UNIVERSITÄT GRAZ

Implications of generative AI for work design: Insights from the A-KI-A project

Dr. Sabina Hodzic
Work and Organisational Psychology

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- Aims of the project

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- Expert workshops

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- Insights from the interviews and experiments

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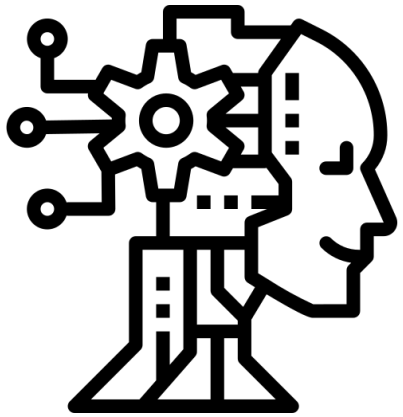
01

Introduction

What is Artifical intelligence (AI)?



“cool things that computers can’t do”

→ technologies emerging today that can understand, learn, and then act based on that information.

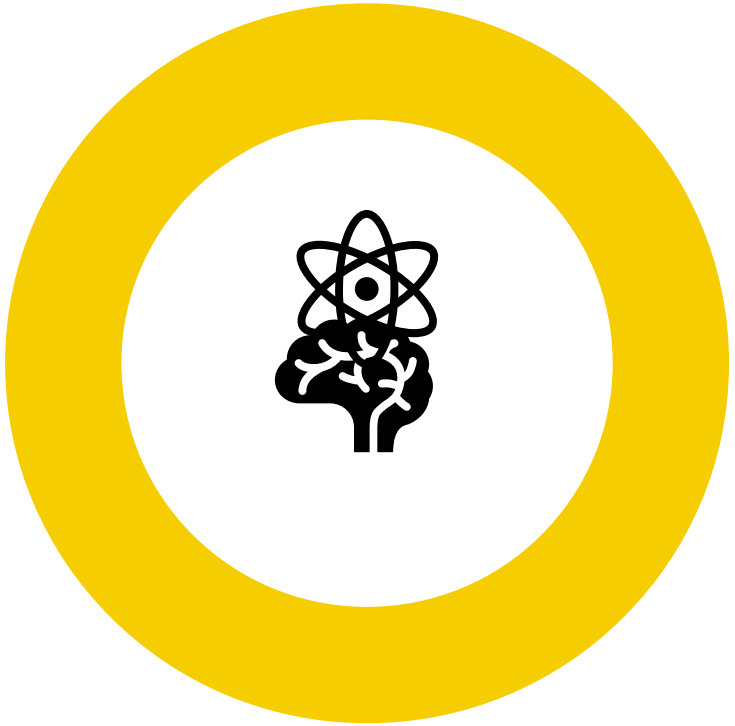
→ autonomy : the ability to perform tasks in complex environments without constant guidance by a user

→ adaptivity : the ability to improve performance by learning from experience

→ software (virtual assistants, image analysis software, search engines, speech and face recognition systems) and "embodied" AI (robots, autonomous cars, drones)

https://www.elementsofai.com/

Definition of AI?



"Artificial intelligence (AI) refers to **systems** designed by humans that, given a complex goal, act in the physical or digital world by **perceiving their environment**, **interpreting the collected structured or unstructured data**, **reasoning** on the knowledge derived from this data and **deciding the best action(s) to take** (according to pre-defined parameters) **to achieve the given goal**. AI systems can also be designed to **learn** to adapt their behaviour by analysing how the environment is affected by their previous actions."

Sources: Udrea et al., 2022; HLEG AI, 2019, S.7

For the impact on work design, it is not decisive whether the systems are based on machine learning or use rule-based algorithms. What is more important is what effects they have on work.

Literature review

Project focus thus far on **ethical** and/or **legal** issues.

Research focus predominantly on **gig work**.

Decision support systems

- Personnel selection
- Medical diagnosis and treatment

Algorithmic management

- Monitoring, Goal setting, Performance management, Scheduling, Compensation, Job termination.

The effects of AI on work design in **classical traditional jobs** has mainly been overlooked.

