



# Enhancing UX Research Activities Using GenAI – Potential Applications and Challenges

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# RESUMÉ



User Experience (UX) Research covers various methods for gathering the users' subjective impressions of a product. For this, practitioners face different activities and tasks related to the research process. This includes processing a large amount of data based on qualitative and quantitative data. However, this can be very laborious in practice. Thus, the application of GenAI can support UX research activities.

This paper provides a practical perspective on this topic. Based on previous studies, we present different use cases indicating the potential of GenAI in UX research. Moreover, we provide insights into an exploratory study using GenAI along an entire UX research process. Results show that Large Language Models (LLMs) are useful for various tasks. Thus, the research activities can be carried out more efficiently. However, the researcher should always review results to ensure quality. In summary, we want to express the potential of GenAI enhancing UX research.

**Keywords**– *User Experience (UX), UX Research, Generative Artificial Intelligence (GenAI), Usability Test, Surveys, Comment Analysis*



## AGENDA

1. Introduction
2. Overview of research activities
3. Analysis of comments
4. Creation of personas
5. Analysis of Semantic Textual Similarity
6. GenAI-supported Exploratory Study
7. Conclusion

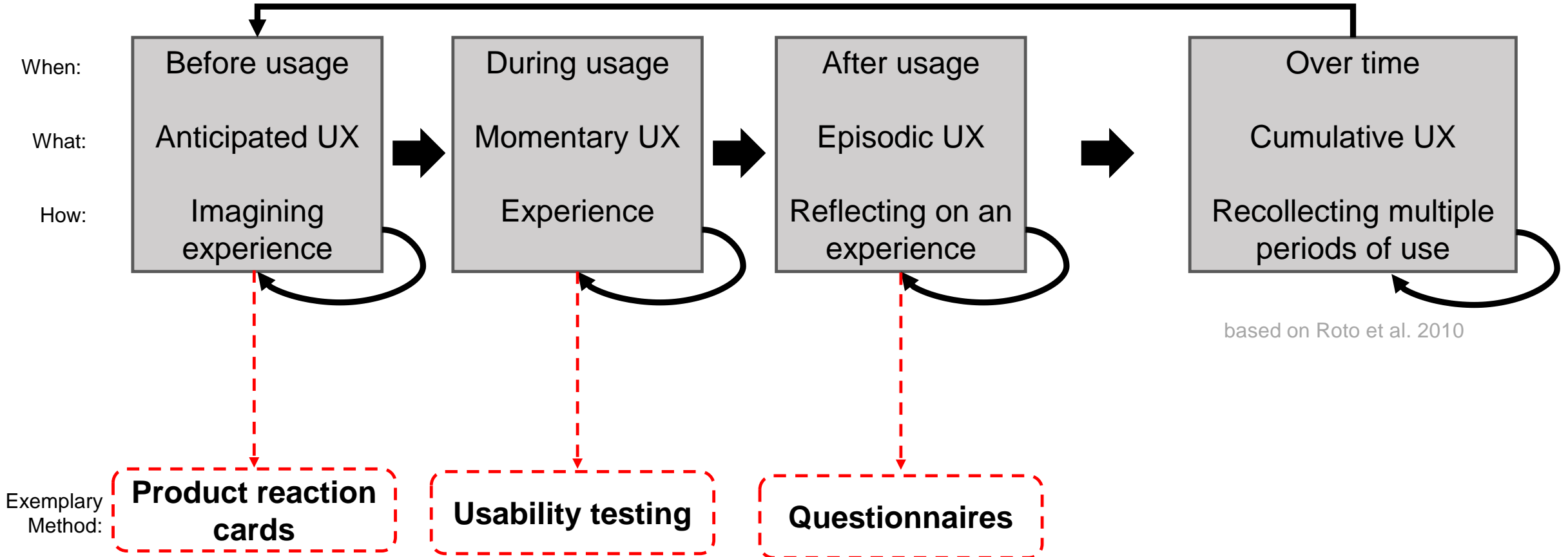
# USER EXPERIENCE

“ person’s perceptions and responses that result from the use or anticipated use of a product, system or service (DIN ISO 9241-210) ”

- **Multidimensional** construct describing the overall impression (Santoso & Schrepp 2019)
- UX is an **success factor** in the development and improvement of information systems (Rauschenberger et al. 2013; Schrepp 2020)
- **Need to understand and measure the UX** and its **dimensions** to improve products, systems and services (Irshad et al. 2020; Schrepp et al. 2023)
- **Various empirical methods** can be found in literature for measuring the UX (Assila et al. 2016; Rohrer 2022; Albert & Tullis 2022)

