to eLearning content, including authoring, storing, publishing, auditing, replacement, deletion, localization, content analytics, and more (Science Soft, 2022).

Learning Content Management Systems (LCMS)

An LCMS stands for Learning Content Management System. It is a platform that allows users to create, manage, host and track digital learning content. We observe a growth of large vendors who sell content (companies like Udemy, LinkedIn Learning, Skillsoft, Coursera, and hundreds of others), but the reality is that almost 70% of all content is developed internally. This is because every organization has its processes, products, safety procedures, internal strategies, and compliance rules. Organizations must buy as much “*off-the-shelf*” content as possible and then invest in constantly updating and refreshing the content as company and business processes change. (Bersin, 2022a).

Social learning platform (SLP)

A Social Learning Platform is a solution that organizations can use to create, manage, and deliver employee training programs. They enable learners to interact based on the model of social media platforms like Facebook, LinkedIn, or Instagram.

The usual features are Social questions and answers (Q&A) or discussion forums where learners can quickly fill in information gaps as coworkers ask questions and get immediate answers from fellow learners. The peer feedback loop to constructive and regular feedback, the competitive gamification such as rewards and badges that incentivize learning, and the opportunity to learners share content like videos (Nichols, 2022).

Learning Experience Platform (LXP)

For several years LMS was the name used to describe the corporate learning system. In an attempt to provide a fresh perspective, around 4 or 5 years ago, some newer systems focused on the user experience, and social or informal learning, resulting in additional classifications such as Next Gen Learning Environment (NGLE) and Learning Experience Platforms (LXP) (Training Magazine Network, 2022).

A learning experience platform, or LXP, is a user-centric learning software built for businesses and consumers to learn, grow skills, discover new information, and engage with peers and leaders across the organization.

Many businesses are implementing LXPs into their training programs and daily operations. Implementing an LXP can benefit training programs by making employees feel more engaged with what they are learning, each other, and their company's mission. This leads to higher information retention and increased productivity across daily business operations (Wisetail, 2022).

Talent Experience Platform (TXP)

It can also be called the Talent intelligence platform. It is a holistic approach to HR where the different domains (Recruiting, Compensation, Internal Mobility, Learning & development), are combined, representing a unique experience for the employee. The TXP integrates insights about workers – their skills, capabilities, experiences, career aspirations, performance, demographics, learning needs, and development opportunities – and uses the information to help people find the right opportunities.

A TXP is the backbone of integrated talent management, matching people to opportunities. When we talk about opportunities, we do not just mean open positions. The real power comes from integration. Because the TXP is built as an integrated platform, it ingests data from a wide

variety of sources – from employee profiles and Human Resources Management Software (HRMS) data, jobs, Applicant Tracking Systems (ATS) data, learning systems, performance data – to match across different areas and for many different use cases. (Eightfold, 2022).

AI-driven platform (Skills Taxonomy creation)

A skills taxonomy is a structured list of skills defined at the organization level that identifies the capabilities of a business in a quantifiable way. It is a system that classifies skills within an organization into groups and clusters (AIHR, 2022).

The big benefit of using technology for skills is that algorithms can automatically develop these inventories, identify adjacent skills, and see which skills are growing or dropping in demand. Rather than simply matching people to jobs (often ill-defined with descriptions that quickly become outdated), we can decompose jobs into roles, each with clear capability needs. Then the system can look for people with relevant capabilities and experiences and find an even better match for candidates (Bersin, 2022b).

HR professionals should keep pace in a new emerging market. Many HCM (Human Capital Management), learning, and recruiting vendors have developed their skills taxonomies, proclaiming theirs as the best. However, these standalone skills taxonomies can quickly become islands, useful only for limited use (Bersin, 2022b).

There are essentially 3 families of skills technologies: the skills engines embedded into an app that could be an LMS, and LXP or TXP), the skills middleware that is built to infer skills across different applications/platforms where import and export of data are done and the algorithm is in a constant “*training*”, and the third is the “*Talent Intelligence Platforms*” that represents companies data gather a huge amount of data and are using their AI to infer skills, career pathways and job clusters (Bersin, 2022c).

Virtual Reality / Augmented Reality (VR, AR)

Virtual reality had existed in various forms as far back as the 1960s when the first digital flight simulators were developed and employed by the world’s major airlines and air forces (Pantelidis, 2010). Augmented reality is a hybrid form of visualization that combines the real and virtual worlds (Choi, 2016). Augmented reality became a part of popular culture in 2016 with the release of the smartphone game Pokemon Go, which has been downloaded over 500 million times.

The advent of affordable and widespread virtual reality technology and the proliferation of smart phones capable of supporting augmented reality has opened incredible opportunities for improving how we learn. The use of virtual reality technology has been shown to increase

learners' engagement and focus, while the immersive and interactive environment encourages the learners to become active learners (Bazavan et al. 2021).

Metaverse (Immersive Learning Experiences)

“We are trying not to define the metaverse so rigidly that it limits the imagination of creators,” said Yosuke Matsuda, CEO of Square Enix. While the definition is still fluid, the consensus view is that the metaverse is the next iteration of the internet, where it becomes something we are immersed in rather than something we view. At its most basic, the metaverse will have three features: a sense of immersion, real-time interactivity and user agency.

The metaverse is the envisioned end state incorporating all digital worlds alongside the physical world, with interoperability between them all. Metaverse is not just gaming, and VR and AR are two of the possible platforms where people can interact with metaverse. As a concept, the metaverse can be broken down into four core building blocks: content and experiences, platforms, infrastructure and hardware, and enablers (Mckinsey, 2022).

Learning & Development is part of the 5 enterprise use cases companies are implementing, according to the report done by Mckinsey. Simulations of real-life settings and situations will allow for a far more captivating learning process, opening possibilities both in onboarding new colleagues and developing current personnel, which is increasingly important for organizations competing for talent on a global scale (McKinsey, 2022).

Taking the digital twins as a way to learn, we are also seeing innovations such as BMW's effort to build a digital factory twin on Nvidia Omniverse which is expected to drive efficiency improvements across its supply chain (Brian Caulfield, 2021). By building virtual replicas of physical settings and objects that generate data in real-time, far richer analyses can be generated than previously to enable improved decision-making (Mckinsey, 2022).

Although in the 21st-century information technology (IT) has developed, understanding the role of learning technologies has not. In general, it is still regarded simply as a way of being more efficient in delivering, storing, and distributing information. (Taylor, 2017). Back to the end of the last century, it is true that learning technologies were related to the proliferation of online learning - eLearning. The premise that it would be as good as classroom training but cheaper and faster to reach all learners was common.

The legacy of cost-cutting measures continued for several years, but nowadays, Learning Technologies are more than that. Technology is both an important enabler and an unrelenting taskmaster. It makes much possible but also sets a pace of business that demands employees know more and faster (Shepherd, 2015).

3 Systematic Literature Review

We performed our Systematic Literature Review (SLR) guided by Kitchenham's Procedures for Performing (Kitchenham, 2004).

The objective was to summarize the main challenges faced by organizations, to identify the existing evidence concerning the learning technologies, to identify any gaps in current research, and last but not least, to provide a framework/background to position the research appropriately. The stages of an SLR adapted are described in Figure 1.

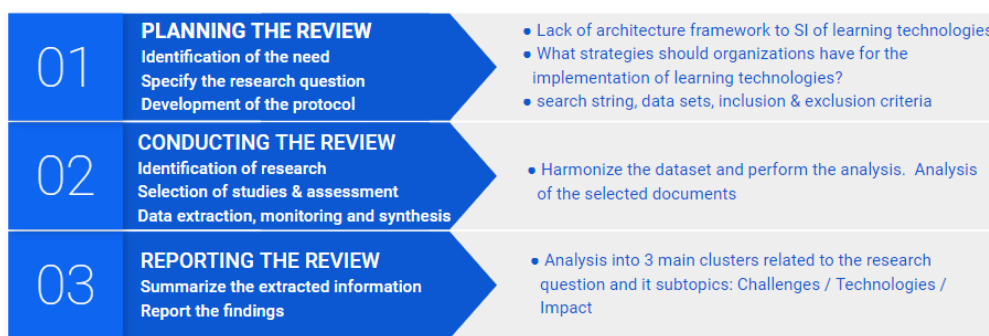


Figure 1 - Stages of the Systematic Literature Review adapted

The SLR section is divided into three phases: Planning, Conducting and Reporting.

3.1 Planning

In the Planning Phases, we will detail the research motivation, the research question and the Review Protocol.

3.1.1 Research Motivation

Implementation of learning technologies is an ongoing practice in several organizations. We are in a context where learning technology is evolving faster, and learning strategies are closely connected with the technologies selected.

However, since the implementation of technologies is a combination of different areas (IT, Management, Talent), there is a lack of reference models that can guide the implementation.

We intend to get information regarding organizations' challenges, the technologies being implemented, and their impact on the organization's field.

3.1.2 Research Questions (RQ)

The systematic review aims to answer a basilar question:

Main RQ - What strategies do organizations consider to implement learning technologies?

In order to achieve the objective, three main areas of analysis were formulated:

RQ1.1 - What are the main challenges that organizations address?

RQ1.2 - What are the common learning technologies used/recommended?

RQ1.3 - What impact (return on investment/benefits) of implementing learning technologies?

3.1.3 Review Protocol

Given the research goals of this review, Table 1 presents the PICOC Analysis where Population, Intervention, Comparison, Outcomes and Context (PICOC) were defined:

Table 1. PICOC Analysis

PICOC Item	Definition
Population	Organizations
Intervention	Technology, Systems and Platforms (LMS, etc)
Comparison	not applicable
Outcome	Learning Strategies
Context	Learning Organizations

Based on the PIPOC analysis, the search string used to perform the search is listed below.

Search String:

organizat AND (“learning management system*” OR “content management system*” OR “knowledge management system*” OR “learning experience platform*” OR eContent OR “mobile learning” OR mlearning) AND (technolog* OR system* OR platform* OR “learning strateg*”) AND (“learning culture” OR “learning organizatio*”) NOT (“high* education” or “universit*” or “college*” or student*)*

The chosen datasets were SCOPUS and EBSCO.

The “*” sign was used at the end of some keywords to expand the range of possible studies. In SCOPUS, instead of operator NOT, it was used AND NOT.

Inclusion and Exclusion Criteria

In order to filter the obtained papers after the search string application, different inclusion and exclusion criteria were defined.

The criteria for inclusion considered are records:

- Related to organizations and learning technologies
- Revised by peers
- From Academic Magazines, Journals, Articles, Reports, and Books

The criteria for exclusion considered are records:

- Related to high education, university
- Related to projects focus on TQM (Total Quality Management)
- Not in English
- Not fully available
- Published before 2015

The review protocol process is illustrated in Figure 2.

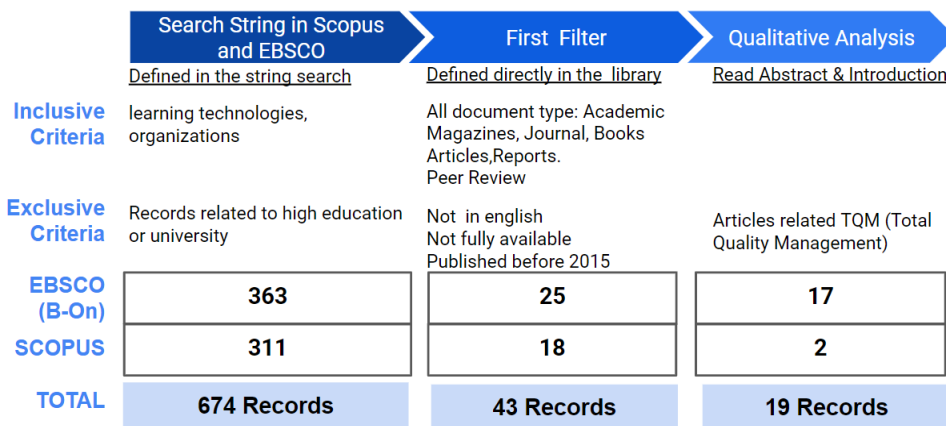


Figure 2 - Review Protocol

3.2 Conducting

Conducting concerns the second phase of the Systematic Literature Review Methodology. The documentation management of all studies reviewed was done on Mendeley, an open-source desktop application to search and organize all references.

3.2.1 Selection of Studies

The search string was used in EBSCO and Scopus Database as a first action. The search string defined an exclusion criterion due to the high volume of records found in the first results. Secondly, the exclusion and inclusion criteria were applied directly in the databases to perform the first filter. Afterwards, a qualitative analysis was performed, and all abstracts were screened to decide their relevance to the research. A final set of papers was obtained, and the final selection of studies to perform the review.

3.2.2 Data Extraction Analysis

Considering the 19 resources selected, we analyzed in Figure 3 the year the records were published. An almost gradual increase in articles published has been observed since 2015 but with a substantial decrease in 2021.

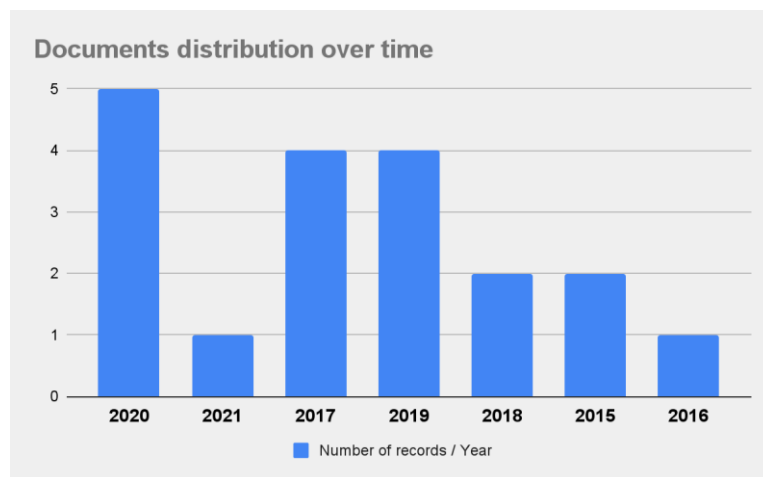


Figure 3 - Documents Distributed over time

In Figure 4, we observe that most documents are articles (17 out of 19).

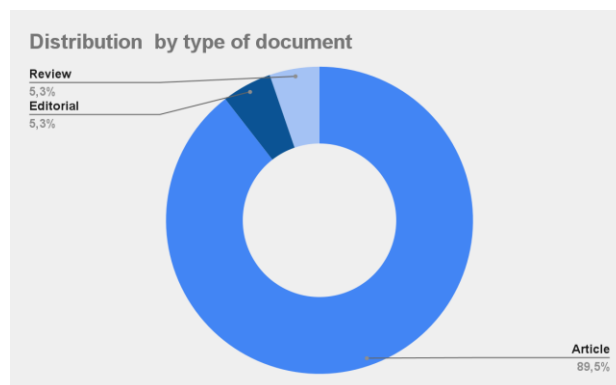


Figure 4 - Distribution by type of document

Figure 5 shows the predominance of documents from the United States. Some of the documents were written by authors from different countries. However, the authors do most of the studies in the same country.

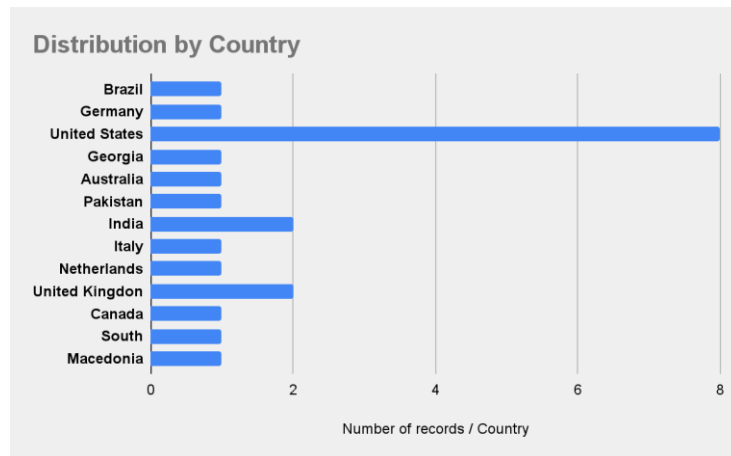


Figure 5 - Distribution by Country

In order to help us identify the areas from which the documents were selected, Figure 6 presents the distribution of underlying theories.