A-KI-A Project

„Auswirkungen KI-unterstützter Systeme auf die Arbeitsgestaltung“

GEFÖRDERT DURCH Digifonds

Goal: to investigate the effects of the use of AI in the workplace on work characteristics and consequently on the well-being of employees in the field of knowledge work.

With this project we wanted to answer two main research questions:

- How does the use of AI in knowledge work affect work characteristics?
- Which cognitive and affective abilities protect workers from the negative effects of AI implementation on work characteristics?

A-KI-A Project

Conceptual clarification

Knowledge work

Knowledge work is defined by thinking as its core task. It is distinguished by the continuous integration of communication, information, and data creation and consumption into daily workflows.

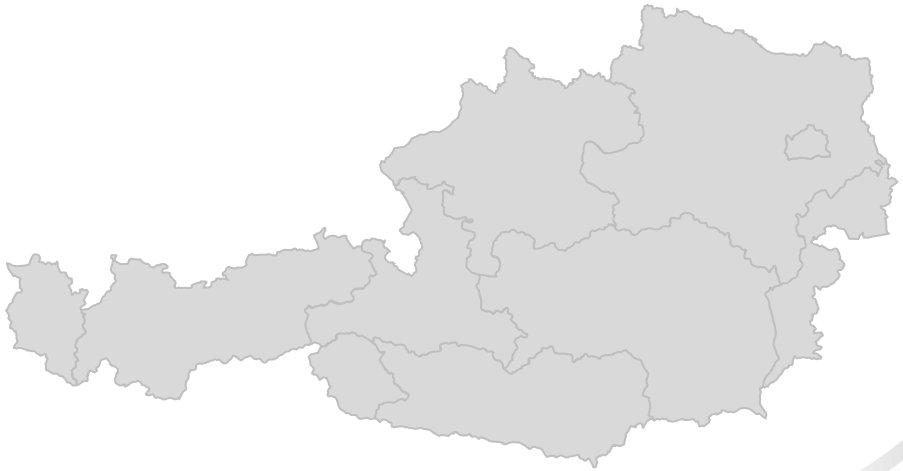
Work characteristics

Work characteristics are various aspects and elements associated with a job that influence worker motivation, satisfaction, and performance. Examples: skill variety, task identity, task significance, autonomy, feedback.