 **Goal: creating a positive user experience** (Schrepp 2020)

# UX RESEARCH PROCESS



 Various tasks and data processing during the research process for researchers

# GENERATIVE ARTIFICIAL INTELLIGENCE

- Rapid development of Large Language Models (LLMs), e.g. ChatGPT-4
- Becoming increasingly popular in both academia and industry (Minaee et al. 2024)
- Useful for a broad range of deep learning and Natural Language Processing (NLP) tasks (Brown et al. 2020; Ouyang et al. 2022; Chang et al. 2024; Minaee et al. 2024; Shen et al 2024)

**→ LLMs can effectively be used for tasks related to natural language understanding, such as text classification or semantic understanding**

**→ Many possibilities to support UX research activities by applying GenAI among the research activities**

*LLMs are statistical language models indicating a strong language understanding and generation abilities based on to the following characteristics:*

- *large-scale*
- *Pre-trained*
- *Transformer-based neural networks*

*(Minaee et al. 2024)*

# RESEARCH OBJECTIVE & QUESTIONS

**➔ Providing an overview of different UX research activities enhanced by GenAI**

***RQ1:** How can GenAI assist UX researchers in categorizing and summarizing user comments?*

**➔ Analysis of textual data (user comments) from usability testing**

***RQ2:** How can GenAI be used to assist UX researchers in the preparation of research and design activities?*

**➔ Preparation and generation of artifacts to support research activities**

***RQ3:** Can GenAI be used to develop a deeper understanding of the concept of UX?