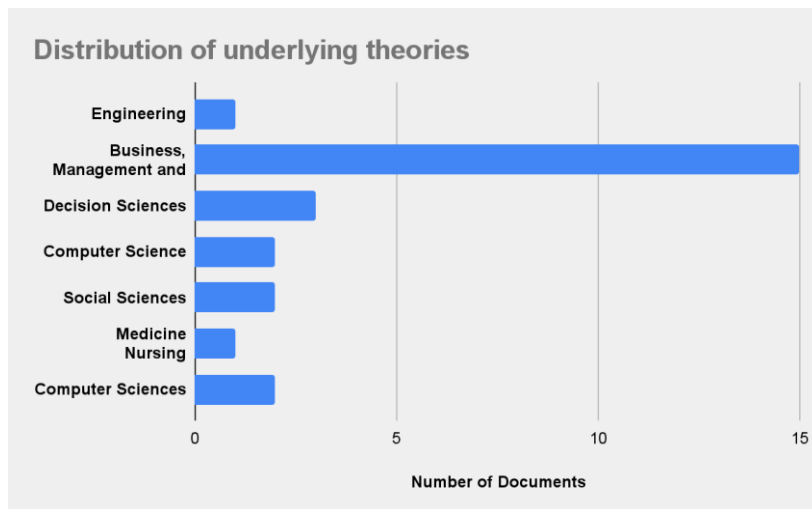


Figure 6 - Distribution by Underlying Theory

We can analyze that the subject is common to different areas, having a stronger highlight in Business and Management Theories. Considering that the implementation of technologies is also an important subject in computer science, it is surprising that this domain does not have a higher number of documents.

3.3 Reporting

Reporting Section concerns the last phase of an SLR. We present the answers to our Research Questions. Table 2 shows an overall view of the documents and the created cluster of the findings per Research Questions.

Table 2. Comparison of RQs and number of cited findings

Research Questions	Findings	Number
RQ 1.1 Challenges	Continuous Knowledge/Skills Management	11
	Employee engagement growth	4
	Technological: System Integration	1
	Disalignment between system and business	2
	Great Resignation	1
	Technological Fast Evolution, Continuous Change, Competition	4
RQ1.2 Learning Technologies	Social Learning Platforms	2
	Learning Content Management Systems	2
	Learning Experience Platform	3
	Learning Management System	3
RQ1.3 Impact	Diversity in the type of content	1
	Decision Data-Driven (Report)	3
	Increased efficiency	4
	Easily convert and share knowledge	4
	Cost reduction	2
	Building knowledge communities,	1
	Curation, Advanced search, Skills framework, User-generated content (UGC)	2

The analysis will now detail the findings for each Research Question item.

3.1.1 What are the main challenges that learning organizations are addressing?

All the challenges presented were analyzed from a learning & development perspective. Table 3 presents the overall view of the challenges per document.

Table 3. RQ 1.1: Findings per document

Document	Challenge
(Macuglia Spanemberg et al., 2020), (Müller et al., 2021), (Millar et al., 2017), (Fazal, 2017), (Anand & Hassan, 2019), (Xenakis, 2018), (Meher & Mishra, 2019),(LAZÄR & ROBU, 2015), (Ketter, 2018), (Hassel, 2017)	Continuous Knowledge/Skills Management
(Macuglia Spanemberg et al., 2020), (Balavadze & Zhgenti, 2018), (Millar et al., 2017), (Betts, 2020)	Employee engagement growth
(Murray M. & Nielsen N., 2019)	Technological: System Integration
(Macuglia Spanemberg et al., 2020)	Great Resignation
(Andrews & Smits, 2019), (Millar et al., 2017), (Betts, 2020), (Ketter, 2018)	Technological Fast Evolution, Continuous Change, Competition

Continuous Knowledge/Skills Management

There is a strong emphasis on knowledge management and the need to develop and retain skills in most documents analyzed. Knowledge sharing is crucial for a successful business, as it helps attain competitive advantage and encourages sharing attitude by helping others concerning various tasks and processes within the workplace. (Anand & Hassan, 2019, cited in Meher & Mishra, 2019).

However, we did not find evidence that implementing learning technologies addressed the challenge. The literature mentioned improvements and changes in the process or systems established, but from a conceptual perspective, not in a concrete technology that enabled knowledge transfer.

Not only must we learn new skills and be able to apply them well and appropriately in different situations. We also have an imperative to learn how to learn as an ongoing capacity and capability that can enable us to diagnose, create, and adapt iteratively. The larger an organization gets, the harder it is to maintain, organize, and disseminate the knowledge it takes for the organization to run effectively and efficiently. (Bergquist and Mura, 2005, Connor, 1998; Stout-Rostron, 2014; Johansen, 2012, cited by Lazar & Robu, 2015)

The challenge affects the different layers of the organizations and areas. In Macuglia Spanemberg (2020), we find the importance of knowledge management on the shop floor: *“The literature recognizes the importance of managing shop floor knowledge and capabilities to create a long-term competitive advantage.”*

Organizations must adopt a strategic approach to manage workers' knowledge because high performance connects to tacit knowledge. Turnover leads to a loss of knowledge, as it may be necessary to hire new people and invest in them (Gambardella et al., 2017, cited by Macuglia Spanemberg et al., 2020).

In Müller et al. (2021), knowledge management is analyzed in high-reliability organizations (HROs): *“Knowledge is of central importance to organizations operating in security-critical environments. The focused transfer of relevant knowledge is necessary for successful emergency operations, which often occur under unequal conditions. Hence, knowledge is always relevant for HRs regarding the performance of their core task: Emergency response. Consequently, an adequate knowledge transfer in HROs is important to enable the exchange of experiences and relevant knowledge for emergency operations. This is the only way to learn from operations that have already been carried out and to preserve the knowledge of the emergency responders.”*

Adequate handling of knowledge as an important resource is essential for the development of an organization. The focused transfer of relevant knowledge is necessary for successful emergency operations, which often occur under unequal conditions (Müller et al., 2021).

The same tendency is found in the Knowledge Intensive Companies (KICs). For such organizations, their intellectual capital, people, is often their only or most precious and valuable asset. Therefore, a key priority for leaders of KICs is to maximise their employees' creative value, stimulating innovative and creative behaviour and creating new knowledge. Organizational leaders are also challenged with ensuring that their intellectual capital and knowledge talent are retained – that competitive edge is kept within their organizational boundaries. (Millar et al., 2017).

Mount Sinai Hospital's Department of Social Work Services Department is also committed to recruiting and developing the most talented social workers to best meet the needs of patients and family caregivers and to serve as integral, valued members of interdisciplinary care teams. Traditional learning methods are insufficient for a staff of hundreds, given the changes in health care and the complexity of the work. (Xenakis, 2018)

The Blaséndian Economy is also identified by Meher & Mishra (2019): *“The real challenge arises when it comes to the retention of knowledge sources. The intellectual capacities in an individual's mind are the most important catalyst for knowledge creation.”*

In Fazal (2017), a case study is analyzed from the perspective of implementing a knowledge management system conceptual model; the main challenge is knowledge transfer. *“Succinctly the reasons that led to Electrocell's failure were the elimination of the cookbook (guidebook),*

which was the knowledge source and a great contributor in the success of the company and the sales persons of Electrocell who had to learn new promotions and approaches.”

AT&T demonstrates the same challenge *“We knew that engaging and reskilling our current employee base to bring them along was the right thing to do for many reasons - not least of which was providing those who have helped to build AT&T an opportunity to grow and succeed along with the company.”* said the Senior Executive Vice President of Human Resources, Billblasée (Hassel, 2017).

A rapidly evolving business environment forces organizations to have strong change management initiatives, nurture critical competencies such as emotional intelligence and relationship building, and create development programs for a diverse workforce. The future of work is coming quickly, and the skills needed to stay up to speed are changing even faster (Ketter, 2018).

Employee engagement and growth

“Developing a learning culture is no longer just another fanciful idea. It is becoming more imperative for companies to cultivate learning if they wish to stay in business.” (Tala A. Nabong, as cited in Balavadze & Zhgenti et al., 2018).

The employee's engagement can also be seen from the perspective of disengagement. A lack of efficiency in the knowledge management system results from the knowledge workers' differing perspectives regarding the value of such systems rather than a disinclination to share and/or knowledge hiding part of the way they work (Millar et al., 2017).

Employees are putting in ever shorter tenures and showing growing impatience with specific learning technology solutions in an always-on, wired world (Betts, 2020).

Technological: System Integration

It can be challenging for learning leaders to actively manage and tell convincing stories about the digital tools and platforms an organization has in its portfolio.

Consequently, an integrated roadmap or comprehensive point of view on creating world-class learning experiences, enabling teams to build and iterate content and courses rapidly, and rigorously measure outcomes may be an issue. Moreover, that means that the ecosystem in place is not the right to enable and track the behaviour and mindset shifts needed to achieve employees' performance goals and execute business strategy. Typically, it is a story of haphazard adoption, periodic bursts of innovation, and a lack of a clear digital learning strategy (Murray M. & Nielsen N., 2019).

Technological Fast Evolution, Continuous Change, competition

Organizations, especially those reliant on sophisticated knowledge management, face challenges due to dynamic complexity, technological change, and international competition (Grant, 2010, as cited in Andrews & Smits, 2019). Technological advancement in how we work brings digitization of work that enables individuals to connect from one location to another and the outsourcing of production formerly done in one location to a dispersed set of global locations. (Millar et al., 2017).

Among the biggest challenges - and opportunities - for Talent & Development professionals are the changing landscape of the workforce, multiple generations working together, and the growing population of Millennials assuming leadership roles for the first time (Ketter, 2018). Technology has changed drastically, with mobile dominating, apps appearing, and artificial intelligence coming to play properly for the first time. (Betts, 2020).

Great Resignation

According to the U.S. Bureau of Labor Statistics, 4 million Americans quit their jobs in July 2021 (Cook, 2021). Losses of knowledge resulting from turnover caused by workers resigning and going after jobs at competitors, dismissal for the excess of the workforce, or retirements, expose the organization to risks.

Employees may possess rare skills that are difficult to reproduce and critical knowledge about the company (Whelan & Carcary, 2011, cited by Macuglia Spanemberg et al., 2020).

Turnover leads to a loss of knowledge, as it may be necessary to hire new people and invest in them (Gambardella et al., 2017, cited by Macuglia Spanemberg et al., 2020). Specialized professionals who are not duly recognized or given growth opportunities may leave the company for better development opportunities, with consequent loss of knowledge for the organization. (Macuglia Spanemberg et al., 2020).

Gallup estimates that the cost of turnover per individual employee is one-half to two times that person's salary (Gallup, 2019).

3.1.2 What are the common learning technologies being used/recommended?

The literature review shows that not all learning challenges have addressed a strategy that connects with technological implementation. A systematic map to understand the impact of investing in knowledge for a production line and correlations between the main variables were defined when looking for knowledge management (Macuglia Spanemberg et al., 2020).

The same was done by Müller et al. (2021), who described factors influencing the transfer of operational knowledge and what a conceptual framework might look like in this context. However, some articles addressed learning technologies that we identified with the corresponding articles in Table 4.

Table 4. RQ 1.2: Findings per document

Document	Technology
(Balavadze & Zhgenti, 2018), (Hassel, 2017), (Xenakis, 2018)	Learning Management System
(Sundaresan & Zhang, 2020),(Millar et al., 2017)	Social Learning Platform
(Yoo & Huang, 2016), (Hassel, 2017)	Learning Content Management Systems
(Tassetto, 2019), (Betts, 2020),(Hassel, 2017)	Learning Experience Platform

Learning Management System (LMS)

Three LMS implementations were found. Balavadze & Zhgenti (2018) described the implementation of a Moodle-based Learning Management System (LMS) as a knowledge-sharing platform to promote experience sharing in the Bank of Georgia. In an interview with Profile magazine, the Vice President at AT&T, John Palmer, shared that a new learning management system was implemented to set a strategy for reskilling their human capital (Hassel, 2017).

Developed in 2012, the Portal for Education and Advancement of Knowledge (PEAK) is Mount Sinai Hospital's Department's Learning Management System (LMS). PEAK disseminates knowledge to wide learning audiences across its health system. It can assign, track, build and evaluate learning content on a system-wide level, an innovative way to maximize the benefits of technology in providing staff education. (Xenakis, 2018).

Social Learning Platform (SLP)

Social platforms are technological knowledge management designed to capture both:

- Explicit or documented knowledge through the documentation of knowledge in an organizational repository
- Implicit or undocumented knowledge through the development of databases or knowledge maps designed to replicate social networks (Criscuolo, Salter & Sheehan, 2007, Watson & Hewett, 2006, as cited in Millar et al., 2017).

An enterprise social network (ESN) is an organisation's specialized online social media platform that allows employees to form online communities and streamline connections across different functional departments. Applying ESNs in promoting knowledge sharing and learning among individuals depends on technological, organizational, social, and individual factors (Chin, Evans, and Choo, 2015, cited by Sundaresan & Zhang, 2020).

Müller et al. (2021) mentioned that it had been shown that, despite the hierarchical structures of these organizations, informal forms of knowledge transfer are particularly relevant, and undocumented knowledge can be managed through the development of databases or knowledge maps that are designed to replicate social networks.

Learning Content Management Systems (LCMS)

In practice, an e-learning system is often utilized to foster professional development as it can deliver information and knowledge to individuals across organizations. More than half (63%) of corporations in South Korea implemented an e-learning system in 2011. Approximately 52.8% of individuals in South Korean corporations participate in e-learning (National IT Industry Promotion Agency, 2011, mentioned in Yoo & Huang, 2016).

Another organizational example of the use of external content providers is AT&T which, in 2013, offered an online master's degree in computer science to develop future tech talent and equip its employees with critical skills for their business. AT&T invested \$2 million to help launch the program, and more than 4,000 students were enrolled (Hassel, 2017).

Learning Experience Platform (LXP)

LXP has presented a next-generation front end to the plethora of available learning opportunities and, at first, looked more modern - a cleaner, more consumer-grade user experience. The LXP should become a tool of self-directed learning that is unique for each user. Most LXPs associate themselves with skills frameworks that enable individuals to diagnose their most immediate needs and frame their activities as a path to self-improvement.

The best LXPs align with organizational strategy, working to identify those skills that are urgent and important to be improved upon for the benefit of an individual's career and an organization's plan (Betts, 2020).

With LXP, learners receive personalized content recommendations. They can also be given the option of adding content they believe is relevant to their learning experience. Learners experience content in a way familiar to them, such as the delivery mechanisms on streaming websites such as Netflix. LXPs put the user in charge of command and control. (Tassetto, 2019).

In the same case study mentioned in the previous topics of the RQs “*Technology*”, AT&T has also launched the Personal Learning Experience platform that allows employees to plan, access, view, manage and track their learning. It also allows them to search for jobs based on their current competencies (Hassel, 2017).

Although technology is pervasive in the workplace, work productivity could remain unchanged if employees have a low acceptance of technology. This unfavourable outcome becomes a reality when organizations think that merely building technological systems is good enough to make their employees use them (Lee et al., 2009; Rosenberg, 2006, cited by Yoo & Huang, 2016).

3.1.3 What impact (return on investment or benefits) of implementing learning technologies?

Technologies represent an impact on increased efficiency, productivity, and profit, where each employee takes part in the knowledge and experience-sharing process and feels ownership and accountability for the organization’s accomplishments. (Balavadze & Zhgenti, 2018).

The impact is a return on investment measured by evidence. Table 5 presents the different impacts observed or expected by the technologies implemented.

Table 5. RQ 1.3: Findings per document

Document	Technology	Impact
(Balavadze & Zhgenti, 2018),	Learning Management System	Diversity in the type of content Decision Data-Driven (Report) Flexibility to adapt Increased efficiency
(Sundaresan & Zhang, 2020)	Social Learning Platforms	Easily convert and share knowledge. Cost reduction
(Yoo & Huang, 2016), (Tassetto, 2019)	Learning Content Management Systems	Flexible access to learning contents Deliver consistently high-quality learning materials Observed: 15% MOOC completion rate Personalized user experience Automatic Content Curation
(Tassetto, 2019),(Betts, 2020)	Learning Experience Platform	Advanced search Skills framework User-generated content (UGC)

The implementation of Moodle in the Bank of Georgia showed an increase in efficiency, productivity and profit, where each employee takes part in the knowledge and experience-sharing process and feels ownership and accountability for the organization’s accomplishments. It also brings new forms of learning for professional/position-related skills

and knowledge enhancement (video, tutorials, and instructions). The reporting capabilities are also an added value. The LMS allows installing plug-ins that give very valuable analysis regarding each employee. (Balavadze & Zhgenti, 2018).