02

Overview of the method

Overview of the method

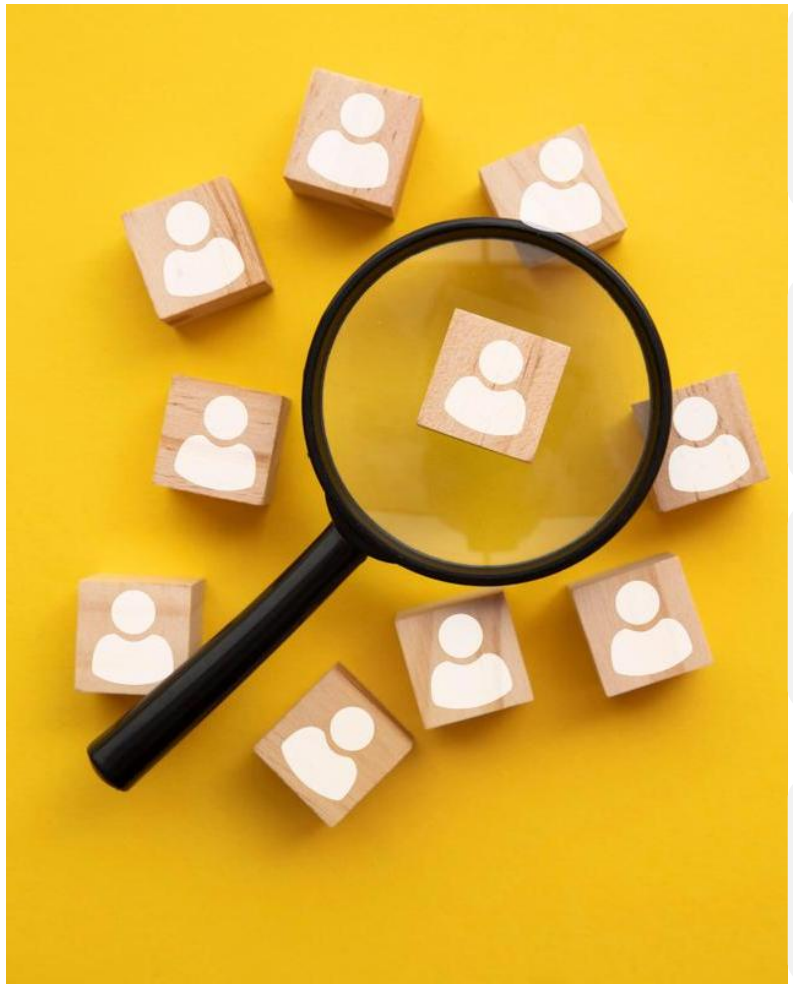


Qualitative study
Semi-structured interviews with knowledge workers from various Austrian companies on the effects of AI use in the workplace.

Online experiments to assess how different work characteristics are impacted by AI in specific work tasks .

Workshops with experts and employee representatives to discuss the results and develop further ideas and recommendations for the optimal implementation of AI.

Qualitative study



10 semi-structured Interviews

Summer 2023-Spring 22024

5 Austrian companies

HR department, marketing department, sales and business development, IT

Age range

24-41 years

Most frequently used AI system: ChatGPT

Goal: to investigating the impact of using AI systems (ChatGpt) on work characteristics and outcomes.

Bild: Uni Graz

Online Experiments

Online Experiment 1 (December 2023)

- Knowledge workers who use AI systems at work
- 2 Conditions
  - Intensive use of AI systems
  - Refrain from using AI systems
- Repeated measures (1 week in between)
- Comparison of work characteristics, well-being and motivation

Online Experiments

- Online field experiments with German-speaking employees
- Goal: To investigate the impact of using AI tools on work characteristics and work-related outcomes

Online Experiment 2 (October 2024)

- Knowledge workers
- No previous AI experience required
- 2 Conditions
  - Decision task with the help of ChatGPT
  - Decision task without the help of ChatGPT
- Comparison of task characteristics and task-related results

Workshops with experts

- 3 workshops; 1-1,5h duration
- 14 participants in total
- AI experts, union representatives, work council representatives