*

**➔ Analysis of semantic textual similarity of items and scales**

***RQ4:** How can GenAI be integrated with existing methods in a typical UX evaluation scenario?*

**➔ Application of GenAI among a UX evaluation scenario**

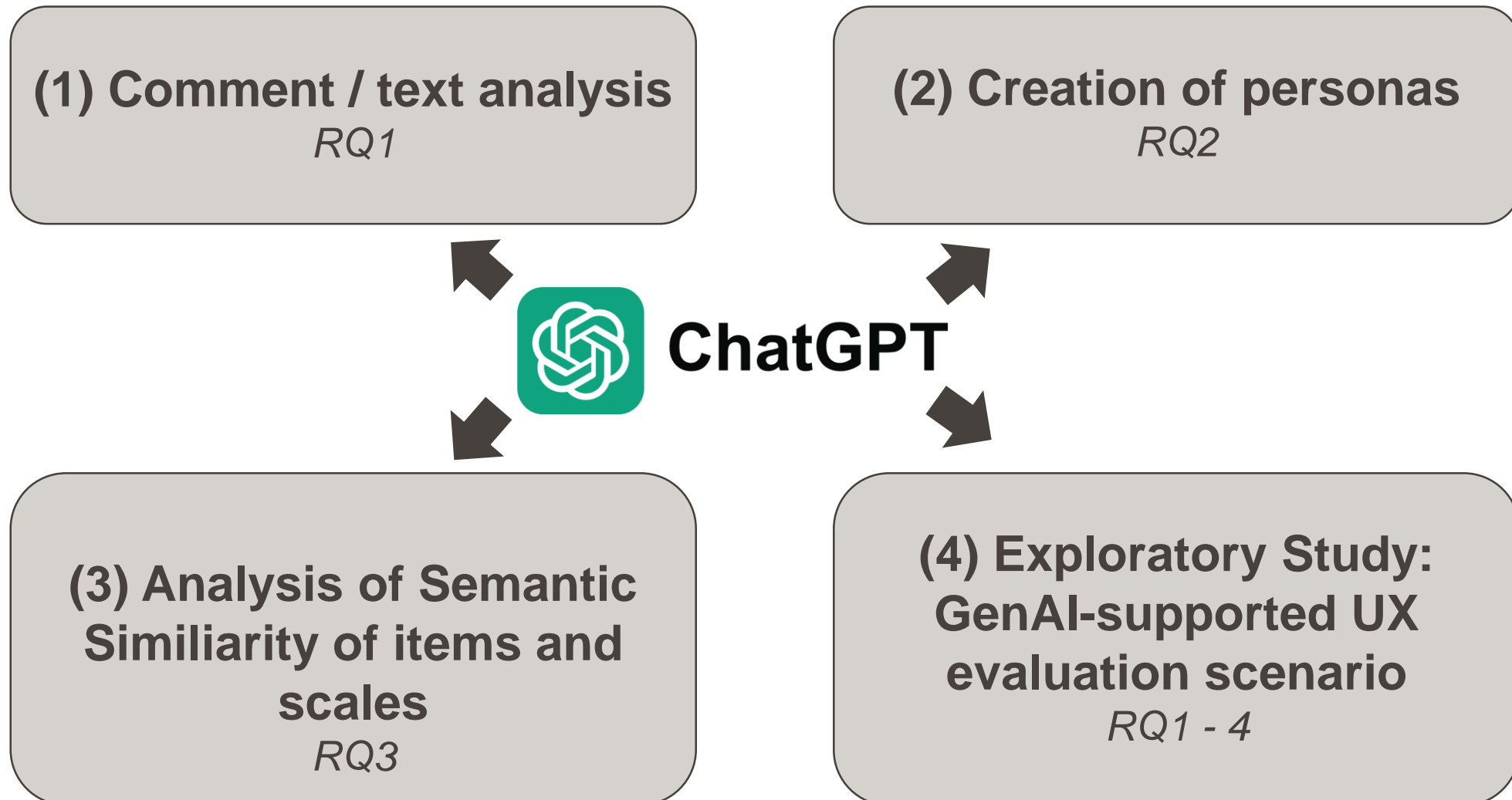


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# OVERVIEW OF RESEARCH ACTIVITIES





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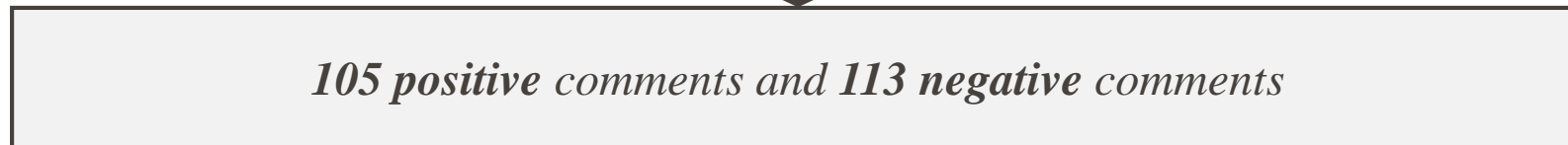
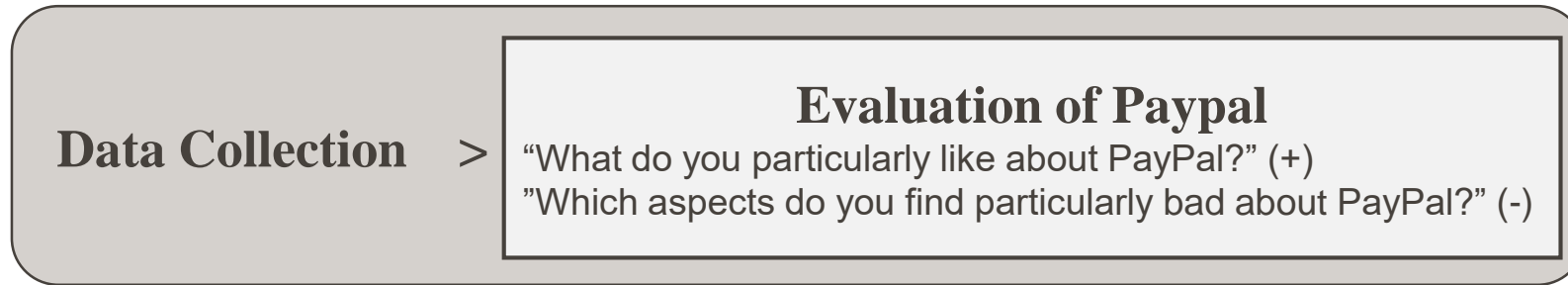
# ANALYSIS OF COMMENTS (1/2)



RheinMain University  
of Applied Sciences

Based on previous research:

[J. Kollmorgen, M. Schrepp, and J. Thomaschewski, "Influence of demographic variables and usage behaviour on the perceived user experience," in Web Information Systems and Technologies, M. Marchiori, F. J. Domínguez Mayo, and J. Filipe, Eds., Cham: Springer Nature Switzerland, 2023, pp. 186–208, ISBN: 978-3-031-43088-6.](#)



**ChatGPT**

*"The numbered list below contains user comments concerning PayPal. Categorize the comments. One comment can belong to more than one category. Create a short name for each category that contains less than two words. Create a summary for each category in a very short sentence. List all categories. Show the short name of the category first. Then, in a new line, the summary of the category. Then the list of comments belonging to that category. Combine the short summaries from the 5 most frequent categories in a short text"*

