Lernende Systeme

GERMANY'S PLATFORM FOR ARTIFICIAL INTELLIGENCE

Competence development for AI

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Executive Summary

Whether in controlling, marketing or on the shopfloor – Artificial Intelligence (AI) is changing the distribution of work between humans and technology and thus the everyday working lives of many employees. The use of AI systems promises great potential not only for companies, for example through optimized production processes and efficiency benefits. But AI can also contribute to richer work for employees – for example by relieving them of routine tasks, by support through assistance functions, and by making work design that fosters opportunities to learn and gain experience.

The use of AI systems in companies, for example, puts collaboration between humans and technology on a qualitatively new level. Certain physical and operational activities as well as cognitive tasks will decrease in importance, while unpredictable tasks requiring communication skills, creativity, or reflection as well as a high degree of flexibility will increase in importance. The use of self-learning systems will therefore also change the competency requirements for employees. New competencies will be required in all industries and domains for the development of AI systems and for dealing with AI technologies for employees with different roles. These changed competence requirements affect technical and social dimensions in equal measure.

An important key to the successful introduction of AI technologies is therefore the early qualification and continuing vocational training of employees. The process of competence development initially relates to the question of which competencies will be necessary or at least beneficial in dealing with Artificial Intelligence in the future. It is essential that this process is integrated into the strategic orientation of the company and is in line with the AI transformation of a company. Important issues here are recruiting, targeted training, and strategic competence management.

The task of competence management for AI is then to define specifically required competencies for the various roles and tasks. To be able to describe the requirements, it is thus necessary to determine contextually how AI affects the respective roles and possibly changes the interaction between humans and machines. Competence development can take place along the following six steps of the competence management process as a starting point for defining (job) roles and their responsibilities in the context of AI:

- Allocation of tasks in the changed division of work between humans and AI
- Deriving and defining the specific AI competencies required to perform the tasks.
- Definition of competence profiles for each (job) role and determination of the associated target profile
- Competence needs analysis: Assignment of employees to the corresponding competence profile and individual assessment
- Definition of suitable further training measures for targeted AI competence development of employees

Visualisation of the six steps of a task-oriented competence management process

1. Roles & Responsibilities	2. (Detailed) Tasks	3. Competencies	4. Competence profiles	5. Competence Assessment	6. Advanced training plans
Determination of the technical responsibility along the (core) tasks of an area	a) Definition of (subject)specific (job)roles b) Listing of the (detailed) tasks of each (job) role	Definition and assignment of the competencies required to successfully perform the tasks with a focus on technical skills	a) Definition of a Competence profile for each (job) role b) Determination of the competence profile of the target profile	a) Assignment of the employees to the corresponding profiles b) Individual Assessment for the Target profile	a) Derivation of suitable further training measures for the targeted competence development b) Determination of job role specific curricula

Source: Own figure (cf. Stich 2021).

Depending on the role, the changing interaction between humans and AI requires different competencies, which can be divided into three categories, each building on non-AI-specific competencies:

- **Technical and basic knowledge,** to be able to cope with the technical requirements of the task on the one hand; on the other hand, also the digital requirements as well as new requirements resulting from AI, such as machine learning.
- **Dealing with AI systems** to be able to understand and shape the changing distribution of work between humans and technology on the one hand, and to be able to act in this distribution of work on the other. In addition to typical competencies in Human Machine Interaction, this also includes personal meta-competencies in particular. Competent handling of data is central to the development of AI systems, which not only focus on machine learning but also build on knowledge-based systems or mathematical logic (Gesellschaft für Informatik 2019).
- **Designing the context of AI systems** to understand AI as a regular element in daily work and to further develop and manage work and change processes based on it.

The competencies required by employees to perform their individual tasks depend on the company in question and the role assigned to the employees. Another factor for the accentuation of individual competencies is he respective AI system used: Artificial Intelligence is not a homogeneous technology and therefore the implications that arise for employees from the use of AI cannot be fully generalized.

The extent to which a competence is ultimately required for a specific role can be systematized by dividing it into different competence levels. This classification can be made according to the complexity of the task for which the competence is required as well as according to the degree of autonomy of the task to be performed.

Qualification and competence development should be conceived and designed in terms of lifelong learning and work-integrated learning. The identification of important areas of competence should be carried out in close cooperation with the employees. For a successful AI transformation, it is necessary that competence development is flanked by a climate of openness and transparency that emphasizes the opportunities for individual development of employees through and with AI systems and at the same time deals honestly with concerns. This openness should also include a positive failure culture that encourages employees to think and act independently and critically regarding the AI systems used.

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