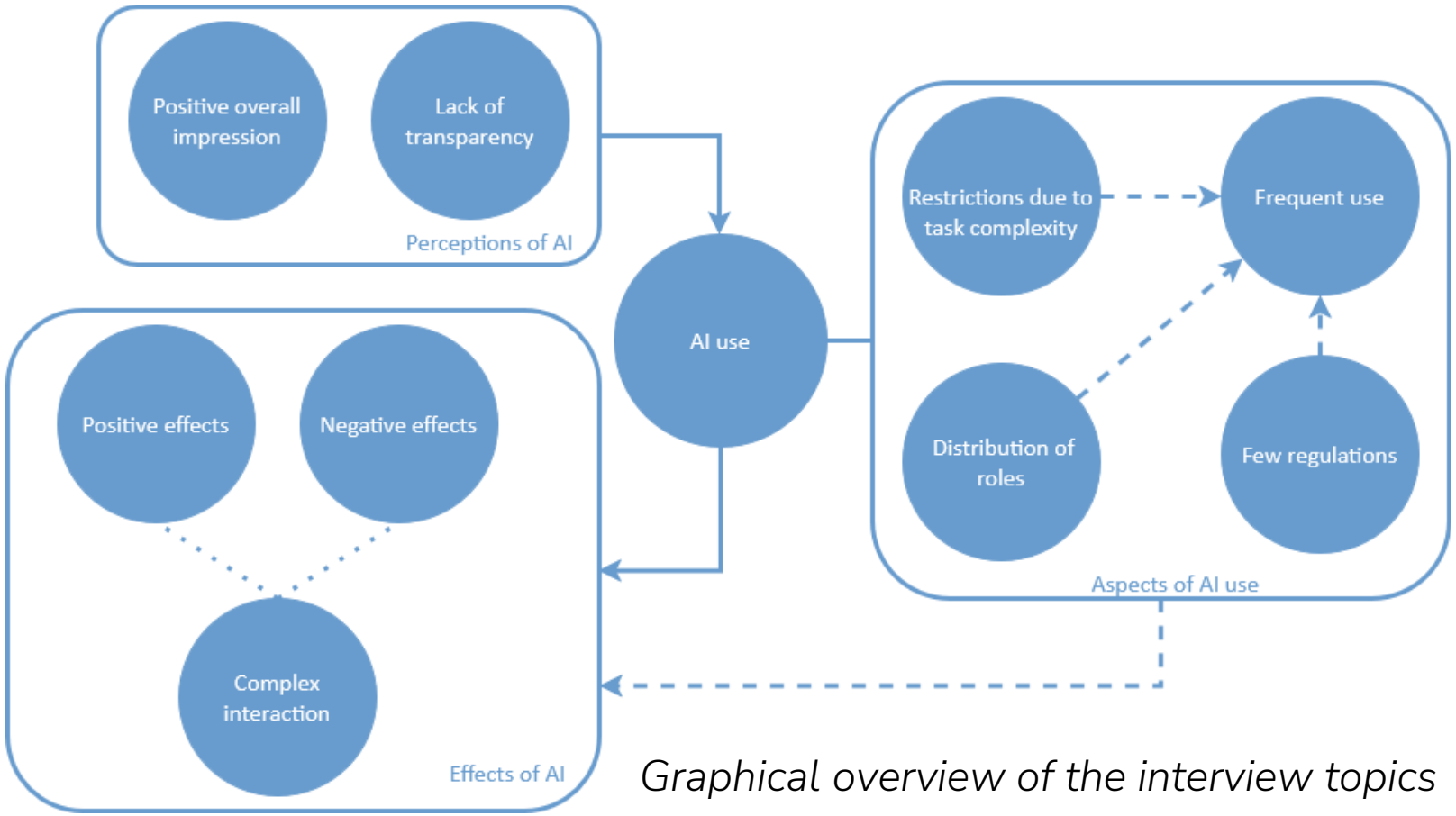
- Discussion of the results before the preparation of the handbook
- Obtaining expert insights for the handbook

03

Results overview

Interviews with knowledge workers

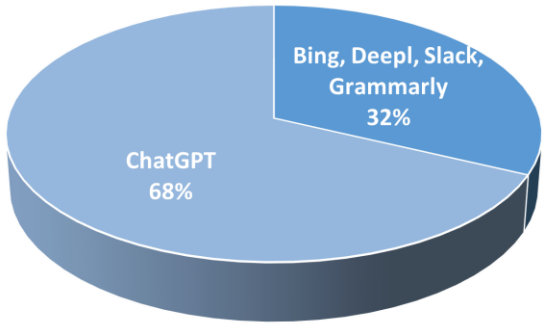
- Knowledge workers have a **positive overall impression** of AI and its impact on their work.
- Potential of AI in terms of **facilitating routine activities**.
- **Supporting role** of AI - the overall responsibility for the task execution remains in the hands of humans.
- When and to what extent knowledge workers benefit from the positive effects of AI use **depends on the task context**.



Graphical overview of the interview topics

Effects of AI systems on work design
Results of experimental research

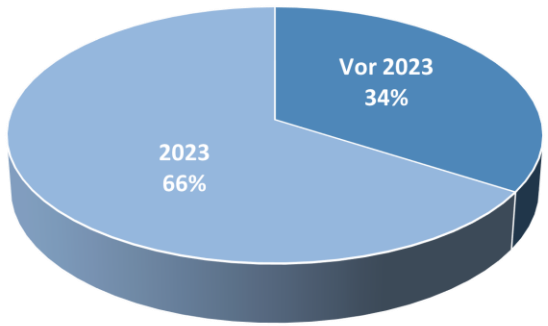
Welches KI-Tool oder -Plugin bzw. welche KI-Softwareerweiterung benutzen Sie am häufigsten?