LCMS are gaining popularity in the workplace due to their many advantages. Such systems provide employees with flexible access to learning content regardless of workplace location, gender, or cultural differences. Additionally, e-learning systems can support learning while creating, sharing, and transferring knowledge across organizations. LCMS also enable organizations to update their capabilities worldwide and deliver consistently high-quality learning materials in various formats (Biech, 2008, Jia et al., 2011, Liebowitz & Frank, 2011, cited by Yoo & Huang, 2016).

However, there are also downsides to digital content that needs to be analyzed. The current completion rate for MOOCs (massive open online courses) averages as low as 15%, for example. Such poor rates make training budgets a wasted and expensive resource (Tassetto, 2019).

In 2019 analyst firm Gartner identified LXPs as a market segment in corporate learning suites, reflecting LXPs position in the corporate learning environment and differentiating it from traditional LMSs. LXPs are interactive and resonate with employees' personal preferences. Their ability to various self-serve content, including podcasts, videos, and learning games, introduces a new way of learning that is entertaining, informative, and easy to traverse. Such an approach promises to bring to an end user indifference and poor completion rates associated with traditional eLearning tools (Tassetto, 2019). The LXP approach is most relevant if a department is struggling to keep up with its business.

From a top-down perspective, it is not easy to provide up-to-date curriculums and content across the entire business. We cannot create content and learning experiences fast enough to keep pace with business and industry changes. Thus, organizations need to shift the corporate mindset from one of waiting to be taught, toward a culture of daily learning that is autonomous and self-directed. (Betts, 2020).

4 Research Methodology

We present our Research Problem, the macro-level vision of the process we follow in this research and the analysis “*per se*”.

4.1 Research Problem

It was possible to take several relevant pieces of information from our Systematic Literature Review based on our selected papers. From the learning perspective, the literature review identified the learning organization as a fundamental pillar of organizations.

The performance and survival challenges faced by many organizations require enhanced dynamic capabilities. Teams of experts should pool and share their explicit discipline-based knowledge while developing the needed capabilities and improving and sustaining their effectiveness (Smits & Bowden, 2015, cited by Andrews & Smits, 2019).

However, that natural process, without guidance, is a hit-and-miss phenomenon that many organizations in dynamic situations can no longer afford. (Andrews & Smits, 2019). Information Technology and Information and Communication Technology (ICT) are indispensable for the effective and efficient dissemination of information (Fazal, 2017).

A topic that has not yet been researched is how technologies can respond to the challenges organizations are facing - Learning Technology identification and strategy to implement it needs to come together. The capabilities of the information system and characteristics of the organization, its work systems, its people, and its development and implementation methodologies, determine the extent to which that purpose is achieved (Silver et al. 1995).

It became clear that successful learning technology implementations are not a matter of chance. Failed implementations usually happen for reasons that are predictable and preventable. (Taylor, 2017). Only a few contributions explore technology as a key actor and this is surprising as technology is of central importance to organizations and is driving the transformation of companies in areas beyond learning, such as new ways of work and core business models.

Our research problem is that a review of current academic literature fails to provide consistent strategies for implementing learning technologies and a clear picture of their impact on organizations.

The SLR supports our proposal for a synergistic relationship among 3 dimensions: the challenges that organizations are facing, the learning technologies that support its implementation, and last but not least, what we get from it, the impact. Considering that many

learning technologies implementations lack empirical support, this research intends to improve the effects and efficacy of these implementations.

4.2 Research Methodology Process

The process considered is illustrated in Figure 7.

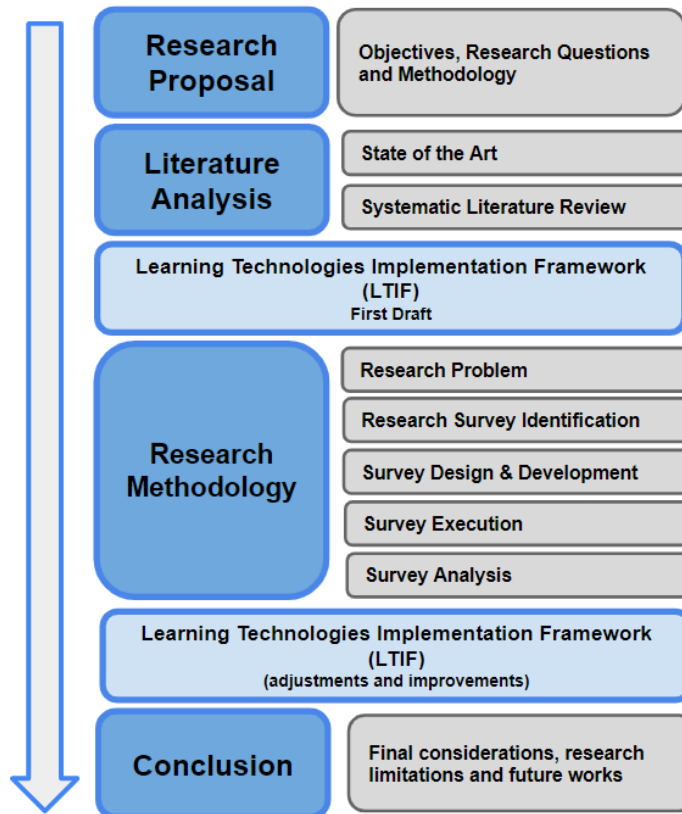


Figure 7 – Research Methodology Process

Our research considers two main methodologies: the Systematic Literature Review (SLR), that is based on the research question and analyzed the existing literature and context; and the Research Survey that we will explore in the next sub-section.

4.3 Survey Research

Survey research is "collecting information from a sample of individuals through their responses to questions" (Check & Schutt, 2012, p. 160). Survey research can use quantitative research strategies (e.g., using questionnaires with numerically rated items), qualitative research strategies (e.g., using open-ended questions), or both strategies (i.e., mixed methods) (Ponto, 2015).

Qualitative research seeks to perceive an issue in more depth, find the cause of an occurrence, create inferences, find solutions to problems and uncover trends (Pollfish, 2022). Quantitative

research quantifies behaviours, opinions, attitudes, and other variables and generalizes from a larger population. Quantitative research uses quantifiable data to articulate facts and reveal patterns in research. This research method involves using statistical and mathematical tools to derive results (Formplus Blog, 2022).

Survey research uses a selected portion of the population from which the findings can be generalized back to the population later. Independent and dependent variables are used to define the scope of the study but cannot be explicitly controlled by the researcher. Before conducting the survey, the researcher must predicate a model identifying the expected relationships among these variables. The survey is then constructed to test the model against observations of the phenomena (Glasow, 2005).

Survey Research is preferred in contrast to other methodologies because it includes the types and number of variables that can be studied, requires minimal investment to develop and administer, and is relatively easy to make generalizations (Bell, 1996, p. 68). Surveys Research can also elicit information about otherwise difficult-to-measure attitudes using observational techniques (McIntyre, 1999, p. 75).

When doing survey research, we must overcome confusion with the survey methods. Survey methods are the tools or processes used in survey research to gather information. Figure 8 presents the survey research process followed, and in the following points, we will detail the analysis of each of the key elements of the survey Process.



Figure 8 - Survey Research Process

4.3.1 Survey Design

According to Levy and Lemeshow (1999), survey design involves two steps. First, a sampling plan and a specific size must be developed, and second, the choice of survey media.

The sampling plan describes the approach that will be used to select the sample, how an adequate sample size will be determined, and the choice of media through which the survey will be administered (Levy and Lemeshow (1999) (p. 6)). Salant and Dillman (1994) noted that the available resources determine the choice of survey medium.

It may be a questionnaire/written survey (paper or online) that lists structured questions to which respondents provide answers. It is a more formal data gathering and can be used for qualitative or quantitative research.

Other options are the interview / oral surveys that include telephone, face-to-face or virtual interviews, or a mixed mode survey that combines both.

Sample Selection, we identified a Non-Probability Purposive Sampling Method, i.e., based on specific criteria and with a selection of individuals for a specific quality relevant to the study (Cint, 2022). Salant and Dillman (1994) observed that a prerequisite to sample selection is to define the target population as narrowly as possible (p. 58).

The target populations are organizations (public or private) with a Learning & Development function. The respondents have responsibilities or are the decision-makers in the implementation of learning technologies and are knowledgeable in the implementation of the learning technologies field. Some examples of roles are Head of Learning, Chief Learning Officer, Learning & Development Manager, Learning Technologies Manager, and Learning Strategic Leader.

Sample size, three criteria usually will need to be specified to determine the appropriate sample size: the level of precision, the level of confidence or risk, and the degree of variability in the attributes being measured (Glenn D. Isreal, 2003). To identify the sample size, we followed the Cochran Equation.

The Cochran formula allowed us to calculate an ideal sample size given a desired level of precision, desired confidence level, and the estimated proportion of the attribute present in the population. Cochran's formula is considered especially appropriate in situations with large populations.

$$n = \frac{Z^2 Pq}{e^2}$$

n = sample size

z = reliability level or significance level. As the confidence level is 70%, Z is set at 1,036

p = is the % of the population estimated to have a particular characteristic. We consider 50% the maximum error, as we do not know the proportion.

e is the degree of precision

$q = 1-p$

e = acceptable sampling error ($e = 0.11$)

Calculation: $((1.036 \times 1.036) \times (0.5 \times 0.5)) / (0.11 \times 0.11) = 21,36 = \mathbf{22,17 \text{ respondents}}$

Choice of Survey Media, considering the nature of this research, we used a written online survey with a mixed analysis method. We combined a qualitative approach to analyze patterns and better explore behaviours and actions by implementing learning technologies and a quantitative approach to confirm theories and assumptions. The decision was taken considering the reduced timeline available and the fact that the survey distribution was easier and faster. It was also the best way to elicit confidential information.

4.3.2 Survey Instrument Development

Certain prerequisites must precede survey instrument development. First, the focus of the study must be carefully defined. Second, the study objectives must be translated into measurable factors contributing to that focus (Salant & Dillman, 1994, pp. 77-78). Third, the researcher must ensure that he or she is well-versed in the topic (p. 99). Finally, the survey must be consistently administered (Fowler, 1995, p. 3).

The focus of the study

The “*Learning Technologies Implementation*” written online survey was designed to understand organizations' strategies for implementing learning technologies. The survey considered the research question and the three main dimensions of analysis: challenges, technology and impact.

Translation of the objectives into measurable factors

The “*Learning Technologies Implementation*” online survey analyzed the learning technologies implementation by industrial sector, geography, type of company, technology, and respondent role. In addition to the characterization information, the survey consisted of six groups of questions:

- Organizational Challenges
- Learning Technologies
- Implementation
- Impact
- Future Implementation

- Conclusion

The survey followed a wording consistent with the respondents' experience. The wording was clear and did not give space for misinterpretations. In order to strengthen the reliability of the written survey, we took the Interview Preview Protocol Refinement Framework (IPR framework) (Castillo-Montoya, 2016) as a best practice. We adapted it to an assessment of the reliability of our written survey.

Appendix A presents the first iteration of the analysis done, which originated the final version of the written survey "Learning Technologies Implementation" after the needed improvements. The survey can be visualized in Appendix B.

Table 6 shows the alignment of each survey section with the research objective (the why of those questions to be included in the survey) and the number of questions. This table is defined as the written survey protocol.

Table 6. Written Survey Protocol

Section in the survey	Question Purpose / Objective	Type of Wording in the survey	Question Nr
Introductory message	Share the purpose of the survey		
	Mention the confidentiality	Text	0
	Duration of the Survey		
Contact Person			
Respondents Characterization	Organization, location, dispersion, size and type of work arrangement.	-Closed-ended Questions: YES/NO, Multiple Choice, DropDow, checkboxes	7
	Respondent's role and experience with implementation	- Open-ended Questions: when the option is "if others."	
Organizational Challenges (RQ1.1)	More updated and precise analysis of the main challenges that learning organizations address with implementation. Connection with the Section Challenges of the Framework and Research Question	- Closed-ended: Questions: Checkboxes	3 (1 opt)
	Main challenges that organizations are addressing	- Open-ended Questions: short answer text	
	Inventory of the platforms/tools part of the organisation's learning ecosystem.	- Closed-ended Questions: Checkboxes	
Learning Technologies (RQ1.2)	Connection with the Section Learning Technologies of the Framework	- Open-ended Questions: when the option is "if others."	3 (1 opt)
Implementation	Evaluate the importance of each section of the framework. Detection	- Closed. Ended questions: Scale (Very Important - Important - Moderately	5

(Main RQ)	of others not included in the draft version	Important -Slightly Important-Not Important) - Open-ended Questions: short answer	(1 opt)
Impact (RQ1.3)	Measure the level of satisfaction and analyze the factors that contributed to the implementation's success (or not). Connection with the Section Impact of the Framework	- Closed.ended questions: Checkboxes with 5 levels using Likert scales (Not at all satisfied to Extremely satisfied) - Open-ended Questions: short answer text	max 7 depends on the answers (1 opt)
Future Implementation	Analyze potential future research or tendencies	- Closed.ended questions: Checkboxes with 5 levels using Likert scales (Not at all satisfied to Extremely satisfied	max 2 depends on the answers
Conclusion	the driver to answer the survey, request the email (optional) and thank to all respondents	- Open-ended Questions: short answer text	2 opt

4.3.3 Survey Execution

The third phase of the survey process is the execution, or use, of the survey instrument. Salant and Dillman (1994) emphasized the importance of maintaining the confidentiality of individual responses and reporting survey results only in the aggregate. Another ethical consideration is recognizing that survey participation is a voluntary event that requires the researcher to encourage participation without undue pressure or coercion of the participants (p. 9).

Data collection was conducted during August and September, 2022. Considering the target population defined, the potential respondents were selected on LinkedIn and personal networks. Figure 9 details the Data Collection Process.

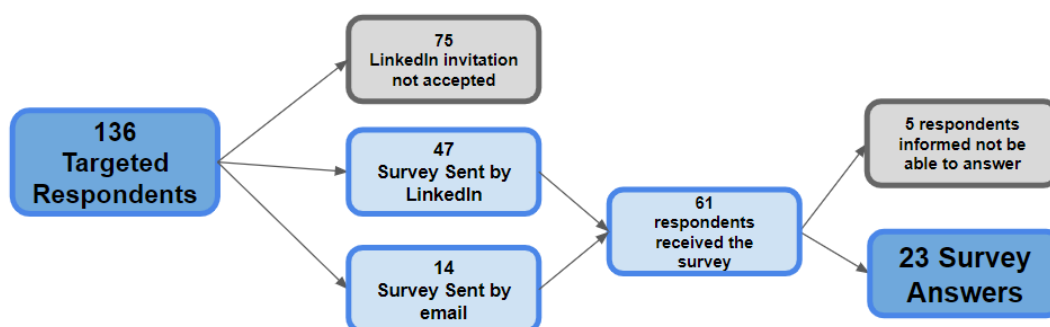


Figure 9 - Data Collection Process

The response rate for the survey was 37,7%. Five of the respondents that received the survey mentioned being retired from the market or not in closer contact with the learning technologies implementation for a while, and therefore decided to do not to answer.

4.3.4 Survey Analysis

It is worthwhile to consider the resource requirements of surveys, data analysis, and effective presentation of results as important elements of a credible and successful survey (Glasow, 2005).

Respondents Characterization

The survey covered organizations with headquarters localized in 12 countries from all over the world. Figure 10, presents the number of those headquarters by country. Switzerland, Belgium, Portugal and the US represent 47.8% of the answers.