# ANALYSIS OF COMMENTS (2/2)

AI-generated topic	AI-based summary	n
Ease of Use (+)	Users appreciate the simplicity and intuitiveness of PayPal	53
Speed (+)	Users value the quickness of transactions with PayPal	21
Security (+)	Users feel secure using PayPal for their transactions	13
Integration (+)	Users like how PayPal integrates with other platforms and services	11
International/Currency Features (+)	Users appreciate the ability to handle international transactions and currency conversions	7
Security Concerns (-)	Users have concerns about the security of PayPal	17
Difficulties with Transfers and Withdrawals (-)	Users find it difficult and time-consuming to transfer or withdraw money	14
High Fees (-)	Users are unhappy with the high fees charged by PayPal	9
Poor Customer Service (-)	Users find PayPal's customer service to be lacking and unhelpful	8
User Interface Issues (-)	Users find PayPal's user interface confusing and difficult to navigate	4

→ **Efficient** analysis of textual data such as user comments

- Evaluation object and context must be known by the LLM
- Researchers have to overview the results



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# CREATION OF PERSONAS (1/2)

Persona creation >

*Developer of cloud applications*



**ChatGPT**



*“In UX research, personas are often used in user interface design to communicate and discuss design decisions. Create a persona for a software developer. The person works for a medium-sized company and is a member of a small team of software developers. The company uses SAP as its major ERP system. The development team creates cloud applications that enhance this ERP system with additional functionalities. Some key challenges in this job are the technical complexity of the applications and the need to get a deep knowledge of the structure and existing interfaces of the ERP system. Can you create a persona description? Please provide, in addition, a quote that could realistically come from the persona, which sums up what matters most to them in relation to the product or service”*

## John Smith



- 35-year-old
- software developer
- medium-sized company
- 7 years experience
- Bachelor's degree in Computer Science
- strong background in cloud computing and ERP systems.

*"Understanding the ERP system is just as important as writing good code. We need to ensure that our applications not only work well but also integrate seamlessly with the existing system. It's a challenge, but it's also what makes our job interesting and rewarding."*

### **Background**

**Role:** John is a member of a **small team** of software developers. His main **responsibility** is to **develop cloud applications** that enhance the company's major ERP system, SAP, by adding additional functionalities.

**Skills:** John is proficient in **several programming languages**, including Java, Python, and C++. He also has a good understanding of cloud computing platforms, especially **AWS** and **Google Cloud**. He has a basic understanding of SAP but is still working on improving his knowledge in this area.

**Key Challenges:** John often struggles with the **technical complexity** of the applications he is developing. He also finds it challenging to gain a deep understanding of the **structure and existing interfaces** of the ERP system.

**Behaviors:** John is a **problem-solver** who enjoys tackling complex technical challenges. He is a quick learner and is always eager to learn new technologies and tools that can help him in his job. He prefers to work in a **collaborative environment** and values clear communication within his team.

**Needs:** John needs **clear documentation and training** materials to help him understand the ERP system better. He also needs a supportive work environment where he can freely discuss his challenges and get help from his team members.

**Goals:** John's primary goal is to **develop robust, efficient, and user-friendly applications** that can seamlessly integrate with the existing ERP system. He also aims to continuously improve his technical skills and understanding of the ERP system to overcome his challenges.



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# ANALYSIS OF SEMANTIC SIMILARITY (1/2)

Questionnaire Selection & Data  
Extraction

> 40 most established  
questionnaires | 1206 Items

19 UX & Usability Questionnaires | 408 UX Measurement Items

Uncover Semantic Similarities between UX Concepts

- Extraction of all positive adjectives
- Generation of items with same structure  
(135 artificially generated items)



ChatGPT

→ Classification of items based on the semantic meaning to related UX concepts

“Below, there is a list of statements related to the user experience of a product. **Select all statements from this list that describe that users perceive the product as useful.** List these statements or questions. Start with those statements and questions that describe this best.”