Most used AI system

(N=327 knowledge workers working in Austria, December 2023)

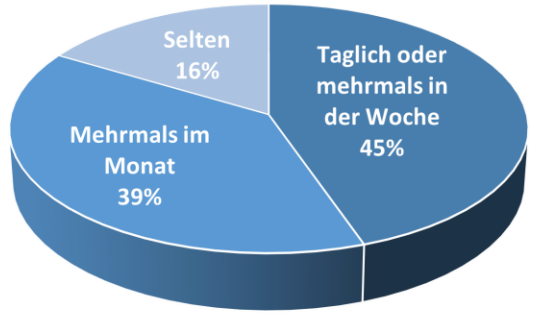
Wann haben Sie ungefähr angefangen, das Tool, das Sie am häufigsten verwenden, zu nutzen?



Start of AI system use

(N=327 knowledge workers working in Austria, December 2023)

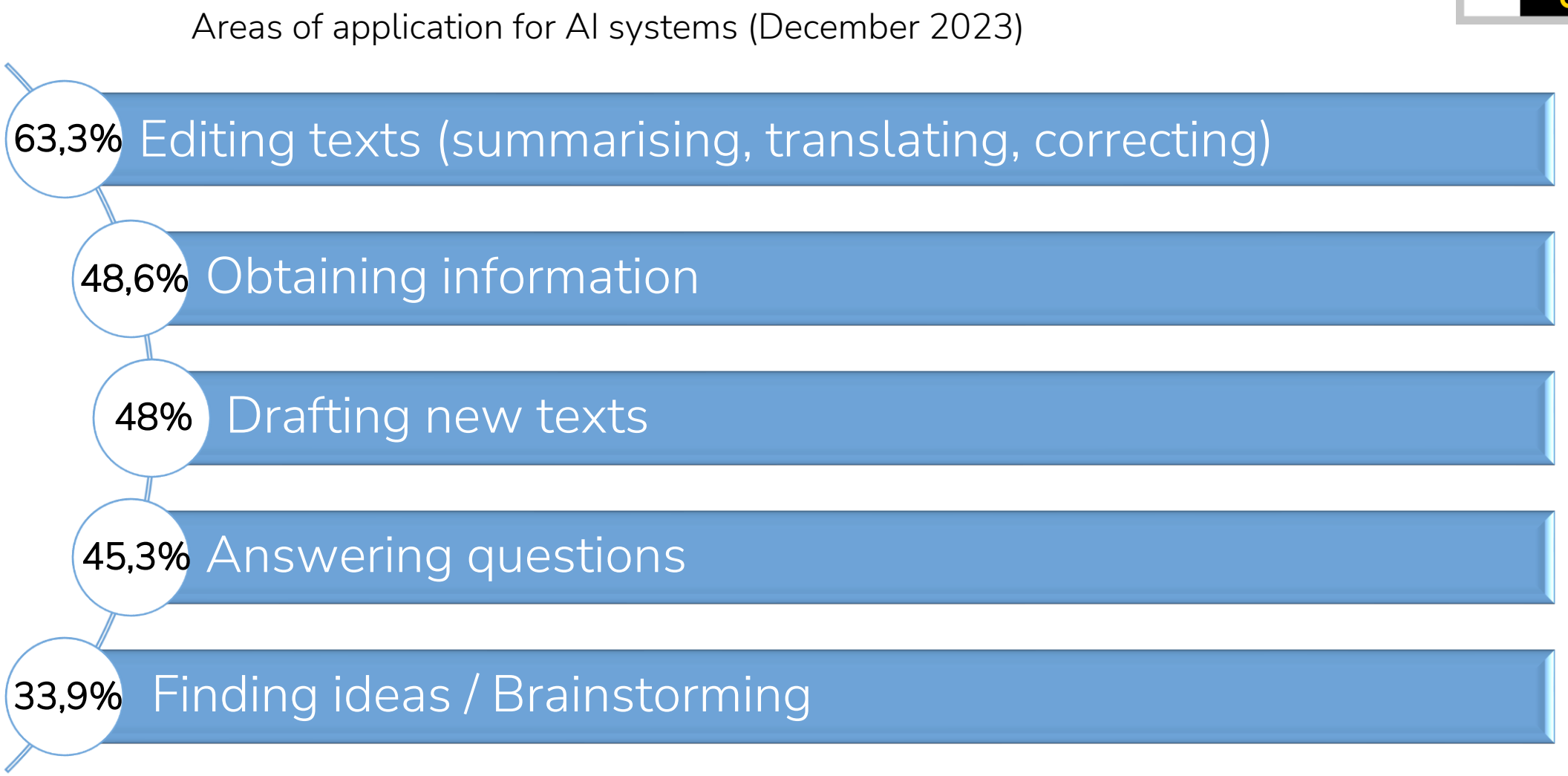
Wie oft benutzen Sie das Tool, das Sie am häufigsten verwenden?