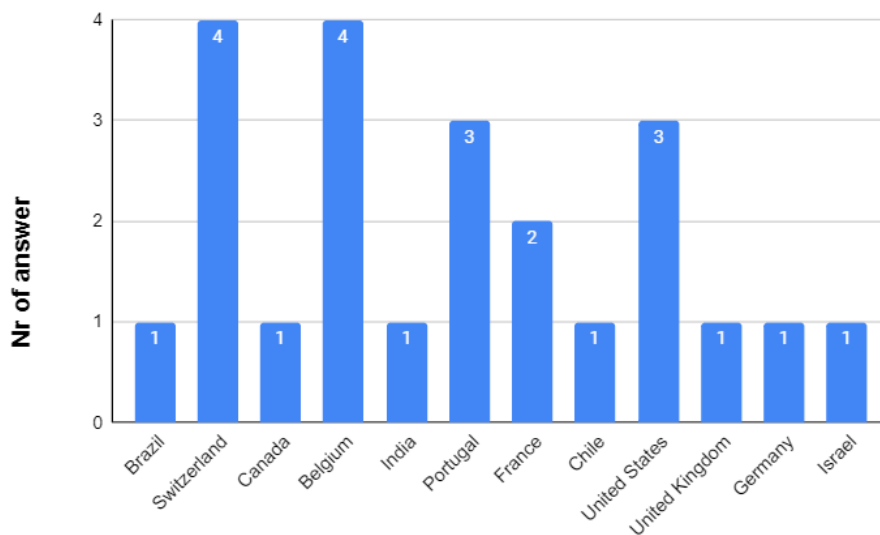


Figure 10 - Survey Question 2: Organizations by country

We observe a diverse landscape when analyzing the industries part of the research as Figure 11 presents. The Manufacturing and High-Tech Industries gathered 39,1% of the answers.

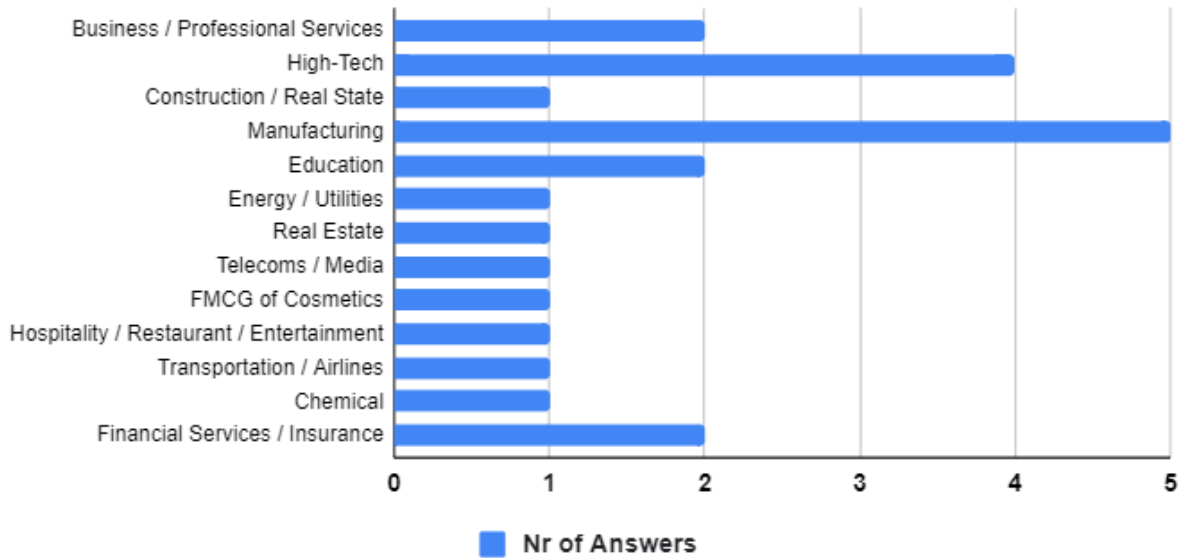


Figure 11 – Survey_Characterization Question 1: Organizations by Industries

The organizations are located in different countries. Only 1 respondent mentioned being located in a single country.

Considering the organizations' size, Figure 12 presents this characterization.

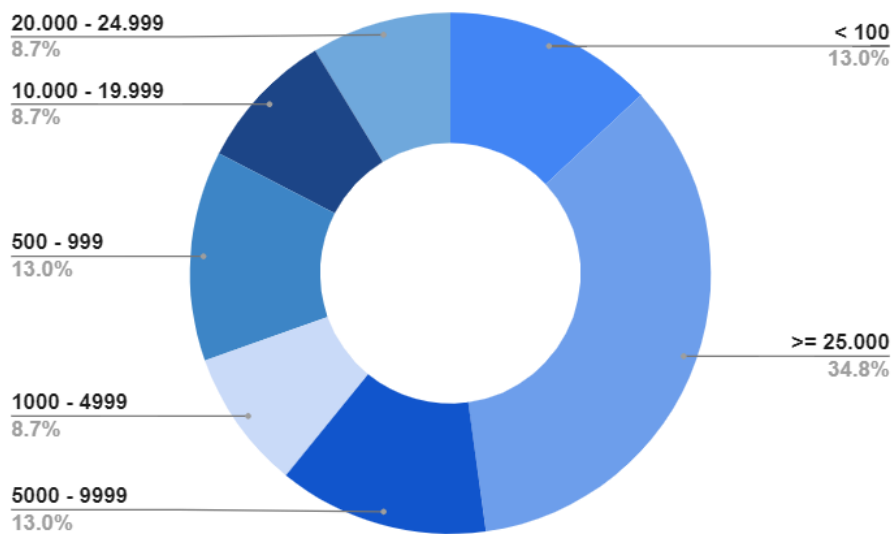


Figure 12 - Survey_Characterization Question 4: Size of Organizations

If we consider that an organization that has more than 5000 employees is large, 65,6% of the answers represent this type of organization.

As a possible result of the new “way of working” post-COVID-19, 73,9% of the respondents identified hybrid work as the established work arrangement. Figure 13 details the answers received.

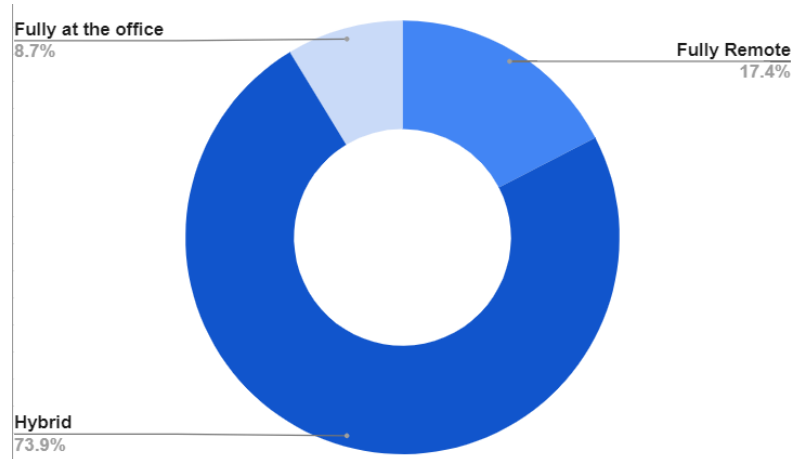


Figure 13 - Survey_Characterization Question 5: Work Arrangement of the Organizations

Figure 14 shows the % of respondents by role in the organization.

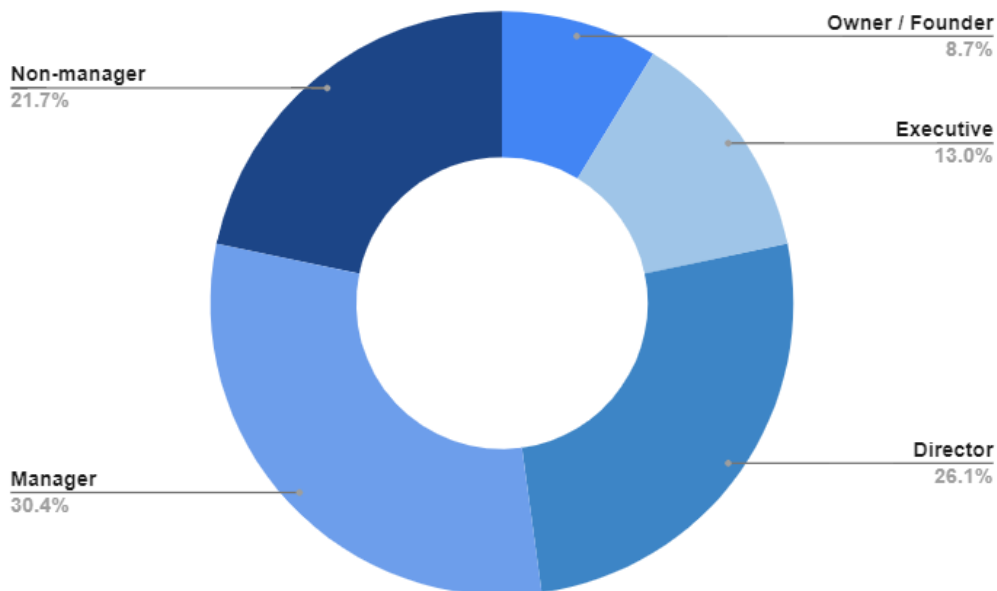


Figure 14 - Survey_Characterization Question 6: Respondents by Role

Last but not least, in the characterization section of the written survey, the respondents were asked about their past or current involvement in the implementation of learning technologies. 87% of the respondents mentioned that they were or are involved in learning technologies implementations.

Organizational Challenges

Looking at the next section of the written survey, we asked for answers related to the dimension challenges. When asked about the most significant business challenges that the organization is facing, 62,2% of the respondents mentioned: “*Digital & Agile Transformation*”,

followed by “*Increasing business agility*” (47,8%), “*Increasing organizational performance & profitability*” and “*Flexible & Hybrid Working*” (both with 24,48%). Figure 15 details the analysis.

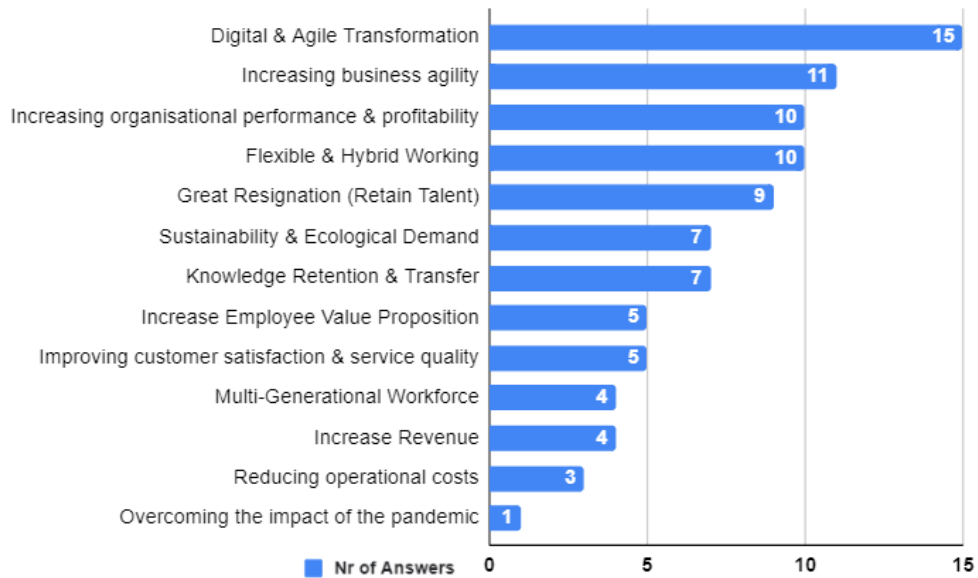


Figure 15 - Survey_Challenges Questions 1: Business challenges faced by the organizations

The impact of the pandemic is already part of the past and does not represent the main challenge, according to the results. Surprisingly, “*Great Resignation*” appears in the 5^a position, which, according to the systematic literature review, was expected to receive a more significant percentage.

When looking at the second layer of challenges - the L&D priorities - the top 3 are: “*Increase Employee's engagement for learning*” (73,9%), “*Reskilling & upskilling*” (65,22%) and “*Better leadership & management*” (52,17%).

Figure 16 illustrates the overall view of the L&D priorities identified by the respondents.

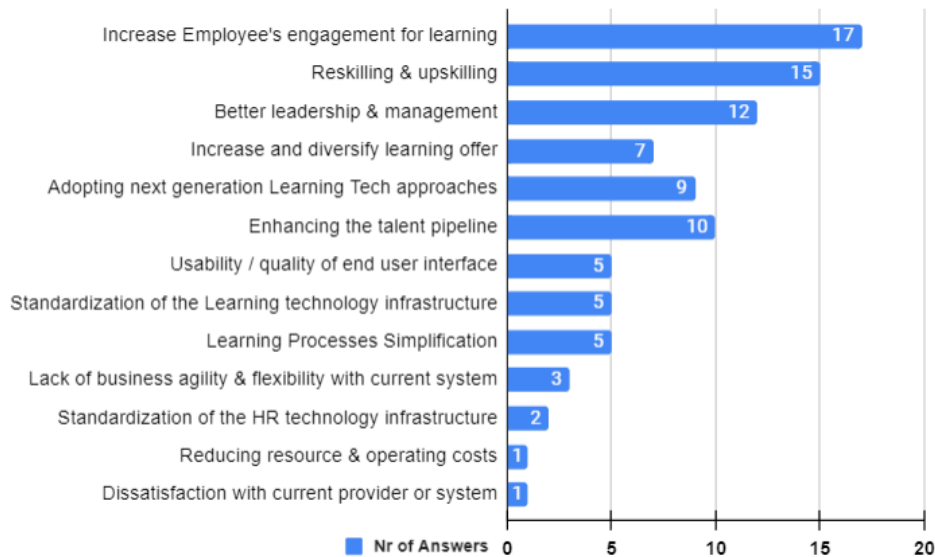


Figure 16 - Survey_Challenges Questions 2: L&D priorities

“Better Learning Regulation & compliance”, “Reducing systems & IT costs”, and “Current solutions limited range of functionality” did not receive any answer. “Dissatisfaction with current provider or system” and “Reducing resource & operating cost” received only 1 answer each.

Considering this, we conclude that most organizations are implementing learning technologies not to reduce costs or resources but because the existing system does not comply with the current needs. The priorities are related to “people-oriented” objectives and engagement strategies rather than operational or structural reasons.

When asked about other challenges, the respondents identified “Build Employee Belongingness”, “Learning in the flow of work”, “Promotion of the catalogue learnings” and “Learning analytics that supports more data-driven decisions”.

From the possibility of selecting 5 items in each challenge (Organizational and L&D), only 20% of the respondents did not select the 5 items in each question. In this research, 80% of the organizations focus on various challenges and priorities while operating in a complex and demanding environment.

Learning Technologies Analysis

Figure 17 identifies the technologies part of the learning ecosystem of the organizations.

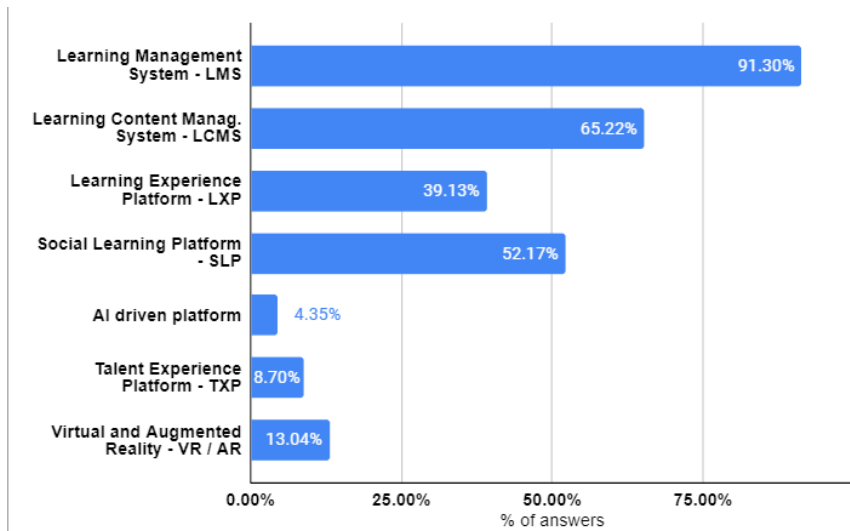


Figure 17 - Survey_Learning Tech Questions 1: Learning Technologies part of the existent Ecosystem

Only two respondents mentioned to do not have an LMS, and only one mentioned using an AI-driven platform to infer skills from their HR/Learning infrastructure.

On average, organizations have 3 learning technologies, as Figure 18 presents.

