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Artificial Intelligence in Learning & Development

Insights and outlooks into the future of Corporate Learning

Contents

1 AI in Corporate Learning: From Vision to Reality

The integration of artificial intelligence (AI) into corporate learning can fundamentally change how we learn, develop and share knowledge. If we manage to utilize the new possibilities of AI by overcoming the challenges we face, our learning landscape can change and develop significantly.

The use of AI in corporate learning is not new. Due to the hype surrounding generative AI, the topic has been more present than ever. AI will fundamentally change the way knowledge is acquired.

The potential applications are vast and varied, ranging from the creation and optimization of learning content to course recommendations for skill acquisition and personalized learning support. For example, chatbots can serve as virtual learning partners for employees.

However, although AI has played an important role in corporate learning for around 10 years and 90 percent of education experts from the Cornelsen Education Index see AI systems as an auxiliary tool or a driver of innovation, according to a Bitkom survey, only 3 percent use generative AI centrally in the company [1]. The understanding of suitable use cases varies considerably within different organizations.

We currently find ourselves between opportunities and challenges: AI offers enormous potential as a supporting tool, such as in the automation of processes. However, this does not imply that human skills and jobs in corporate learning will be obsolete. Rather, a new, symbiotic collaboration between humans and technology is becoming possible.

The successful implementation of AI in corporate learning requires a balanced relationship between technology, structural processes within the organization, and the people who work with it. The overarching transformation of an organization is crucial. Without adjustments to processes and employee training, the integration of AI cannot achieve the desired results. It is therefore crucial for companies to invest in both, technology and processes, as well as in employee training. This is the only way to successfully and legally implement AI in corporate learning.

Rule-based, data-based, cognitive? The development of adaptive learning systems

People were already talking about personalized learning systems in Corporate Learning in the 1980s and 1990s. In most systems, learners could choose one of several learning

Adaptive learning systems use AI and data analysis to maximize learning success through individual learning experiences.

[1] ↗https://www.bitkom.org/Presse/Presseinformation/German-companies-hesitate-at-ChatGPT-Co#_

paths or change avatars in playful environments. However, this was not yet a personalization of the learning process in today's sense and was not based on AI. Today, these systems are referred to as rule-based systems.

Data-based learning systems dominate current developments**.** These systems collect user data and make decisions at fixed nodes based on the user's data. One example is the language learning app Duolingo.

The vision of future learning systems with AI goes beyond and consists of **cognitive learning systems** (deep learning systems). In this vision, teachers are replaced by AI systems and indistinguishable from humans in terms of language and behaviour. These systems are based on human-machine interaction. In the future, such learning systems will be able to create training courses completely on their own, based on data.

Currently, systems like Large Language Models (LLMs), such as ChatGPT or enterprise-focused AI like WatsonX, come closest to this vision, though they are still a long way off.

Today, we find ourselves between data-based and cognitive learning systems. In literature, these are collectively referred to as **adaptive learning systems**. The term refers to all systems that independently evaluate learning data and user data and enable users to learn in a personalized way. Personalization goes far beyond binary data and includes personal and statistical data. Adaptive learning systems use AI and data analysis to maximize learning success through individual learning experiences. The first pilot projects in the development and use of such AI learning systems already exist.

Adaptive learning systems: the future of learning

Today

Sales of adaptive learning systems are currently increasing by more than 20 percent per year. Europe is the world's second-largest growth region after Asia. North America has already achieved a very high level of coverage.

Adaptive learning systems not only provide users with a personalized environment and learning experience that takes a variety of factors into account; they also learn from their users and automatically improve based on the data collected.

However, general practice does not yet correspond to the possibilities and the state of research. Although many systems draw on existing data sets, it is also important to link these with other data. This can be illustrated with an example: the sheer number of clicks on a video sequence in a learning system says nothing about why the learners clicked on this sequence. To date, most data-based learning systems do not take into account a lack of previous training or different goals. Valuable adaptive learning systems give users the chance to customize the learning environment based on

personality, individual goals and many other factors. An essential factor for narrowing down suitable learning content is taking prior knowledge into account.

In summary, good adaptive learning systems can:

- Configure learning objectives, learning content and learning speed
- Adapt content to personality and personality traits
- Adapt learning paths to the current level of competence and offer individual support in the “moment of need”
- Adapt learning content and time schedules to user needs

Future

It is not yet predictable when the vision of cognitive learning systems will be realized. Adaptive learning systems will develop rapidly over the coming years and will allow greater personalization, particularly based on collected data. Learning systems will react to experiences of users and, for example, recognize independently when a generational change requires a shift in the personalization of content.