Frequency of use of AI systems

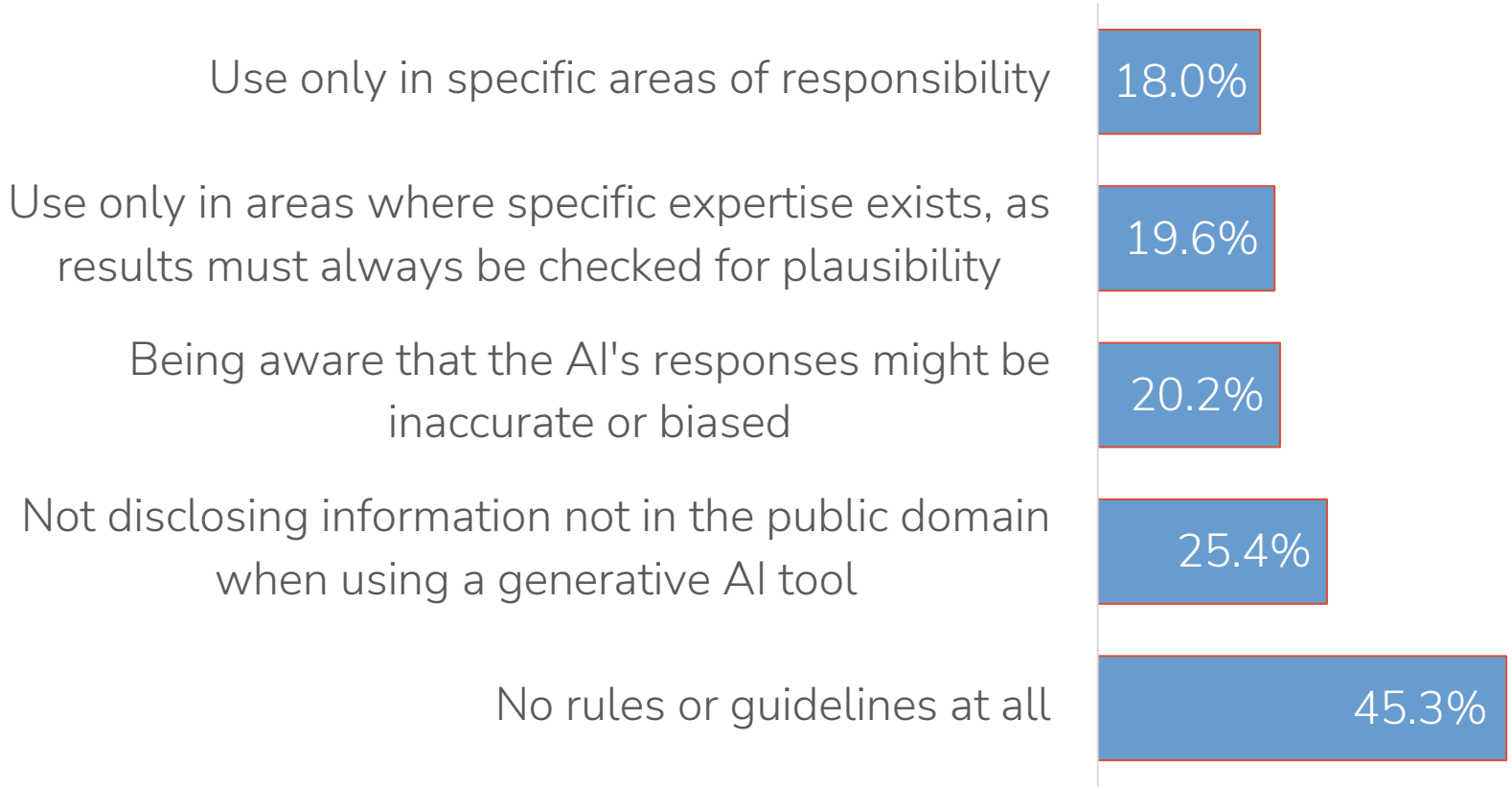
(N=327 knowledge workers working in Austria, December 2023)