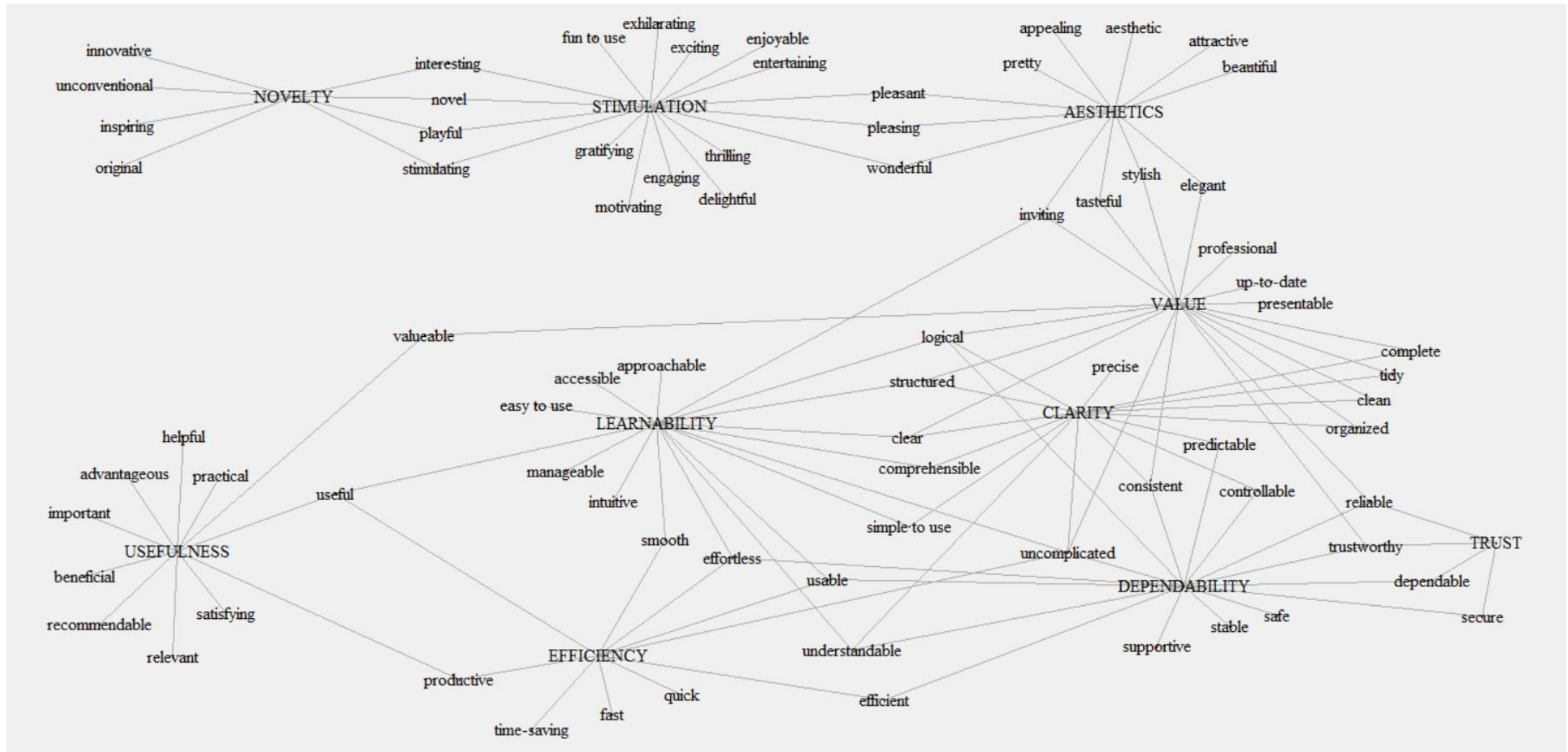
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of Applied Sciences

Based on previous research:

- [Graser, S., Böhm, S., Schrepp, M. \(2023\). Using ChatGPT-4 for the Identification of Common UX Factors within a Pool of Measurement Items from Established UX Questionnaires. CENTRIC 2023, Valencia.](#)

- [Graser, S., Schrepp, M., Böhm, S. \(2024\). Identifying Semantic Similarity for UX Items from Established Questionnaires Using ChatGPT-4. SysMea24v17n12, International Journal on Advances in Systems and Measurements, vol. 17, nr. 1&2.](#)