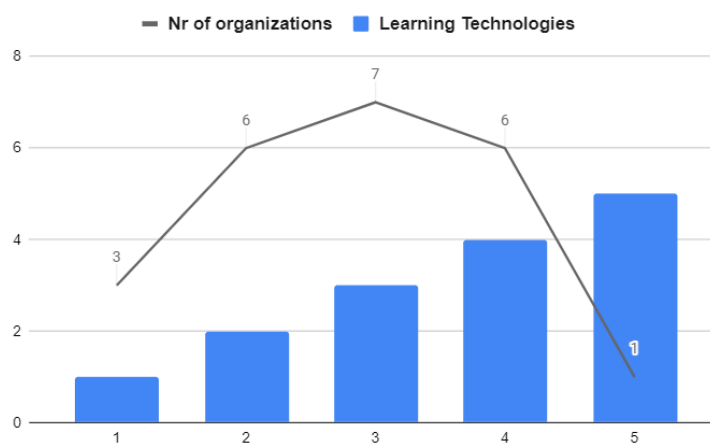


Figure 18 - Nr of Organization vs Nr of Learning Technologies

For the question “*How does this Learning Ecosystem dovetail with your needs?*” the answers received were related to 3 main areas: the improvement needed, positive feedback so far, and examples of the utilization of the learning technologies. Table 7 presents the resume of those answers.

Table 7. Survey_Learning Tech Questions 3: How does this Learning Ecosystem dovetail with your needs?

Room for improvement	Positive Feedback	Example of activities and future actions
Traditional approach to learning	Cost reduced by 50%.	Replace with new LMS and/or LXP
Minimal use of online content	Ok for employees	Efficient in planning and managing training
Slower	Well	needs to add other engagement tools for
Overly complex	Gives quick and satisfactory online classes	
Underserves our needs	solutions	Search and register learning needs.
Needs updating	Perfectly well	Anchored to leadership characteristics
Not always easy for administrators	OK	Missing a TXP
Space to improve tacit knowledge	Satisfied the basic needs	Scalability of the digital learning created by the organization
Moderately	Is good and appreciated	
	Redesigned & configured the way LCMS brings behavioral training to all we wanted	employees
		SLP to deliver leadership academy programs

Implementation

The respondents selected, in their majority, the implementation of LXP and LMS (both with 9 answers). The TXP and SLP did not receive any answer. Figure 19 illustrates the selection of the respondents.

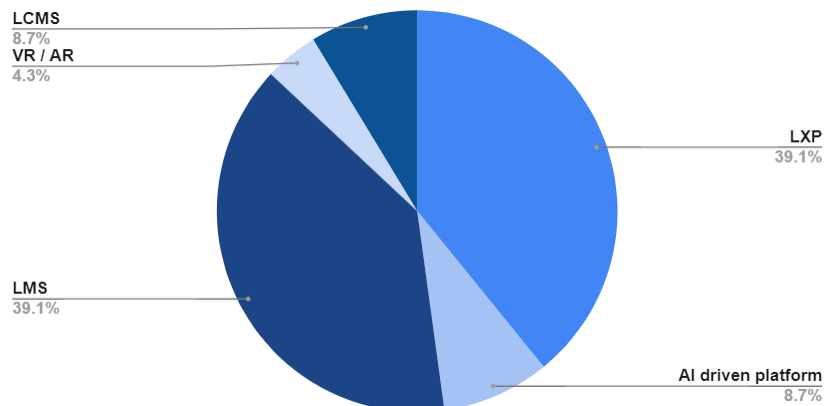


Figure 19 - Survey_Implementation Questions 1: Learning Technology Implementation Selection

Going into the implementation details, we observe that the respondents evaluated the items mainly between the “*very important*” and “*important*” levels of the Likert Scale. A possible analysis is that our first draft of the framework was already effective and covered the most important items. In order to better define the items contributing to successful implementation, we assigned points to each level. The “*very important*” item received 5 points for a differentiator weight among the other items.

- Very Important – 5 points
- Important – 3 points
- Moderately Important – 2 points
- Slightly Important – 1 point
- Not Important/Not considerer – 0 points

Table 8 presents the 5 most important items (6 in case of items with the same points) in the following phases: before the implementation, when selecting the vendor and during the implementation.

Table 8 - The most important items to each implementation phase (all implementations)

Implementation Items	
BEFORE	Focus on employee experience first (create personas)
	Identify your most important use-cases/ business case
	Partner with IT team
	Budget the project
	Insure that data is clean and coming from the right sources
SELECTING THE VENDOR	Provider flexibility to see beyond their own solution
	Provider performance post-installation.
	Provided experience in similar projects
	Predefined business and technical requirements
	Importance of software features
	Demos presentations
DURING THE IMPLEMENTATION	Communication Plan to kick off and after
	Create a pilot with some end users
	Evaluation plan to after the kickoff
	Recurrent meetings with the project team (internal & provider)
	Iterate feedback during all project and specially the pilot

When asked about other items that are (were) important to the implementation, the respondents added: “*the need to know the owner needs to do not get influenced by the several features may bring*”, “*change management*”, “*add real users to user acceptance test (UAT)*”, “*process management*”, and “*flexible approach*”.

To better understand if the implementation ranking items may differ considering the technology implemented, we performed the same analysis isolating the LMSs and the LXPs implementation. The assigned points followed the same approach explained above.

We found minor changes in the list of items when comparing all implementations with an LMS implementation (only one item, “*the approval of all item*” changed). In an LXP implementation, we have major changes. Table 9 details the 5 most important items (6 in case of items with the same points) to the LMS and LXP implementation.

Table 9. The 5 items most important in each phase (LMS and LXP implementation)

	LMS Implementation	LXP Implementation
BEFORE	Insure that data is clean and coming from the right sources Get the approval of all the implementation items Focus on employee experience first (create personas) Partner with IT team Identify your most important use-cases/ business case Create a senior governance team	Assemble Project Team Identify your most important use-cases/ business case Partner with IT team Get the Ownership of leadership team Focus on employee experience first (create personas) Involve key stakeholders like business leaders
SELECTING THE VENDOR	Demos presentations Importance of software features Provider performance post-installation. Predefined business and technical requirements Provided experience in similar projects Provider flexibility to see beyond their own solution	Provider flexibility to see beyond their own solution Provided experience in similar projects Predefined business and technical requirements Provider performance post-installation Feedback from other clients
DURING THE IMPLEMENTATION	Create a pilot with some end users Recurrent meetings with the project team (internal & provider) Iterate feedback during all project and specially the pilot Communication Plan to kick off and after Evaluation plan to after the kickoff	Communication Plan to kick off and after Evaluation plan to after the kickoff Recurrent meetings with the project team (internal & provider) Iterate feedback during all project and specially the pilot Create a pilot with some end users

Impact

If the list of the previously mentioned implementation items resulted in a successful implementation, we can confirm that the items are relevant.

When asked about the satisfaction of the business executives/boards with the learning implementation, the answers vary between 3 and 5 on a Likert scale of 1 to 5. When looking for the respondent's opinion on the same question, the answers tend to be more positive. Table 10 shows the results.

Table 10. Survey_Impact Questions 4&5: Satisfaction with the implementation

Scale	business executive / board satisfaction		Respondents satisfaction	
	Nr of answers	%	Nr of answers	%
Not at all satisfied				
2				
3	7	33.3%	7	33.3%
4	13	61.9%	11	52.4%
Extremely satisfied	1	4.8%	3	14.3%

The first point to consider is that all implementations identified received positive satisfaction; therefore, the impact was relevant. Second, we also observe that respondents's satisfaction tends to be more positive than business executive/board.

When asked about the identification of the KPIs related to the implementation, 76% (16 answers) said that it was done (“Yes”).

From those, 75% measured the impact. Figure 20 shows that analysis.

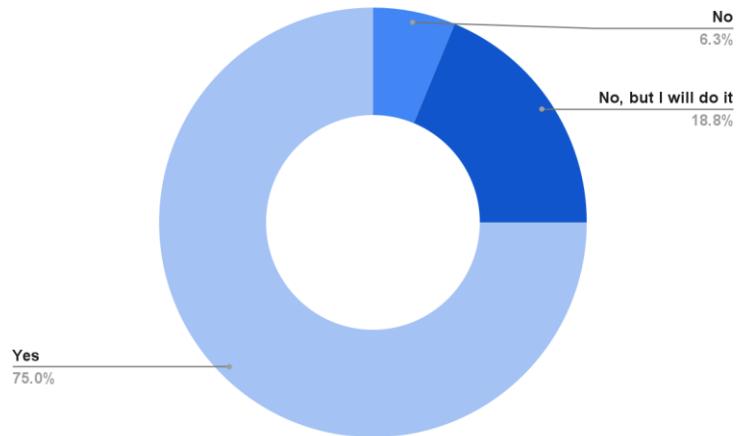


Figure 20 - Survey_Impact Questions 3: Measurement of the Impact

This indicates that the definition of KPIs in advance will result in future stages of the implementation, in the vast majority of the cases, in a real/actual measurement of the digital learning implementation.

The most important measurements taken into consideration when implementing learning technologies are identified in Figure 21.

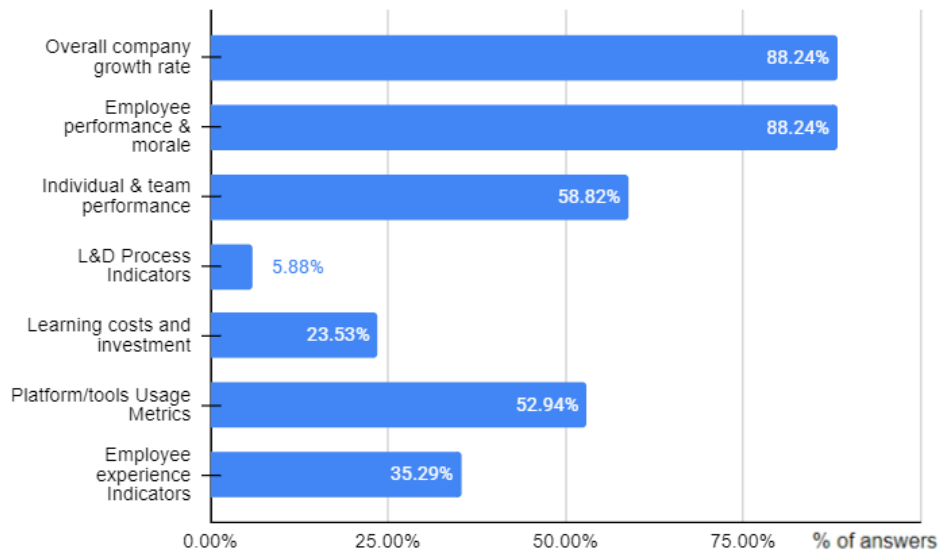


Figure 21 – Survey_Impact Questions 2: Most Important Measurements

In the assessment of the current ecosystem, 65,2% of the respondents mentioned that their ecosystem fits with the modern workforce, as Figure 22 illustrates.

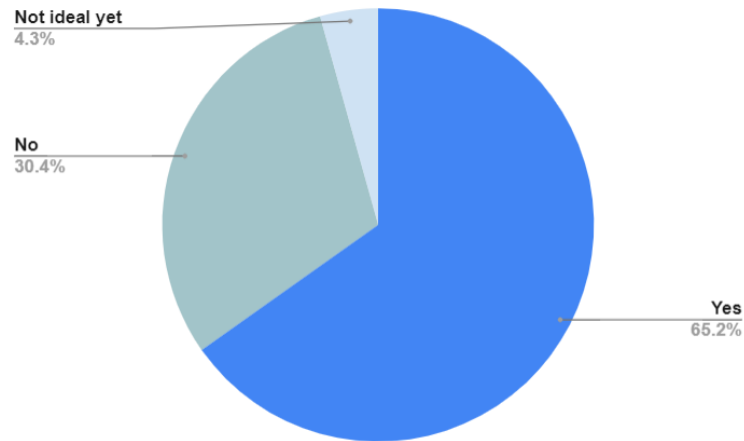


Figure 22 – Survey_Impact Questions 6: Do you think your Learning Ecosystem fits the modern workforce?

To answer the free text question: “*What is missing most from your Learning Technologies to enable you to better support your organization?*” respondents mentioned actions they need to implement related to the learning technology, areas of improvement already spotted, and the new learning technologies needed. Table 11 details the answer received.

Table 11. Survey_Impact Questions 7: What is missing most from your Learning Technologies to enable you to support your organization better?

Actions related to the learning technology	Areas of improvement	New Learning Technologies
Tool Adoption Tutorials	Tool Adoption	Skills
Adoption plan after implementation	Digital experience	AI
Competency Management	Connected with learning strategy	Metaverse
Usage of all existent tools	Assess skills required	Adaptive Learning
Talent management	Personalized learning to up-skill.	TXP
	Engagement in virtual, experiential learning	
	Connect learning with current and future job opportunities in the company	
	Stronger analytics features	
	User-Friendly Feedback/evaluation	
	Better curation	
	Reach a broader population on any device	

Future Implementation

Respondents had the opportunity to look at the future and refer to the timeline for foreseen implementation. Figure 23 presents the answers received.

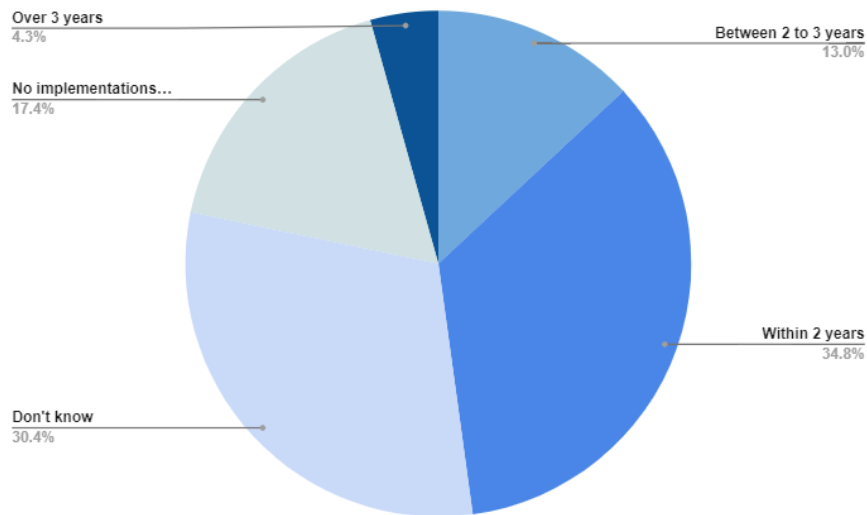


Figure 23 – Survey_Future Implementation Questions 1 “When do you intend to implement another learning technology? – Answers received

Only 17,4% of the respondents do not expect new implementations. From those without an agenda in the learning technology layer, 75% mentioned that their Learning Ecosystem is fitting for the modern workforce. Their ecosystem is mainly based on LMS and LCMS, and none use the more advanced learning technologies like LXP, TXP or AI-Driven platforms.

Regarding the learning technology to be implemented, the respondent mentioned the AI-Driven Platform (50%) in their majority. Figure 24 presents more information about the answer received.

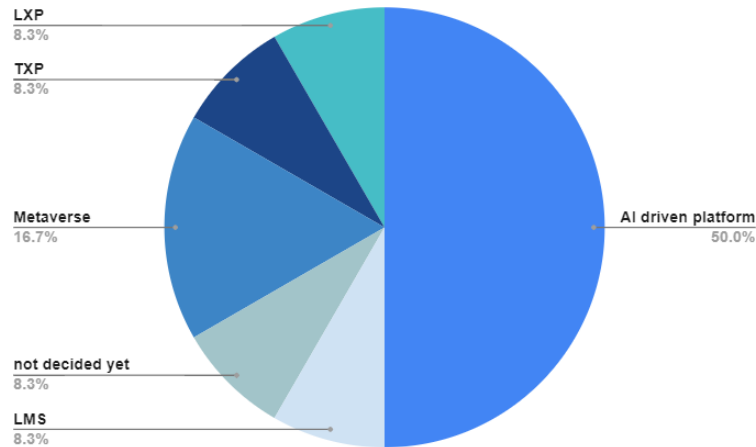


Figure 24 – Survey_Future Implementation Questions 2 What learning technology do you intend to implement? – Answers received

The survey gave insightful findings that help us understand how organizations implement learning technologies. Combining some of the answers, we can infer additional insights, which are as follow:

Learning technology industry is massive and complex

The respondents represent 23 organizations using 65 learning technologies in total. We can conclude that a massive learning technology market offers different platforms and tools.