Results of experimental research



Results of experimental research

Rules/guidelines for the use of AI systems in the workplace in Austrian companies (December 2023)



Results of experimental research

Effects on decision-making autonomy and information processing

While AI increases efficiency (e.g. more text in less time), it reduces decision autonomy and information processing, leading to concerns about over-reliance on AI systems.

Negative impact on problem solving

Intensive use of AI over a one-week period led to a reduction in problem-solving demands, suggesting that prolonged reliance on AI may impair employees' active cognitive engagement.

Long-term vs. short-term effects of AI systems

AI does not immediately reduce work demands, suggesting that over time employees will abandon repetitive tasks and focus more on strategic tasks as they become more proficient with AI tools.

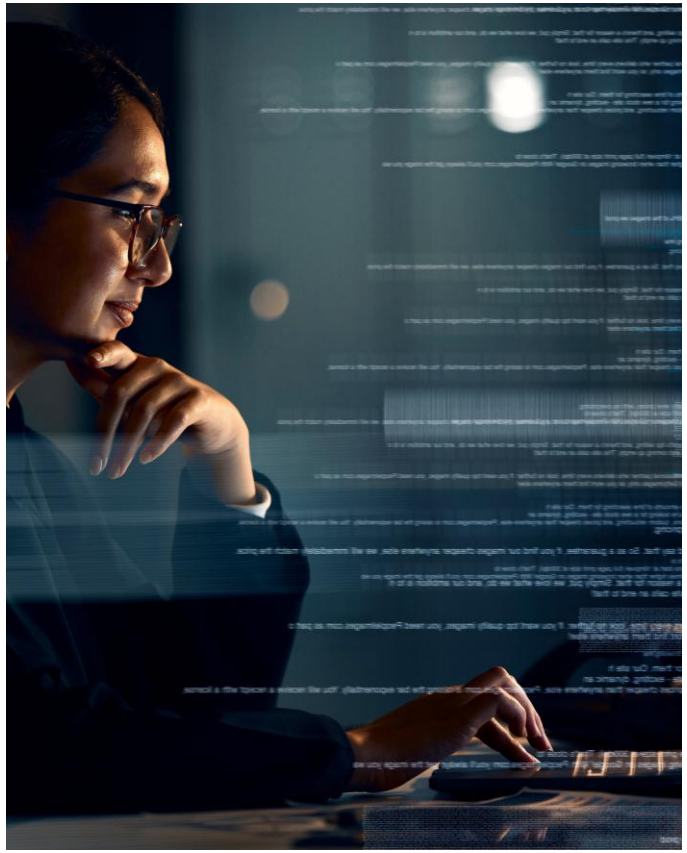
The effects of AI systems are not pre-determined

Employees with a higher specific self-efficacy and a positive attitudes towards AI showed better work-related outcomes.

04

Practical implications

Practical implications



Clayton D/peopleimages.com / Adobe Stock

- The introduction of AI systems influences work processes, work roles and organizational cultures and therefore requires **strategic planning**.
- Clear **regulatory framework** conditions (including data protection aspects) create transparency and legal compliance.
- Early involvement of **all interest groups** promotes the acceptance and sustainable use of AI.
- Further **training and skills development** enable competent and safe use of AI.
- **Overreliance** on AI systems and decision-making through AI systems should be avoided.
- Implementation processes should be designed in such a way that the use of AI improves **working conditions** and promotes the **well-being** of employees.