# ANALYSIS OF SEMANTIC SIMILARITY (2/2)

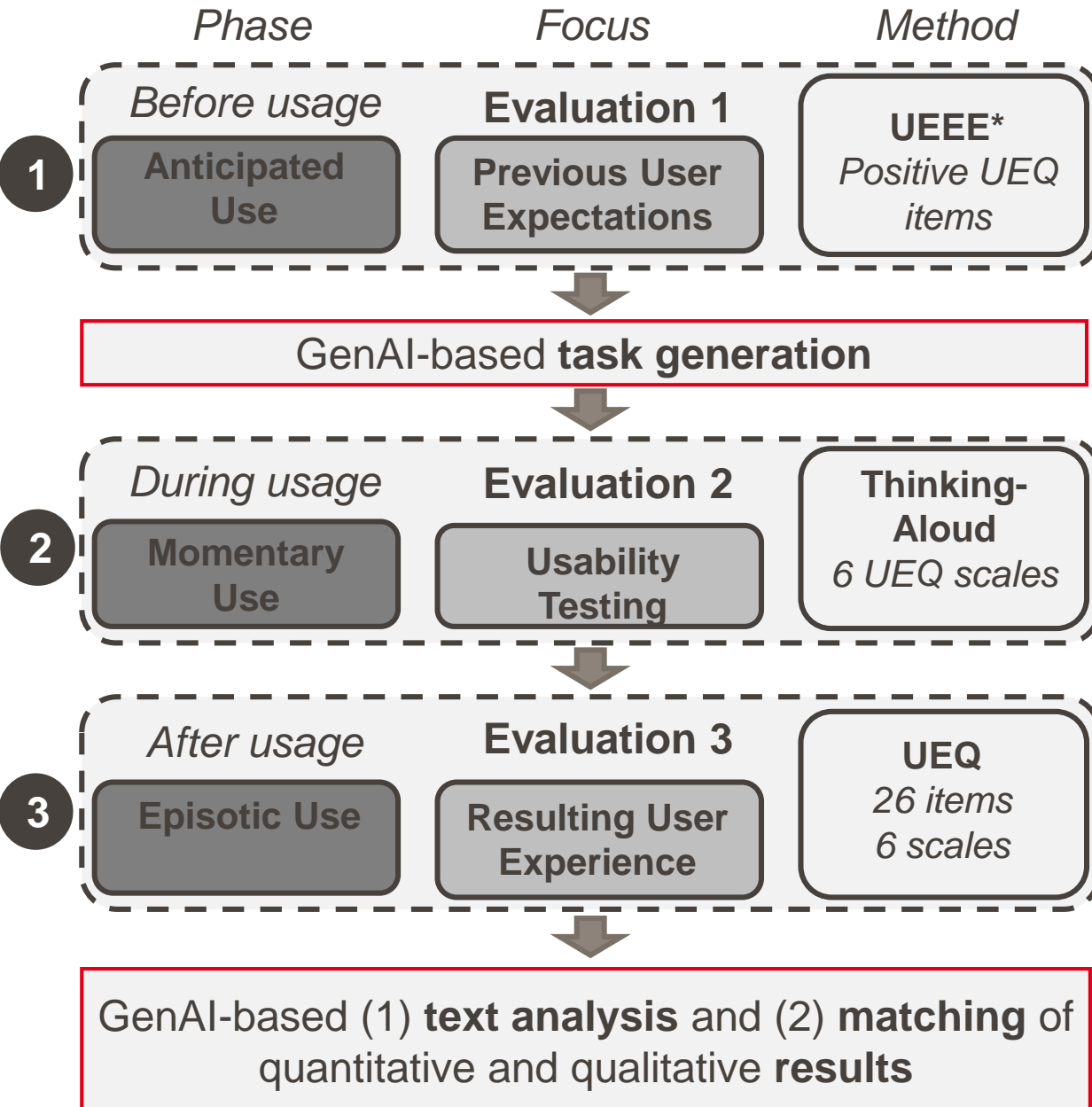




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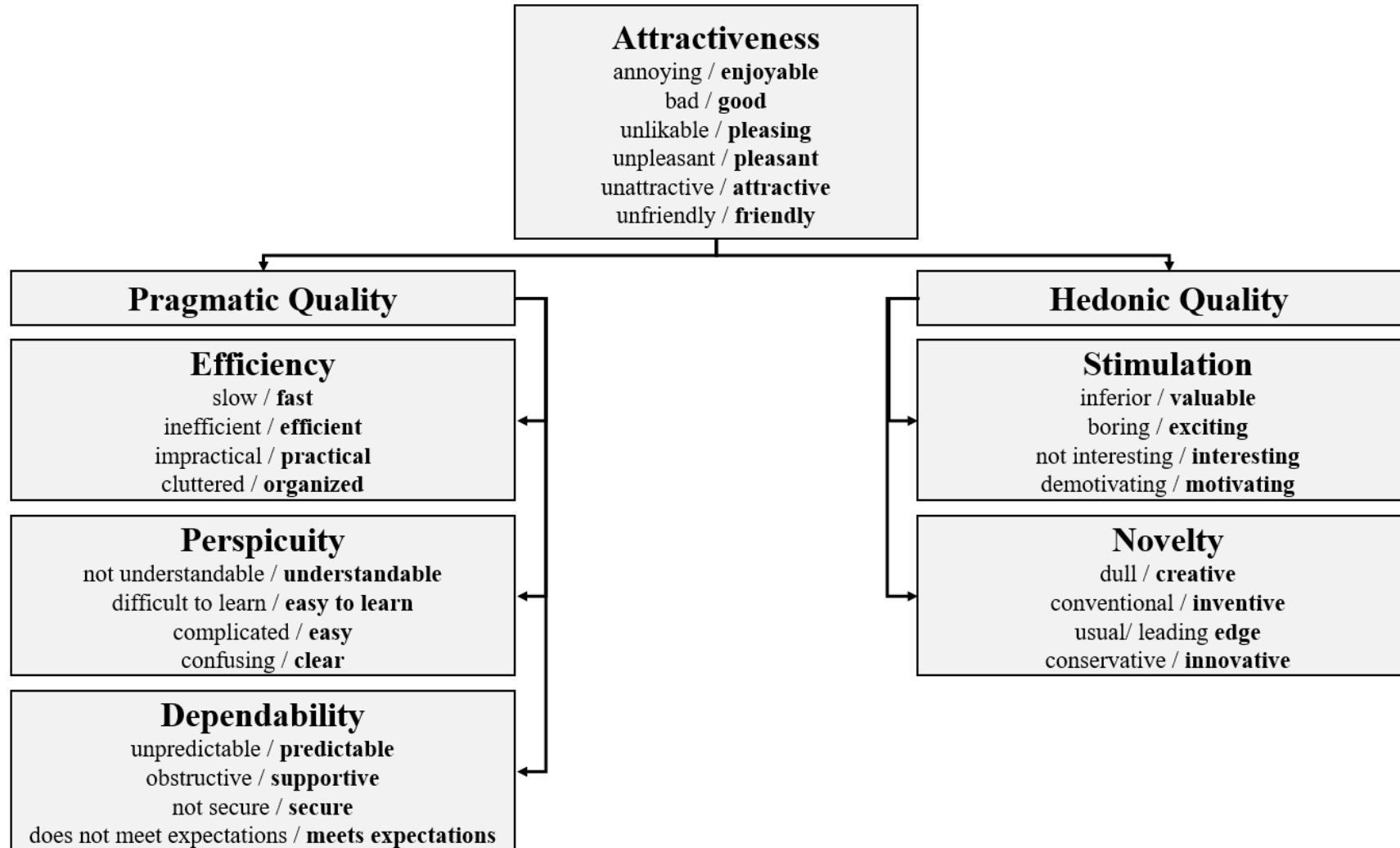
# EXPLORATORY STUDY – APPROACH



\*UEEE = User Experience Expectation Evaluation  
(same idea as Product Reaction Cards)

- Mixed-method approach
- Evaluation of all **three stages** among the UX research process
- Evaluation object: *Instagram*
- Convenience sample:  $n = 30$
- In *German*
- **Items and Scales** of the **UEQ** were applied as **base**

# DIGRESSION – STRUCTURE OF THE UEQ





## Unsupported GenAI-based text analysis

### → Generation of topics

#### AI-generated topics

- Ease of Use and Intuitiveness
- Feature Discovery
- Personalization and Creativity
- Information Clarity
- Learning Curve and User Guidance
- Functionality and Performance
- Accessibility and User Experience Variability

## Supported GenAI-based text analysis

### → Classification to UEQ scales

#### Stimulation

inferior / valuable: **n=22**

*"I enjoy scrolling through the reels."* (Participant 10)

boring / exciting: **n=15**

*"But I find the reels very exciting. It motivates me to keep watching."* (Participant 4)