When we requested the provider's name (an optional question in the written survey), we received 18 different providers. It is very important to define criteria for identifying the best learning technology otherwise, organizations can be overwhelmed by the huge offering the market offers.

L&D own a strategic position in the organization

When looking at how organizations connect their learning technology strategies with business challenges, we observe a strong focus on digital transformation and the need for more agility.

Organizations seek this outside approach to their business rather than just coping with internal challenges related to reducing operational costs. Based on the results, we also observe that L&D Priorities are more strategic than operational, a tendency observed in the SLR.

Implement a learning technology to standardize the HR technology infrastructure, to reduce cost, system or even resources; these are items we see at the end of the priorities list. Nevertheless, a surprising finding is that organizations are still pursuing the engagement of their employees in their learning, which is the respondents' main priority.

It is a dichotomy result because even if L&D is in a more strategic position, it is at the same time, still pursuing one of the basics in a learning culture, which is engagement for learning. Of course, implementing learning technologies can enable the learning culture. However, it is important to know the learning engagement level at the beginning of the implementation to define the needed efforts and actions.

Take a TXP implementation as an example: in an organization where the learning engagement is low and prescriptive, stronger efforts are needed to put the employees in the driver's seat of their careers.

On the opposite side, if the level of engagement for learning is already high, the organization is already strong in the learning culture. Therefore, the needed behavioural change will be more fluid.

The strategy for the implementation of learning is transversal to all industries

Overall, the usage of learning technologies is not confined to a specific industry; instead, we observe a proliferation of the technologies not depending on the Industry Field.

Learning technology implementation is a continuous process and not a spot project in the organization

Based on the answers received, we observe that the learning technologies layer is an iterative cycle where we can expect more than just one implementation. 87% of the respondents mentioned that in the past or currently, they are involved in implementations, and 52% identified an implementation in the coming future.

The implementation is an effort to continuous improvement. Even if some basic learning needs are covered, the learners' engagement and user experience, both learners and admins, are continuous and always evolving.

It is interesting to see only one respondent mentioning dissatisfaction with the current system or provider in the L&D Priorities. However, several comments indicate the need for better features or current systems limitations.

Additionally, to support this finding, we need to consider the 30,4% of the respondent that said "No" to the question, "*Do you think your Learning Ecosystem is fit for the modern workforce?*".

More traditional business models embark on innovative learning technology

When looking at traditional business models such as the Manufacturing or Chemical Industry, where we may expect a more standard approach to Learning, we find use cases with LXPs, TXPs or VR / ARs representing a more innovative approach to learning. In Figure 25, we present the usage of each learning technology by these Industries.

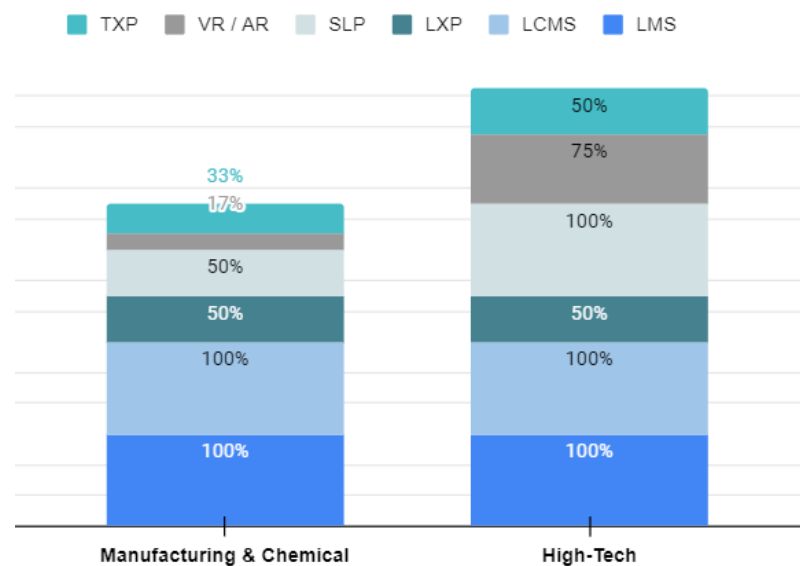


Figure 25 - Manufacturing & Chemical Industry and High-Tech Industries by learning technologies

Even if we find use cases of different learning technologies in all industries, we see a tendency in the High-Tech industries to be more “*innovative*” in such implementation. Figure 25 shows us that the High-Tech organizations have in their Learning Ecosystem TXP (50%) and VR / AR (75%), while in Manufacturing & Chemical, only 33% have TXP and 17% VR / AR.

These findings can add a new area of interest to the paradigm of the talent marketplace: the democratization of talent decisions, driven by skills and the interests of the employees, is not dependent on the industry but can be implemented in all industrial fields. The more traditional industries can learn from the more innovative ones, like the High-Tech, because these last industries are a step further in implementing learning technologies.

Organizations are creating a tailor-made learning technology ecosystem

There is no definite market trend that identifies what is the next learning technology that an organization should implement.

Analyzing the existing ecosystem of the respondents that expressed their willingness to a new implementation in the coming years, we found a diverse landscape without a specific orientation. Table 12 presents further details.

Table 12. Current Learning Technology Ecosystem vs Future Implementation

Existent Learning Technology Ecosystem	Future Implementation
LMS - LXP	AI-Driven Taxonomy
LMS - LCMS - SLP - AI-driven platform - VR,AR	LMS
LMS	Not decided yet
LMS - LCMS	AI-driven platform
LMS - LCMS - TXP- VR,AR	AI-driven platform
LMS - LCMS - TXP- Metaverse	Metaverse
LXP	AI-driven platform
LMS - LCMS - LXP	AI-driven platform
LMS - LCMS - LXP	Metaverse
LMS - LCMS - LXP	AI-driven platform
LMS - SLP - LXP	TXP
LMS - LCMS - SLP - LXP	LXP

Skills are dominating the organizational strategy agenda

Organizations are moving toward a whole new operating model for work and the workforce that places skills, more than jobs, at the center.

Across all the organizations that foresee an implementation, we discovered a strong preference for a more skills-based model over one based on jobs. Technologies, such as the AI-driven platform, collected 50% of the answers when looking at the technologies to implement.

Identifying in advance metrics and expected impact may be correlated with successful implementation

The importance of identifying the impact of the implementation is confirmed when we correlate the executive's satisfaction with the metrics' definition. In Table 13, we observe a positive tendency between the “*satisfaction*” of the board with the identification of metrics in advance.

The tendency can result from the routine established since the beginning, where a person will keep control and continuous measurements of the expected impact, opening the opportunity to adjust the implementation strategy in advance.

In contrast, the tendency is not observed in the respondent's satisfaction. They keep a positive evaluation independently of the identification of metrics, what may happen due to their involvement in the implementation and the access to information during the process.

Table 13. Correlation between the satisfaction and identification of KPIs

Did you identify metrics and KPI's related to the implementation?	Scale	business executive / board satisfaction		Respondents satisfaction	
		Nr of answers	%	Nr of answers	%
YES	Not at all satisfied				
	2				
	3	5	31.25%	6	37.50%
	4	10	62.50%	8	50.00%
	Extremely satisfied	1	6.25%	2	12.50%
NO	Not at all satisfied				
	2				
	3	2	40.00%	1	20.00%
	4	3	60.00%	3	60.00%
	Extremely satisfied		0.00%	1	20.00%

A current fit in the modern workforce does not mean a slowdown in the learning technologies implementation

Half of the organizations part of this research that are “*satisfied*” with the fit between the Learning Ecosystem and modern workforce, engage with the future implementation of new learning technologies.

Of the respondents, 53,3% identified the intention to implement learning technologies, 26,7% said they “*do not know yet*”, and only 20% mentioned “*no foreseen implementation*”.

To proper measurement of the implementation’s impact, L&D professionals need to consider a holistic view

Several of the examples given by the respondents can be allocated to strategic vision or more tactical operations. Creating a clear view of all the different measurement areas is important to address the different stakeholders in the organization.

5 Learning Technologies Implementation Framework (LTIF)

The written survey developed was useful in confirming the dimensions proposed in the LTIF by interpreting the answers provided.

The foundation for the LTIF remains the holistic view of the learning technology implementations used in formulating the research questions: challenges that organizations are facing, the learning technology identified to support these challenges and the expected impact.

An implementation of a learning technology starts even before the selection of the technology. The alignment with the organization's strategy is the starting point. Identifying the technology is the following step, and exploring the best provider goes beyond analyzing platform features: the provider's service and the integration into the existing infrastructure are also important areas to dive deep.

The first version of the Framework was created based on the literature consulted during the completion of a state-of-the-art and systematic literature review.

The Research Survey analysis contributed to improving the framework. Some of the most important adjustments are:

Challenges Tab:

We included the option to select only 5 challenges from the organization's challenges and L&D priorities. To prioritize the challenges will help to better focus on what is more relevant to the organization. A maximum of 5 challenges need to be narrowed down.

Due to the importance of learning engagement awareness in the definition of the implementation, we included this item.

Technology Tab:

The mapping of the existent features in the new technology is a needed action to better understand all the potential of the new technology. Nevertheless, knowing in advance the features that the organization most values will keep the focus on what is important.

Based on the respondents' input, we added to the Technology tab all the features identified as areas of improvement or were highlighted as important.

Implementation Tab:

Depending on the technology, we may have implementation items that are more important than others. Having this in mind, we added sections with the importance of the items to the LMSs and LXPs implementation. Other items mentioned by the respondents were added as well.

Impact Tab:

We reordered the metrics expected to be measured and added others that the respondents identified.

The scheme of the LTIF is presented in Figure 26.

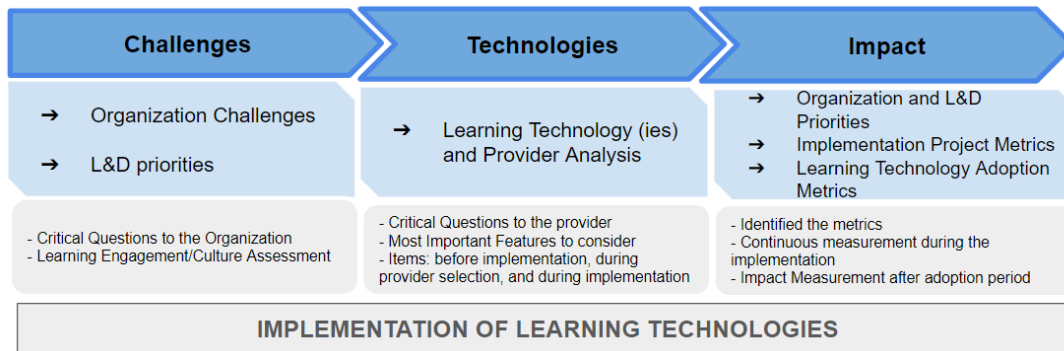


Figure 26 – Scheme of the Learning Technologies Implementation Framework

The LTIF can be visualized in Appendix C or this link:

<https://docs.google.com/spreadsheets/d/1D3XTMFgmbtYmMFsuVAASbbBuS-AcVCztHfUe0KkYLfk/edit?usp=sharing> (copy to a browser)

6 Conclusions

We present the summary of the study, interpretation of the findings, limitations, discussion, and suggestions for future work.

6.1 Summary of the study

Nowadays, organisations operate in a transforming context, guided by a changing and accelerated environment. In their efforts to quickly pivot for a more agile operating model, they understood that enabling collaboration and leveraging enriching experiences to their human capital is important. This is needed to create the conditions for continuous learning and the rise of the needed capabilities.

L&D teams are gradually shifting to the spotlight of the organizations' strategies to lead this vision and prepare the workforce for rapid changes and demands.

The transformation faced at the business level is transversal to the L&D operations. Currently, plenty of new learning technologies can accelerate this mission and, in some cases, guide the evolution of the learning strategy itself.

It is not an easy action. Learning Technology becomes much more massive every day, and we may find several cases where huge investments are made without clear evidence of the added value to the organization.

This was the starting point of the research, and from there, we deep dive into the analysis of the principles of andragogy from Malcolm Knowle or the model 70:20:10 from Charles Jennings. The baseline is that organizations and HR need to move from conventional learning to more practical, innovative and informal learning. This makes employees productive, engaged, and responsible and ensures the organisation's longevity.

Different types of learning are possible. Besides the already-known formal learning, organizations could support their strategies with blended learning (a combination of formal and social learning) or continuous learning that highlights the importance of learning in the flow of work.

Supportive learning environments, concrete learning processes and practices, and leadership behavior that reinforces learning are the characteristic of a Learning Organization. More than branding it's the desirable place "*where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning how to learn*

together” as Peter Senge referred. A learning culture is the “*concrete observation of those conditions*” by the employees.

At the technological learning layer, in order to narrow down the research, we selected learning technologies identified as uses cases in the systematic literature review, such as:

- LMS, to training management
- LCMS, to visualize and create e-learning content
- SLP, to deliver a learning experience embedded with social learning activities
- LXP, to a more learner-experience approach

We also consider other technologies that appeared as emerging trends in the literature:

- TXP, an opportunity marketplace for career development driven by employees
- AR/VR to augment or virtual learning experiences
- AI-driven platforms to infer the skill taxonomies or frameworks
- Metaverse to deeper immerse learning experiences

In the Systematic Literature Review, 3 main dimensions came to light when we looked at the implementation process.

Learning technology implementation to be successful needs to go beyond the technology alone. It must be aligned with the business needs and what the employees (users and learners) value. The second dimension is to identify how the technology can best support those objectives. The third dimension is the Impact, expected and achieved.

Structured and strong planning is crucial, and it starts even before the decision on the best technology. A proper strategy is required that facilitates the analysis of the 3 dimensions of successful implementations: **Challenges, Technologies and Impact.**

With the goal defined, we designed and developed a framework as a referral for implementing learning technologies in organizations **Learning Technologies Implementation Framework (LTIF).**

In the framework foundation, we identified some challenges: the need to continuously retain and transfer knowledge or upskill/reskill the employees' capabilities. Other challenges were related to the great resignation “movement” faced by several organizations and the fast technological evolution, continuous change and competition. Connected to the technology, we found the need to create integrated systems that originated learning ecosystems.

Regarding the impact, the SLR pointed out some of the metrics used by organizations, such as: diversity in the content available, personalized user experiences, flexibility and increased employee exposure to learning opportunities.

Even if several conclusions were possible, a review of current academic literature failed to provide consistent strategies for implementing learning technologies and a clear picture of their impact on organizations. Considering this lack of empirical support, and in a joint effort to improve the framework, we answered the following research question:

What strategies do organizations consider to implement learning technologies?

We performed survey research using an online written survey, the “*Learning Technologies Implementation*”. The target population were organizations (public or private) with a Learning & Development function. The respondents needed to be knowledgeable in implementing the learning technologies. From the 23 answers, we better understood organizations' strategies for implementing learning technologies.

Our analysis confirmed the relevance of the implementation of learning technologies and their transversality across different industries. Learning technology use cases were found in different organizations spread worldwide. We did not find evidence of deceleration when there was already a current fit of their existing ecosystem with the modern workforce.

In the Challenge dimension, we understood that most organisations are implementing learning technologies with a strategic mindset, not purely to reduce cost or headcount. This evidence reinforced the literature review finding that pointed in the same direction. Another interesting finding was the identification of L&D priorities besides the business challenges. The needed increase in employee engagement in learning was the main priority identified by the respondents. It is a vital step as it relates to the notion of learning culture observed when implementing learning technologies.

We reinforced our findings about the current complex learning industry by looking at the technologies. Respondents have an average of 3 different platforms in their learning ecosystem, and only 17,4% mentioned not foreseeing new implementations.

The implementation is an effort to continuous improvement and not a spot project. From a project mindset, L&D professionals must move to a product mindset to innovate continuously. When preparing an implementation, they need to identify the technology and find the best partners to keep cooperation and going in the same direction.

To assess the main features needed, requesting further information from the providers about their experience in similar projects or their product roadmap, are key in this identification.

Besides, it is strongly relevant to plan the implementation considering the actions before the implementation itself and during the project.

The Impact is a dimension that connects with the identification of the challenges. While identifying the challenges and priorities, L&D professionals should also detail the metrics, respective impact foreseen and channels that will be considered to measure it. This exercise will follow all journey, having a highlighted role at the end of the implementation. To look at metrics related to business challenges and L&D Priorities, the implementation project and the technology performance, need a holistic view of the impact.