Imagine a teacher who knows his students with all their characteristics and adjusts to each of them.

Personalized learning experiences and cognitive systems that understand learners' strengths, weaknesses, and preferences and respond to their needs will further evolve and may become the norm.

Learners' consent to store their data and be open to personalization will be a key factor in the further development of adaptive learning systems. By jointly processing personal information and technical data from learning systems, algorithms can offer future users more efficient learning and more personalized learning experiences.

However, analysing and processing (personal) data also entails risks. Therefore, it is imperative to consider where we adopt a technology-open approach to learning and where we impose limits.

2 Setting the Scene for Adaptive Learning Systems

AI is revolutionizing traditional learning concepts. New tools for text summaries, interpretation, speech-to-text and text-to-speech can be implemented. The new possibilities increase the personalization, adaptability and inclusive use of learning content. Furthermore, AI can replace passive learning methods, such as the mere

absorption of information, with more active practices like retrieval, reflection, and integration of information.

The staff of Learning & Development (L&D) departments can analyse learners' behaviour and progress in real time when using AI integrated into learning systems. The system can directly adapt the learning content based on this data. The adaption boosts learners' motivation and engagement, enhancing the efficiency of the entire learning process. In addition, various AI technologies can record individual learning preferences, knowledge levels and learning progress. Such data can be used to create personalized learning paths that meet individual needs of learners. Generative AI tools can give recommendations for necessary training by analysing employee data, or the systems can output more appropriate reflection questions for learners. It allows employees to develop more specifically and effectively without the need to implement new learning programs.

Factors to consider when using AI

In order to successfully use AI in corporate learning, we need to clarify what prerequisites and skills learners need to interact with AI. To do this, a distinction should be made between three levels: the company (organization) level, the level of managers and executives, and the level of learners themselves.

1st level: the company (organization)

> AI is modernizing the learning concepts we know.

The recognition of the importance of L&D in companies is rising. Today, the department is often represented at board level, because of the strategic relevance of L&D in the context of disruptive changes. A first basic requirement is the definition of a **company-wide learning strategy.** It defines the direction in which a company and its core competencies will develop, motivates the workforce to use AI in individual learning projects and establishes the use of AI in the L&D department.

The second requirement is an active **learning culture** that promotes innovation and experimentation, including a certain degree of uncertainty due to constant technological development, as well as trial and error in collaboration with AI. Companies need to create the foundations to establish such an active learning culture. The learning culture should be communicated in a targeted manner and with concrete ideals.

Further requirements include a **company-wide AI strategy, technical framework conditions and suitable resources.** In order for AI-supported applications to function and to be fully effective, a company-wide AI strategy is needed. It should be aligned with the corporate vision and the goals of the learning strategy, while keeping a holistic view of data flows and the interoperability of systems. In addition, companies require a robust technical infrastructure that can support AI-based tools and platforms. It must also be ensured that data protection and the safety of learners are guaranteed. Finally, sufficient financial means and resources must be provided to implement and maintain AI systems.

2nd level: Managers & Executives

As with any new technology, the success of learning with artificial intelligence depends on being open to **technology**. New technologies can only be understood by engaging with them and trying them out.

Managers and executives must understand that dealing with AI requires its own learning process. **Skills development** requires that learners and users are given enough **time and suitable offers** to learn with AI**.**

The transition to learning with AI is facilitated when leaders and managers act as **ambassadors and facilitators**. It helps to break down barriers, creates trust and democratizes learning with AI.

Those responsible must also ensure that the use of AI is in line with local and international laws and standards. This includes, for example, **compliance with the General Data Protection Regulation (GDPR)** and other relevant legislation. This can be done partly via the configuration.
Since adjustments to the laws can occur, constant monitoring should also be carried out. As far as the processing of personal data is concerned, compliance with the GDPR applies to all AI tools and systems. The principles of data economy, purpose limitation and transparency must therefore be observed. It is important to check whether personal data needs to be used at all and, if so, to what extent. Alternatively, data can also be pseudonymized or anonymized.