not interesting / interesting: **n=25**

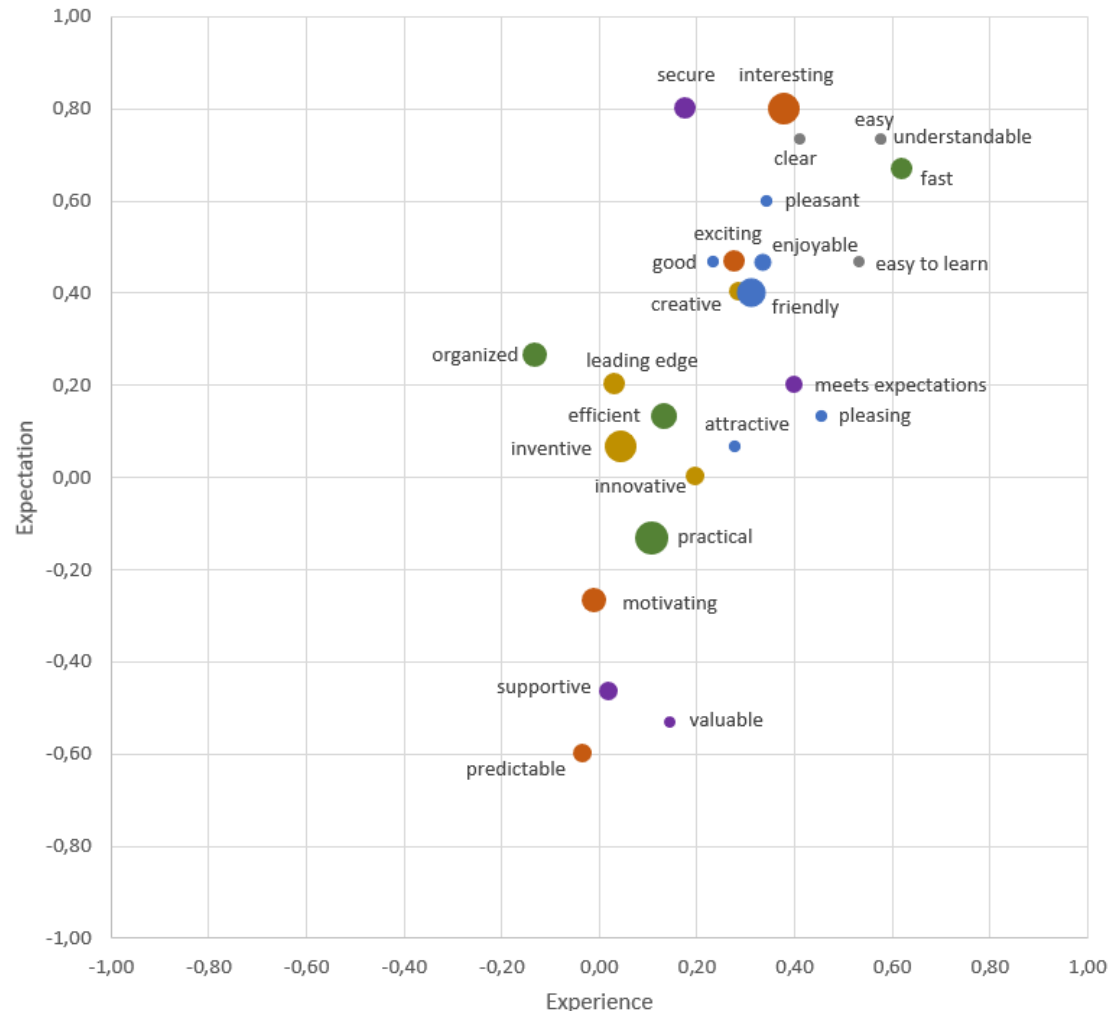
*"There are lots of interesting things coming up and that takes up a lot of my time in the evenings."* (Participant 3)

demotivating / motivating: **n=18**

*"Sometimes you have to watch the reel twice. Maybe 3 or 4 until you finally stop at the right place."* (Participant 6)

# RESULTS (3/3)

## Combining qualitative and quantitative evaluation results



- User expectations (pre-testing, UEEE) and experiences (post-testing, UEQ) were measured using established UX questionnaires.
- Assessment was carried out using semantic differentials with bipolar adjectives – with resulting ratings from -1 to +1.
- A rating of +1 means that the system was fully rated with the respective adjective, while -1 means the contrasting adjective was supported.
- Pre-test, post-test (scores) results and number of extracted statements (size of dots) are shown in the diagram on the left.
- Results indicate a higher number of statements for UX factors with user dissatisfaction (i.e., items rated with high expectations but a lower experience).





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# DISCUSSION

- **RQ1:** *How can GenAI assist UX researchers in categorizing and summarizing user comments?*  
→LLMs are useful in analyzing and summarizing short text data.  
→However, results must be reviewed due to heterogeneous data
- **RQ2:** *How can GenAI be used to assist UX researchers in the preparation of research and design activities?*  
→LLMs can efficiently generate user tasks and personas
- **RQ3:** *Can GenAI be used to develop a deeper understanding of the concept of UX?*  
→GenAI was able to identify and classify UX measurement items based on the semantic similarity
- **RQ4:** *How can GenAI be integrated with existing methods in a typical UX evaluation scenario?*  
→ChatGPT-4 was useful analyzing and combining quantitative and qualitative evaluation results

# CONCLUSION

- Emphasis of potential to enhance UX research by applying GenAI:

**1) *Analyzing both small and large text data***

**2) *Creating personas***

**3) *Analyzing semantic similarity***

**4) *Generating user tasks***

**5) *Matching quantitative and qualitative evaluation results***

- Lack of understanding the mechanism of LLMs (blackbox)
- Need of overviewing results by researchers

**➔ Initial presentation of concrete usage scenarios for the application of LLMs in UX research activities in practice**

**➔ Further considerations of the application of GenAI in UX research activities needed**



**THANK YOU FOR YOUR ATTENTION!**



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**Connect!**



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