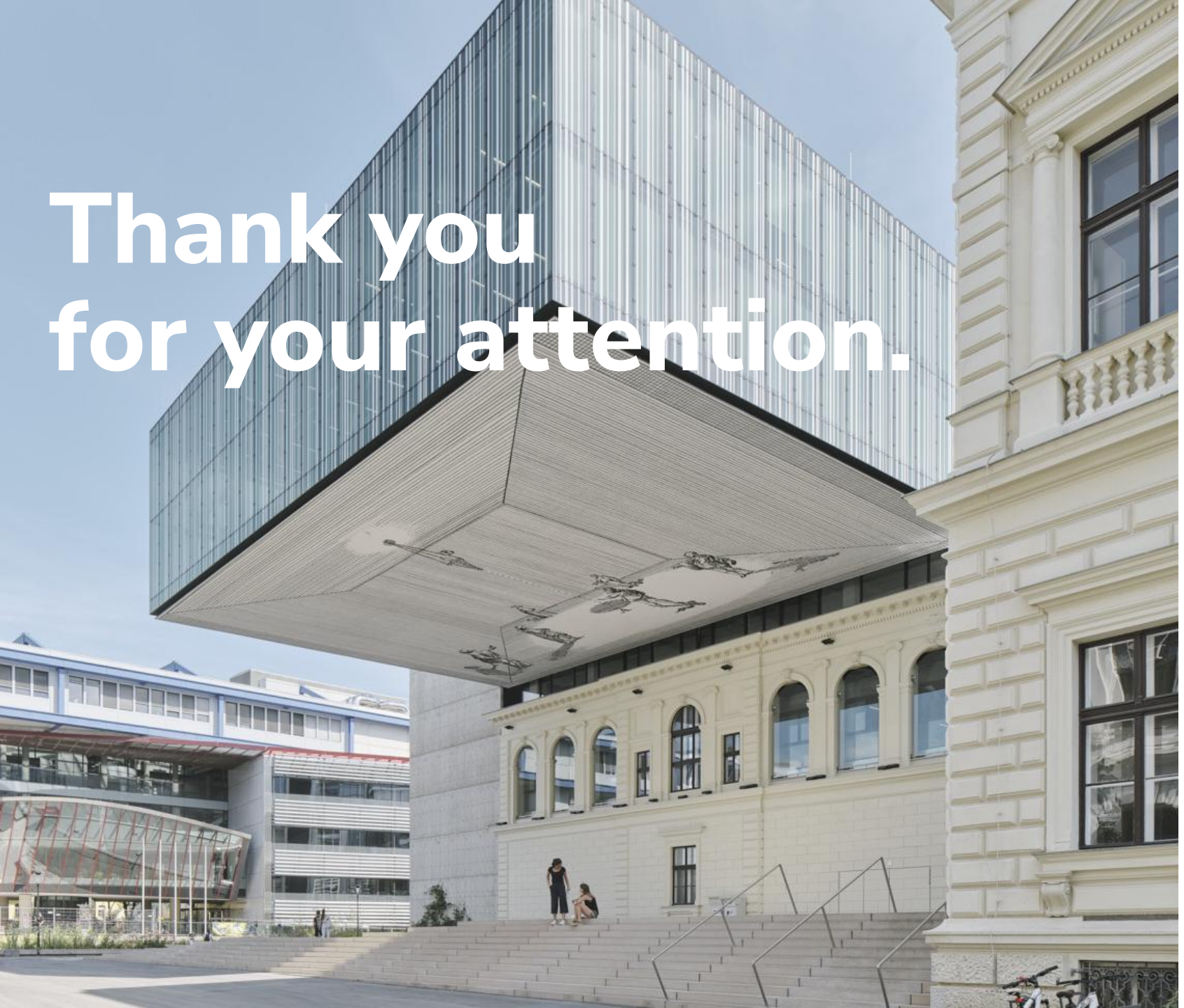
A comprehensive guide on the topic of AI systems and their impact on work design

→ specifically directed towards the application of AI systems in knowledge work

→ which work design characteristics should be taken into account when introducing or using AI

→ how the work design characteristics and subsequently the well-being and motivation of employees can be influenced by AI, both positively and negatively

Available for download at Open Science Framework (OSF)
https://osf.io/tjbqm/



Thank you for your attention.

University of Graz
Work and Organisational Psychology
Dr. Sabina Hodzic
Universitätsplatz 2/DG, 8010 Graz, Österreich
43/(0)316/380–3888 I sabina.hodzic@uni-graz.at
https://arbeits-organisationspsychologie.uni-graz.at/en/