Learning technology implementation is an emerging market, and organizations are exploring their path, sometimes creating a tailor-made learning technology ecosystem. Some are pioneers, so sometimes, there are no best practices or other use cases to support their strategies.

6.2 Main Limitations

During the different stages of the research, we identified several limitations.

A lack of relevant literature was identified in the SLR. The first literature searches resulted in a high volume of documents related to universities and colleges, and few cover clear use cases for implementing digital learning technologies in organizations. It was also limited in terms of factual evidence of the impact's measurement. An abundance of impact was foreseen, but a much-reduced number addressed concrete examples of measurements.

While preparing the data collection in the survey research phase, our target population was very specific and demanded a detailed calibration of potential respondents. This contributed to a reduced number of responses and an analysis based on a confidence level of 70%. Even if the framework aims to give a general orientation/guidelines and we did not pursue 100% confidence, increasing this level would increase the findings and support our conclusions.

Another limitation is the lack of examples of implementations of other digital learning technologies besides the LMS and the LXP. We identified changes in the implementation items to the LXP and LMS, but we did not receive enough respondents to make conclusions about the other learning technologies.

Our sample does not have a significant percentage of the organization that are single country-based. Considering that 95,7% of the respondents are located in more than 1 country, we cannot correlate learning technologies implementation with an organisation's global or local presence. The same happens with the organizational work arrangement, where 74% of the

respondents are working in a hybrid work, not giving enough margin to explore how remote or office base organizations handle their learning technology implementation strategy.

Lastly, deep diving into the technologies' features is a work not part of this research but a second phase of the LTIF improvements. An important activity that contributes to successful implementations focuses on categorizing the functionality that the organization values most and identifying all necessary technical requirements. To have it done by technology is to recognize that not all technologies pursue the same challenges.

6.3 Future Works

The research concluded that there is still much work to do in this area. There is still a big buffer for improvement and to standardize best practices when implementing learning technology.

Considering this, we believe that this research can be a foundation for future work. It may be improved by using a bigger and more diverse sample and by including other technologies or framework items.

Related to the framework, testing in a real environment can increase the quality and its application.

We will continue the research of this topic in our future studies in the **PhD Web Science and Technology**.

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Appendix

Appendix A – “Learning Technologies Implementation” survey evaluation using an adaptation of the Interview Research: The Interview Protocol Refinement Framework (IPR)

Aspects of an Interview Protocol	Yes	No	Feedback for Improvement	Follow up
Survey Protocol Structure				
Beginning questions are factual	x			
Questions at the end of the survey protocol are reflective and provide the participant an opportunity to envision the future	x			
A brief script throughout the survey protocol provides smooth transitions between topic areas		x	reduce the number of section	Done
The survey closes with expressed gratitude and any intent to stay connected or follow up	x			
Overall, a survey is organized to promote a fluid path	x			
Writing of survey Questions & Statements				
Questions/statements are free from spelling error(s)	x			
Only one question is asked at a time	x			
Questions are written in a non-judgmental manner	x			
Length of Survey Protocol				
All questions are needed		x	delete the redundant questions	Done
Questions/statements are concise		x	reorganize the options of the selected learning technologies	
Comprehension				
Questions/statements are devoid of academic language	x			
Questions/statements are easy to understand for a person that has experience in the field	x			

SURVEY: Learning Technologies Implementation

What strategies should organizations have in consideration for the implementation of learning technologies?

* Required

Welcome to this research, in which we explore the strategies for the implementation of learning technologies, that organization are putting into practice.

Your insights are important to the wider scientific community and us. They will help build a picture of how L&D are overcoming the challenges in the technological layer and evolving as a function.

The survey should take around 20 minutes to complete. All responses are treated in the strictest confidence, and no views or information will be directly attributed to a person or company in published results. Your name is not given to external parties nor associated with responses. Survey findings are only reported in aggregate.

All participants who provide their email addresses will receive a copy of the final results, which will be shared later this year. Thank you in advance for completing this important survey. If you have any issues, please email: helena.r.ferreira@tecnico.ulisboa.pt

This research is part of the Master in Information Enterprise System from Instituto Superior Técnico and Universidade Nova

1. Are you currently involved (or were) in the implementation of learning technologies * in your organization?

Mark only one oval.

Yes

No

CHARACTERIZATION

Demographic and categorization questions

2. 1 - Which of the following best describes **your industry?** *

Mark only one oval.

- Agricultural / Mining
- Business / Professional Services
- Construction / Real State
- Education
- Energy / Utilities
- Financial Services / Insurance
- Government / Defense
- Healthcare
- High-Tech
- Hospitality / Restaurant / Entertainment
- Manufacturing
- Non-Profit
- Retail / Wholesale
- Telecoms / Media
- Transportation / Airlines
- Other: _____

3. 2 - Please identify the Country, where your Organization's Headquarters is located.

Mark only one oval.

<input type="radio"/> Afghanistan	<input type="radio"/> Cambodia	<input type="radio"/> Gabon	<input type="radio"/> Laos	<input type="radio"/> Niger	<input type="radio"/> Somalia
<input type="radio"/> Albania	<input type="radio"/> Cameroon	<input type="radio"/> The Gambia	<input type="radio"/> Latvia	<input type="radio"/> Nigeria	<input type="radio"/> South Africa
<input type="radio"/> Algeria	<input type="radio"/> Canada	<input type="radio"/> Georgia	<input type="radio"/> Lebanon	<input type="radio"/> North Macedonia	<input type="radio"/> Spain
<input type="radio"/> Andorra	<input type="radio"/> Central African Republic	<input type="radio"/> Germany	<input type="radio"/> Lesotho	<input type="radio"/> Norway	<input type="radio"/> Sri Lanka
<input type="radio"/> Angola	<input type="radio"/> Chad	<input type="radio"/> Ghana	<input type="radio"/> Liberia	<input type="radio"/> Oman	<input type="radio"/> Sudan
<input type="radio"/> Antigua and Barbuda	<input type="radio"/> Chile	<input type="radio"/> Greece	<input type="radio"/> Libya	<input type="radio"/> Pakistan	<input type="radio"/> Sudan, South
<input type="radio"/> Argentina	<input type="radio"/> China	<input type="radio"/> Grenada	<input type="radio"/> Liechtenstein	<input type="radio"/> Palau	<input type="radio"/> Suriname
<input type="radio"/> Armenia	<input type="radio"/> Colombia	<input type="radio"/> Guatemala	<input type="radio"/> Lithuania	<input type="radio"/> Panama	<input type="radio"/> Sweden
<input type="radio"/> Australia	<input type="radio"/> Comoros	<input type="radio"/> Guinea	<input type="radio"/> Luxembourg	<input type="radio"/> Papua New Guinea	<input type="radio"/> Switzerland
<input type="radio"/> Austria	<input type="radio"/> Congo, Democratic Republic of the	<input type="radio"/> Guinea-Bissau	<input type="radio"/> Madagascar	<input type="radio"/> Paraguay	<input type="radio"/> Syria
<input type="radio"/> Azerbaijan	<input type="radio"/> Congo, Republic of the	<input type="radio"/> Guyana	<input type="radio"/> Malawi	<input type="radio"/> Peru	<input type="radio"/> Taiwan
<input type="radio"/> Bahamas	<input type="radio"/> Costa Rica	<input type="radio"/> Haiti	<input type="radio"/> Malaysia	<input type="radio"/> Philippines	<input type="radio"/> Tajikistan
<input type="radio"/> Bahrain	<input type="radio"/> Côte d'Ivoire	<input type="radio"/> Honduras	<input type="radio"/> Maldives	<input type="radio"/> Poland	<input type="radio"/> Tanzania
<input type="radio"/> Bangladesh	<input type="radio"/> Croatia	<input type="radio"/> Hungary	<input type="radio"/> Mali	<input type="radio"/> Portugal	<input type="radio"/> Thailand
<input type="radio"/> Barbados	<input type="radio"/> Cuba	<input type="radio"/> Iceland	<input type="radio"/> Malta	<input type="radio"/> Qatar	<input type="radio"/> Togo
<input type="radio"/> Belarus	<input type="radio"/> Cyprus	<input type="radio"/> India	<input type="radio"/> Marshall Islands	<input type="radio"/> Romania	<input type="radio"/> Tonga
<input type="radio"/> Belgium	<input type="radio"/> Czech Republic	<input type="radio"/> Indonesia	<input type="radio"/> Mauritania	<input type="radio"/> Russia	<input type="radio"/> Trinidad and Tobago
<input type="radio"/> Belize	<input type="radio"/> Denmark	<input type="radio"/> Iran	<input type="radio"/> Mauritius	<input type="radio"/> Rwanda	<input type="radio"/> Tunisia
<input type="radio"/> Benin	<input type="radio"/> Djibouti	<input type="radio"/> Iraq	<input type="radio"/> Mexico	<input type="radio"/> Saint Kitts and Nevis	<input type="radio"/> Turkey
<input type="radio"/> Bhutan	<input type="radio"/> Dominica	<input type="radio"/> Ireland	<input type="radio"/> Micronesia, Federated State of	<input type="radio"/> Saint Lucia	<input type="radio"/> Turkmenistan
<input type="radio"/> Bolivia	<input type="radio"/> Dominican Republic	<input type="radio"/> Israel	<input type="radio"/> Moldova	<input type="radio"/> Saint Vincent and the Grenadines	<input type="radio"/> Tuvalu
<input type="radio"/> Bosnia and Herzegovina	<input type="radio"/> East Timor (Timor-Leste)	<input type="radio"/> Italy	<input type="radio"/> Monaco	<input type="radio"/> Samoa	<input type="radio"/> Uganda
<input type="radio"/> Botswana	<input type="radio"/> Ecuador	<input type="radio"/> Jamaica	<input type="radio"/> Mongolia	<input type="radio"/> San Marino	<input type="radio"/> Ukraine
<input type="radio"/> Brazil	<input type="radio"/> Egypt	<input type="radio"/> Japan	<input type="radio"/> Montenegro	<input type="radio"/> Sao Tome and Principe	<input type="radio"/> United Arab Emirates
<input type="radio"/> Brunei	<input type="radio"/> El Salvador	<input type="radio"/> Jordan	<input type="radio"/> Morocco	<input type="radio"/> Saudi Arabia	<input type="radio"/> United Kingdom
<input type="radio"/> Bulgaria	<input type="radio"/> Equatorial Guinea	<input type="radio"/> Kazakhstan	<input type="radio"/> Mozambique	<input type="radio"/> Senegal	<input type="radio"/> United States
<input type="radio"/> Burkina Faso	<input type="radio"/> Eritrea	<input type="radio"/> Kenya	<input type="radio"/> Myanmar (Burma)	<input type="radio"/> Serbia	<input type="radio"/> Uruguay
<input type="radio"/> Burundi	<input type="radio"/> Estonia	<input type="radio"/> Kiribati	<input type="radio"/> Namibia	<input type="radio"/> Seychelles	<input type="radio"/> Uzbekistan
<input type="radio"/> Cabo Verde	<input type="radio"/> Eswatini	<input type="radio"/> Korea, North	<input type="radio"/> Nauru	<input type="radio"/> Sierra Leone	<input type="radio"/> Vanuatu
	<input type="radio"/> Ethiopia	<input type="radio"/> Korea, South	<input type="radio"/> Nepal	<input type="radio"/> Singapore	<input type="radio"/> Vatican City
	<input type="radio"/> Fiji	<input type="radio"/> Kosovo	<input type="radio"/> Netherlands	<input type="radio"/> Slovakia	<input type="radio"/> Venezuela
	<input type="radio"/> Finland	<input type="radio"/> Kuwait	<input type="radio"/> New Zealand	<input type="radio"/> Slovenia	<input type="radio"/> Vietnam
	<input type="radio"/> France	<input type="radio"/> Kyrgyzstan	<input type="radio"/> Nicaragua	<input type="radio"/> Solomon Islands	<input type="radio"/> Yemen
					<input type="radio"/> Zambia

4. 3 - Does your organization have **Employees in More Than One Country?** *

Mark only one oval.

- Yes
 No
 Other: _____

5. 4 - How **many employees** does your company employ? (company wide) *

Mark only one oval.

- Fewer than 100 employees
 100 -499 employees
 500 - 999 employees
 1000 - 4999 employees
 5000 - 9999 employees
 10.000 - 19.999 employees
 20.000 - 24.999 employees
 25.000 or more employees

6. 5 - In a typical week your **Current Work Arrangement** is: *

Mark only one oval.

- Fully at the office
 Fully Remote (Local Workforce)
 Fully Remote (Distributed Workforce)
 Hybrid (Remote & In-Office)
 Other: _____

7. 6 - What is your **Role** within your organization? *

Mark only one oval.

- Owner / Founding Partner
 Executive
 Director
 Manager
 Individual Contributor / Non-manager
 Other: _____

ORGANIZATIONAL CHALLENGES

Main challenges that learning organizations are addressing - transversal to other organizations or specific to your company - where a learning technology implementation play(ed) an important role.

8. **1 - Currently, what are your organization's most significant business challenges?** *

(Please select no more than 5 options from the list below)

Check all that apply.

- Flexible & Hybrid Working
- Increase Revenue
- Great Resignation (Retain Talent)
- Increase Employee Value Proposition
- Reducing operational costs
- Multi-Generational Workforce
- Digital & Agile Transformation
- Sustainability & Ecological Demand
- Increasing organisational performance & profitability
- Improving customer satisfaction & service quality
- Increasing business agility
- Overcoming the impact of the pandemic
- Knowledge Retention & Transfer
- Other: _____

9. **2 - What are your top L&D priorities ?** *

(Please select no more than 5 options from the list below)

Check all that apply.

- Reskilling & upskilling
- Increase Employee's engagement for learning
- Usability / quality of end user interface
- Learning Processes Simplification
- Increase and diversify learning offer
- Standardization of the Learning technology infrastructure
- Standardization of the HR technology infrastructure
- Better Learning Regulation & compliance
- Better leadership & management
- Adopting next generation Learning Tech approaches
- Enhancing the talent pipeline
- Reducing systems & IT costs
- Reducing resource & operating costs
- Lack of business agility & flexibility with current system
- Dissatisfaction with current provider or system
- Current solutions' limited range of functionality
- Other: _____

10. **3 - Is there any other challenge that you would like to add, where a learning technology implementation play(ed) an important role. (optional)**

LEARNING TECHNOLOGIES

The platforms or tools that are part of your Learning Ecosystem.

11. **1 - What technologies are part of your Learning Ecosystem? ***

Check all that apply.

- Learning Management System (LMS)
- Content Management Systems (LCMS) - Digital Learning Content System
- Learning Experience Platform (LXP)
- Social learning Platform (Applications to social learning, virtual discussions, collaboration)
- AI driven platform (Skills Taxonomy creation)
- Talent Experience Platform (TXP)
- Virtual Reality / Augmented Reality (VR,AR)
- Metaverse (Immersive Learning Experiences)
- Other: _____

12. **2 - Please indicate the name of the vendor to each of the tool/platform identified - optional**

13. **3 - How this Learning Ecosystem dovetail with your needs? ***

IMPLEMENTATION

This is the process taken since the preparation of the implementation, the selection of the technology until complete the implementation of the learning technology.

14. 1 - Select **one** learning technology part of your ecosystem, that in your opinion, the implementation is the most remarkable: *

Mark only one oval.

- Learning Management System (LMS)
- Content Management Systems (LCMS) - Digital Learning Content System
- Learning Experience Platform (LXP)
- Social Learning Platform (Applications to social learning, virtual discussions, collaboration)
- AI driven platform (Skills Taxonomy creation)
- Talent Experience Platform (TXP)
- Virtual Reality / Augmented Reality (VR,AR)
- Metaverse (Immersive Learning Experiences)
- Other: _____

2 - Taken that implementation in consideration, answer the following questions:

15. 2,1 - Rate the level of importance of the following items BEFORE the implementation that you consider(ed): *

Mark only one oval per row.