Especially when using generative AI, **ethical considerations** regarding fairness, transparency, and the avoidance of bias are becoming increasingly important. The principle of equal treatment must be upheld, meaning that AI-based decisions must be free of discrimination. When generating texts, images, audio, and videos using AI, it is important to check that prejudices are not perpetuated and reinforced by the dissemination of the content, but that representations are diverse. Companies should develop their own ethical guidelines for the use of AI which organize the work of AI systems fair and transparent and comply with them. In this way, discrimination, marginalization and the spread of prejudices can be avoided.

To meet the requirements and use the tools effectively, the **L&D staff** must be **appropriately qualified**. This includes AI literacy, an understanding of opportunities and challenges, and the opportunity to try out the tools. This is the only way to identify use cases and implement them in a legally compliant manner. Ongoing training and dialogue with other departments ensure sustainable use. It benefits not only the learners but also the L&D departments themselves.

The AI Act

The AI Act regulates the safety, transparency, reliability and fairness requirements that AI systems and general-purpose AI models (GPAI) must fulfil across Europe, depending on their risk potential. The AI application area of education, which includes both general and vocational education, is generally categorized as high-risk in the AI Act. However, whether an individual AI system in the education application area is categorized as high-risk depends on whether its use poses a significant risk to the health, safety or fundamental rights of natural persons and significantly influences decisions. High-risk applications must undergo an assessment to be certified. The obligations for high-risk systems apply 36 months after entry into force, i.e. from mid-2027. The AI Act must now be transposed into national law.

3rd level: Users & Learners

Learners must understand the philosophy of **lifelong learning.** Learning with AI requires the **willingness, openness, and adaptability** to deal with new things. It may also require leaving one's comfort zone. Furthermore, the half-life of specialist knowledge changes with the use of technology: the more advanced the technology, the shorter the half-life. Currently, it is three to five years. Users must therefore repeat and refresh content in a targeted manner and be prepared to integrate learning into everyday life.

Another important factor in learning with AI is **feedback** for learners. You should consciously choose AI systems that can, for example, provide feedback on the status and development of learning success.

Learners should be aware that AI can provide individual support and adapt to personalities and specific learning needs. However, these possibilities require **trust** in the organization, the use of AI and the learning process. If trust is present, **individual learning goals can be** defined, **self-directed learning** can be enabled, and optimal individual learning support can be offered.

3 Application Scenarios of AI in Corporate Learning

The areas of application for AI in L&D departments are diverse.
They range from creation of learning content to automatic adaptation of courses to the learner's level of learning. Various application scenarios are described below:

In **personalized learning,** AI provides a customized learning opportunity that adapts to the user's role and provides individual recommendations.

Adaptive learning goes even further and ranges from simple pre-tests to advanced machine learning algorithms. With the help of data and algorithms, courses and content adapt to the needs of learners.
Particularly advanced systems enable users to learn in a way that is as customized as with a personal tutor. Individual adjustments can be made before, during and after a course.

Another scenario is the use of AI to support employees' **career planning.** AI can create personalized learning paths or offer learning recommendations that optimally prepare an employee for a new position. Through benchmarking and development recommendations, employees can be specifically prepared for soft skills and future technologies.

Competence management systems **map and display skills and competencies in employee profiles** and learning content, support the tracking and development of skills and make them directly visible.

AI can tailor **daily learning recommendations to a wide range of users.** These are based on the user's individual learning behaviour and preferences. To provide suitable content, past interactions and learning successes are analysed.

LLMs for daily learning can be used as personal learning guides and sparring partners. These tools can provide users with individual and appropriate examples and explain complex issues in more detail. They can also set tasks from everyday work to consolidate what has been learned.

AI can provide learners with **real-time feedback** on their **learning progress**. Completed courses, learning goals and other factors are considered. By analysing the data and recognizing patterns, strengths, and weaknesses can be identified. Thus, feedback and suggestions for improvement can be given.

Generative AI can also **support the L&D department.** It can help to create a structure for an e-learning course by designing learning content. In addition, an AI can generate spoken texts for videos, images or entire videos and thus support the production of e-learning. For content that has already been created, AI can generate quiz questions to test learning progress.

The following table summarizes the application scenarios presented. In addition to the technology, data and organizational requirements need to be considered to optimize the use of AI.