	Very Important	Important	Moderately Important	Slightly Important	Not Important	Not considered
Get the Ownership of leadership team	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Identify your most important use-cases/ business case	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Focus on employee experience first (create personas)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Identify in advance the metrics and expected impact	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Investigate a vast list of potential technologies to implement

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

Insure that data is clean and coming from the right sources

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

Assess your current Learning system (all available functionalities)

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

Budget the project

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

(acquisition, implementation and implementation)

Create a senior governance team which owns the design, implementation, and success of the system

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

Assemble Project Team (cross-disciplinary buying team, implementation team and change management responsible)

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

Involve key stakeholders like business leaders

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

Partner with IT team

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

Create a Project Chart

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

Define the service delivery model (who will do what once the system goes live)

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

Define the completion and success criteria

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

Get the approval of all the items

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

mentioned above

16. **2.2 - Rate the level of importance of the following items while SELECTING THE *
VENDOR that you consider(ed):**

Mark only one oval per row.

	Very Important	Important	Moderately Important	Slightly Important	Not Important	Not considered
Predefined business and technical requirements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Importance of software features	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Provider Culture (business values)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Provided experience in similar projects	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Feedback from other clients	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Demos presentations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Provider performance post-installation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Provider flexibility to see beyond their own solution	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Provider perception of your	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

company as a customer

17. **2.3 - Rate the level of importance of the following items DURING THE IMPLEMENTATION that you consider(ed)?** *

Mark only one oval per row.

	Very Important	Important	Moderately Important	Slightly Important	Not Important	Not considered
Stabilized project team (no changes during the project)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Recurrent meetings with the project team (internal & provider)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Recurrent presentation with key stakeholders	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Continuous status point (evaluation of milestones)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Create a pilot with some end users	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Iterate feedback during all project and specially the pilot	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Communication Plan to kick off and after	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Evaluation plan to after the kickoff	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

18. Specify other items that are (were) important to the implementation - before, during the provider selection or during the implementation - that were not mentioned in the previous questions.

IMPACT

Related to the metrics, KPIs and the evaluation process

Please continue to consider the implementation identified previously, and answer the following questions:

19. **1 - Did you identify metrics and KPI's related to the implementation? ***

Mark only one oval.

- Yes Skip to question 20
 No Skip to question 22

20. **2- What are the most important measures of success that have been defined for your implementation?**

(Please select no more than 5 options from the list below)

Check all that apply.

- Platform/tools Usage Metrics
 Employee experience Indicators
 Learning costs and investment
 Overall company growth rate
 Employee performance & morale
 L&D Process Indicators
 Individual & team performance
 Other: _____

21. **3 - Do (did) you measure the impact of the implementation? ***

Mark only one oval.

- Yes
 No, but I will do it Skip to question 22
 No Skip to question 22

22. **4 - How satisfied do you believe your business executive / board are with your Learning technology implementation? ***

Mark only one oval.

	1	2	3	4	5	
Not at all satisfied	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Extremely satisfied

23. **5 - And what about you, what is your level of satisfaction in regards to the technology implementation? ***

Mark only one oval.

	1	2	3	4	5	
Not at all satisfied	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Extremely satisfied

24. **6 - Do you think your Learning Ecosystem is fit for the modern workforce? ***

Mark only one oval.

Yes

No

Other: _____

25. **7 - What is missing most from your Learning Technologies to enable you to better support your organization?**

Future Implementation

The strategic vision: A perspective in the long view

26. **1 - When do you intend to implement another learning technology? ***

Mark only one oval.

- Within 2 years *Skip to question 27*
- Between 2 to 3 years *Skip to question 27*
- Over 3 years *Skip to question 27*
- No implementations expected *Skip to question 28*
- Don't know *Skip to question 28*

Future Implementation

27. **2 - What is the type of learning technology that you intent to implement? ***

Mark only one oval.

- Learning Management System (LMS)
- Content Management Systems (LCMS) - Digital Learning Content System
- Learning Experience Platform (LXP)
- Social media platform (applications to social learning, virtual discussions, collaboration)
- AI driven platform (Skills Taxonomy creation)
- Talent Experience Platform (TXP)
- Virtual Reality / Augmented Reality (VR,AR)
- Metaverse (immersive learning experiences)
- Other: _____

CONCLUSION

28. What is the **Primary Reason** you **Chose to Participate** in this survey?

29. **Share your email, if you would like to receive a copy of the Research**

Once you click in **SUBMIT** your survey is complete.
Thank you for your collaboration!

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Google Forms

Appendix C – Learning Technologies Implementation Framework (LTIF)

Introduction

Click 'File' > 'Make a copy' or 'Download' as a Microsoft Excel (.xlsx) file to start using this template.

Implementation of Learning Technologies Framework	
Why should you use this framework?	
The decision to implement learning technologies, must be well prepared. This is the framework that you should have in consideration to turn your implementation a success.	
This is a guide, highlighting the aspects that you should take in consideration, during the implementation process.	
How to use the Framework	
- This template has been designed so you can follow the guiding principles to better implement learning technology	
1. It covers the Implementation Process since the Provider Selection phase until the implementation planning. Use this as a guide during all process.	
2. At the bottom of the file, you'll see all tabs dedicated to each milestone of the Learning Technologies Implementation Approach (CHALLENGES - LEARNING TECHNOLOGY - IMPACT)	
3. In each tab, you'll find all the topics to consider, the questions that you need to ask, and the evaluation to be done. Complete the framework with the relevant information while moving forward in your implementation.	
4. Consider to do the copies needed, and add further tabs if there are other information that you would like to add.	
Breakdown of each section within the Framework	
Challenges	In the age of the digital economy and market globalization, competition has increased, and companies are constantly seeking to reduce costs, improve quality, raise productivity, and comply with environmental regulation. Identify the challenges that your company are facing.
Technology	Ready to start the project? Make sure that you cover all aspects of your implementation: - Ask the most critical Questions to the provider/vendor. - Most Important Features to Consider - Before the implementation, while selecting the provider and during the implementation. In this section you can see the importance given to the item when the implementation is an LMS or LXP. All items were identified has very important or important.
Impact	After a specific period of time you should measure the efficiency of your implementation. Complete this tab with that evolution.
For more information	
Helena Rodrigues Ferreira helena.r.ferreira@tecnico.ulisboa.pt LinkedIn Profile	

Challenges

Possible challenges	add more if needed
Organization_Challenges	Learning_and_Development_Priorities
- are challenges that are depending on the context and therefore are common to other companies - business strategy	- Related to the Organization Learning Strategy
Flexible & Hybrid Working	Reskilling & upskilling
Organizational Profitability	Increase Employee's engagement for learning
Great Resignation (Retain Talent)	Usability / quality of end user interface
Increase Employee Value Proposition	Learning & Development Process Simplification, Standardization & automation
Reducing operational costs	Increase and diversify learning offer
Pandemic Disruption	Standardization of the Learning technology infrastructure
Multi-Generational Workforce	Better Learning Regulation & compliance
Digital & Agile Transformation	Better leadership & management
Sustainability & Ecological Demand	Adopting next generation Learning Tech approaches
Increasing organisational performance & profitability	Enhancing the talent pipeline
Improving customer satisfaction & service quality	Reducing systems & IT costs
Increasing business agility	Reducing resource & operating costs
Overcoming the impact of the pandemic	Lack of business agility & flexibility with current system
Knowledge Retention & Transfer	Dissatisfaction with current provider or system
Organizational Innovation	Current solutions' limited range of functionality
Competitive Advantage	
Define what are your challenges (maximum of 5)	size your ambition, finetune your challenges and do not try to solve all challenges. Avoid complexity
Type	What are the challenge that is the solution addressing?
Learning_and_Development_Priorities	Standardization of the Learning technology infrastructure
Learning_and_Development_Priorities	Usability / quality of end user interface
Organization_Challenges	Organizational Profitability
Learning_and_Development_Priorities	Increase Employee's engagement for learning
Organization_Challenges	Great Resignation (Retain Talent)

Critical Questions	do not lose the sight, return to this section in a recurrent way to continue seeking the vision expected
What is your long term vision? <i>(Have a look at the future. Think about your Technological Ecosystem and what you want to reach in the coming years)</i>	
Why are you considering a implementation of a learning technology?	
Measure your Learning Engagement	you can use an assessment or describe your own perception. This is just for reference and to give guidelines for the implementation
4 Pillars	
Managers are actively involved in the development of their teams	3 ▾
People permanently share and learn from others	▾
Resources and development opportunities are readily available in sufficient quantity and quality	▾
People have a strong Learning Agility: high capacity and motivation to learn from daily experiences, successes and failures, and an active role in one's own development	3 ▾
The Foundations	
Trust and Respect: Is there enough trust and psychological safety between individuals at all levels of the organization	1 ▾
Shared Mission: Does everyone within the organization share the same vision and purpose? Do they actively collaborate to achieve the same objectives?	4 ▾
Openness to New Ideas and Experimentation: Are new ideas and experimentation sought out and welcome whatever their origin?	4 ▾
Continuous Improvement: Is there a constant drive to improve performance across the whole organization?	▾
TOTAL	;
Colors scheme	Result definitions
5 - Strongly Agree	The green level represents that, even if the engagement is already good, we recommend that the implementation planning keeps a pulse on this to make sure that there are no unexpected blocking points.
4 - Agree	
3 - Neutral	The red levels represents that your implementation needs to include strong actions that will increase the engagement for learning. We strongly recommend that a group of people is allocated to those actions
2 - Disagree	
1 - Strongly Disagree	

Technology

Define in advance the best technology that cope with your needs			
What is the platform(s) that you are considering?	Select	Name of the Provider / Contact Person	Comments
LMS (Learning Management System)	<input type="checkbox"/>		
LCMS (Learning Content Management System)	<input type="checkbox"/>		
LXP (Learning Experience Platform)	<input type="checkbox"/>		
SLP (Social Learning Platform)	<input type="checkbox"/>		
AI / SKILLS (AI Driven Platform)	<input type="checkbox"/>		
TXP (Talent Experience Platform)	<input type="checkbox"/>		
VR,AR (Virtual Reality / Augmented Reality)	<input type="checkbox"/>		
Metaverse (Immersive Learning Experiences)	<input type="checkbox"/>		
Other	<input type="checkbox"/>		
Critical Questions to the provider/vendor.			
Select a service/deployment according to your scope	Provider answer		Comments
How many deployments have you done so far?			
How big are the deployment? <i>How many users involved</i>			
From those deployments how many were POC(s) or Pilot(s)?			
How many deployments are concluded?			
If not concluded specify at what stage are you now			
Can you identify other external partners that you have already work with in the deployments? <i>Example: other partners that you needed to integrate your system</i>			
Expected return of investment	Provider answer		Comments
How do you measure effectiveness and ROI?			
What's the process for ongoing review?			
Product Roadmap			
What is the future product vision over the next three to five years?			
What are the major functional enhancements over the next three to five years?			
Integrations with other platforms			
Type of integration with the existent platform (name of the platform)			
What existing systems / infrastructure will it need to integrate with?			
Is the tool integrated with social network platform like G+, facebook?			
If yes, please describe main functionalities			

Learning Technologies					Most Important Features to Consider			
LMS	Course	LXP	Blended	XP		Your requirements	Provider answer	Your Evaluation
X	X	X	X	X	LMS (Learning Management System)			
X	X	X	X	X	Intuitive User Interface			
X	X	X	X	X	Digital Experience			
X	X	X	X	X	Effective Content Management			
X	X	X	X	X	Responsive Mobile Learning Support			
X	X	X	X	X	Flexible Online Testing And Assessment Options			
X	X	X	X	X	Easy, Customizable And Accurate Reporting Tools			
X	X	X	X	X	Role Assignments And Adjustable User Profiles			
X	X	X	X	X	Strong Adoption Features			
X	X	X	X	X	Engagement and diverse activities in the virtual deliver			
X	X	X	X	X	Register Learning Needs			
X	X	X	X	X	Personalized Learning Pathways			
X	X	X	X	X	Strong Analytic Features			
X	X	X	X	X	Better Curation			
X	X	X	X	X	Reach Broader population on any device			
Learning Technologies					Before the Implementation			
LMS		LXP				Select	Status Point	Comments
57.6%		77.6%		Initial Evaluation of Needs and Requirements		<input type="checkbox"/>		
68.9%		84.4%		Make sure that you have the ownership of leadership team and keep them updated		<input type="checkbox"/>		
71.1%		77.8%		Identify your most important use-cases/ business case		<input type="checkbox"/>		
60.0%		73.3%		- Clarifying the problems you want to solve before you go out and buy a new platform		<input type="checkbox"/>		
66.7%		53.3%		- Identifying the long terms goals connected with the technological strategy		<input type="checkbox"/>		
73.3%		73.3%		Focus on employee experience first (create personas)		<input type="checkbox"/>		
73.3%		73.3%		Identify the metrics and expected impact		<input type="checkbox"/>		
73.3%		73.3%		Investigate the potential technologies to implement		<input type="checkbox"/>		
60.0%		82.2%		Insure that your data is clean		<input type="checkbox"/>		
				Insurence your data is coming from the right source		<input type="checkbox"/>		
				Assess your current Learning system (you may find functionality you did not know existed)		<input type="checkbox"/>		

LMS	LXP		Select	Status Point	Comments
60.0%	64.4%	Budget	<input type="checkbox"/>		
		Budget to the acquire the platform	<input type="checkbox"/>		
		Budget to implement the platform	<input type="checkbox"/>		
		Budget to keep the platform	<input type="checkbox"/>		
LMS	LXP		Select	Status Point	Comments
66.9%	64.4%	Resources and project definition	<input type="checkbox"/>		
55.0%	88.9%	Create a senior governance team which owns the design, implementation, and success of the system	<input type="checkbox"/>		
		Assemble a cross-disciplinary buying team with representatives from HR, IT and finance, as well as departmental managers and staff who will use the software	<input type="checkbox"/>		
		Assemble an implementation team, set a governance and responsibilities:	<input type="checkbox"/>		
		- Making sure the project receives appropriate resources.	<input type="checkbox"/>		
		- Overseeing administrative details.	<input type="checkbox"/>		
		- Managing conflicting priorities.	<input type="checkbox"/>		
64.4%	51.1%	Create a Project Chart (develop a calendar with the milestones, the tasks and it responsibilities and dependencies, duration)	<input type="checkbox"/>		
		Define your Project Boundaries (in scope / not in scope)	<input type="checkbox"/>		
		Define assumptions / constrains / risks(if needed)	<input type="checkbox"/>		
		Define a change management and communication responsible	<input type="checkbox"/>		
64.4%	73.3%	Define the completion Criteria	<input type="checkbox"/>		
		Define Success Criteria of your project team	<input type="checkbox"/>		
60.0%	77.8%	Intimately involved your business partners in the implementation so the technology are seen as strategic business solutions.	<input type="checkbox"/>		
71.1%	80.0%	Partner closely with IT to cover all technical and infrastructures fit	<input type="checkbox"/>		
66.7%	66.7%	Define your service delivery model (who will do what once the system goes live)	<input type="checkbox"/>		
73.3%	71.1%	Get the approval of all the items mentioned above	<input type="checkbox"/>		
LMS	LXP		Select	Status Point	Comments
73.3%	84.4%	Technology and Providers Selection	<input type="checkbox"/>		
80.0%	64.4%	Predefined business and technical requirements	<input type="checkbox"/>		
48.9%	53.3%	Importance of software features	<input type="checkbox"/>		
		Provider Culture	<input type="checkbox"/>		
		- What are their business values?	<input type="checkbox"/>		
73.3%	66.7%	Provided experience in similar projects	<input type="checkbox"/>		
		- Are they global experienced or sensitive to geographies that are important to you?	<input type="checkbox"/>		
		- Have they worked with similar companies?	<input type="checkbox"/>		
66.7%	75.0%	Feedback from other clients	<input type="checkbox"/>		
84.4%	66.7%	Demos presentations	<input type="checkbox"/>		
75.0%	84.4%	Provider performance post-installation.	<input type="checkbox"/>		
73.3%	88.9%	Provider flexibility to see beyond their own solution	<input type="checkbox"/>		
		- Are they able to see beyond their own solution and flex with your company style to drive value?	<input type="checkbox"/>		

Impact

Key Perform Indicators	Expected Impact	NPS (Net Promoter Score)	Comments
Organization Challenges and L&D Priorities			
Implementation (Project Metrics)			
Meet Original goals			
Complete within budget			
Complete on time			
Experience Scope creep			
Are deemed failures			
Others			
Learning Technology (Platform/Tool) Metrics			
Usability - Intuitive User Interface			
Perceived Usefulness			
System Recommendation			
Platform/tools Usage Metrics			
Employee experience Indicators			
Learning Technology (Platform/Tool) Metrics			
Learning costs and investment			
Employee performance & morale			