Application scenario	Description
Personalized learning	Tailored learning opportunities for lecturers, trainers, teachers, and learners through powerful search functions, innovative user interfaces and individual recommendations
Adaptive learning	Adaptation of the learning process to individual needs of learners through machine learning algorithms
Career development	Support in preparing for new roles through personalized learning paths, benchmarking, and development recommendations
Skill -Competence Management System	Tracking and developing employee skills through a skills and competence management system
Daily learning recommendations	Providing daily recommendations for learning activities based on employees' individual needs and interests
LLMs for "Daily Learning"	Using AI-based chatbots to provide employees with daily support and recommendations for learning activities
Feedback on learning progress	Real-time feedback on employees' learning progress to optimize their learning journey and improve their performance
Supporting the L&D department	Support the L&D department in planning, implementing and evaluating learning and development initiatives through AI-powered tools and analytics

The following cheat sheet summarizes how generative AI can support employees in L&D departments. The possibilities are constantly growing, and new tools and applications show up every day.

4 Cheat Sheet: Generative AI in Learning & Development

Generative AI in Learning & Development

How generative AI can support employees in the L&D sector

There's an AI for that

The website provides an up-to-date overview of available AI tools and their possible applications:
↗theresanaiforthat.com

Application examples of generative AI in Learning & Development

EXPLORATION

- Analysing target groups and creating personas/ learner profiles
- Rephrasing of technical or specialised content
- Automated evaluation of learner feedback

e.g. through Large Language Models

STRATEGY

- Brainstorming ideas for content-related topics, learning activities and scenarios
- Use as a sparring partner to explore ideas in a dialogue
- Development of project plans or learning strategies

e.g. through Large Language Models

CONTENT CREATION & CURATION

- Creation of texts, images and descriptions for learning content
- Creation of explanatory films & avatars
- Creation of audio files for voice-over
- Development of learning paths and programmes, personalised and adaptive learning

e.g. through text generation, image generation, audio generation and video generation

TRANSLATION & TRANSCRIPTION

- Automatic translation into several languages
- Translation of audio tracks in videos with lip sync
- Creation of subtitles and transcripts for videos

e.g. through AI translators, video translation AI

EVALUATION & FEEDBACK

- Creation of test questions and answers for the respective learning content
- Optimisation suggestions based on course feedback from learners
- Clustering of data sets

e.g. through AI tools for e-learning, text generation

COMPETENCE DEVELOPMENT

- Identification of competences for a role
- Consolidation of competences and standardisation of designations
- Creation of development plans

e.g. through large language models, AI tools for e-learning, AI-based HR tools

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Quick-tip for good prompting

To get the best possible results from the AI tools, you need a solid prompt. The better and more targeted the prompt, the better the result. A prompt should always be given a **role** and a **context** in order to achieve an optimal result.

Example:
You are a **Learning and Development Specialist**. How can we promote and maintain a culture of continuous learning **in a company with 500 employees**? Please detail each of the top 10 actions and list them in order of importance, ending with a matching emoji.

If you are not quite sure, you can ask the AI to ask you questions that will help you to specialise your query and thus improve your results.

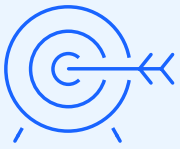
Example:
You are a Learning and Development Specialist. How can we promote and maintain a culture of continuous learning in a company with 500 employees? Please detail each of the top 10 actions and list them in order of importance, ending with a matching emoji.
Before you answer, ask me 5 questions so that you can better understand what I want from you. Please ask questions and wait for my answers.

What do I need to bear in mind when using these tools?

Data protection

Bias

Impossibility of deletion



Clearly defined goals

Context

Critical review

Risks such as data protection, bias, the impossibility of deleting entered data and the potential for discriminatory results or AI hallucinations must be taken into account. Clearly defined objectives and sufficient context are crucial for high-quality outputs. A critical review of the responses generated is advisable.

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Bitkom represents more than 2,200 companies from the digital economy. They generate an annual turnover of 200 billion euros in Germany and employ more than 2 million people. Among the members are 1,000 small and medium-sized businesses, over 500 start-ups and almost all global players. These companies provide services in software, IT, telecommunications or the internet, produce hardware and consumer electronics, work in digital media, create content, operate platforms or are in other ways affiliated with the digital economy. 82 percent of the members' headquarters are in Germany, 8 percent in the rest of the EU and 7 percent in the US. 3 percent are from other regions of the world. Bitkom promotes and drives the digital transformation of the German economy and advocates for citizens to participate in and benefit from digitalisation. At the heart of Bitkom's concerns are ensuring a strong European digital policy and a fully integrated digital single market, as well as making Germany a key driver of digital change in Europe and the world.

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