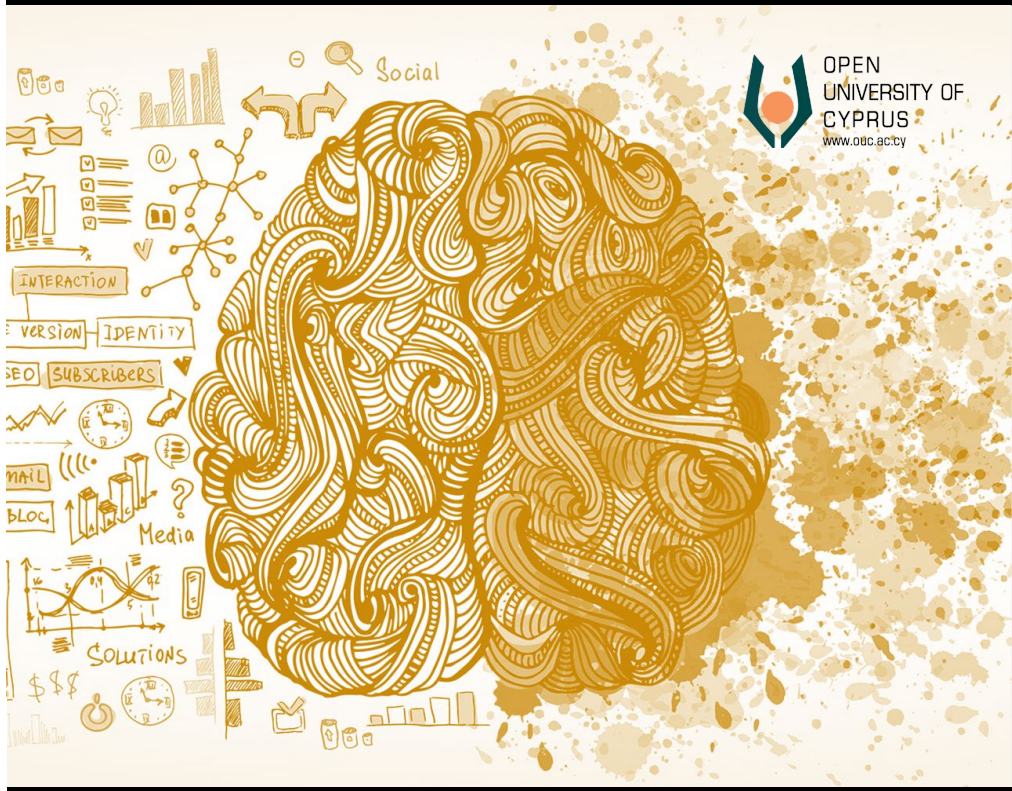
« Divergent and Convergent Thinking in AI-Driven Creativity and its Ethical Implications in the Creative Design Industries. »

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GreekCHI Symposium

CYCHI

ACM GreekCHI-CYCHI **Symposium 2026**

LITERATURE REVIEW

RESEARCH PROBLEM



- **Generative AI** is increasingly used in **creative design**
- The **impact of AI** on creativity is **not clear**
- **Limited experimental research** in design context
- Need to study **human-AI collaboration**

PRIMARY PURPOSE

AIM OF THE STUDY

Examines how AI influences **divergent and convergent thinking** in graphic design creativity.

Evaluates whether AI **enhances or limits creative performance and Human-AI collaboration**.



THEORETICAL CONTRIBUTION

Explores whether AI can replicate or complement **human creative thinking** and participate meaningfully in **creative collaboration**.

PRACTICAL CONTRIBUTION

Provides **guidance for the responsible integration of AI** while supporting *human creativity, authorship, and ethical practices*.



- **(RQ 1)** How does the interaction between divergent and convergent thinking influence creative performance in graphic design tasks, in relation to time efficiency, originality, accuracy, and pseudocreativity?

- **(RQ 2)** How do participants behave in applied design tasks when collaborating with AI?

- **It is hypothesised** that AI alone leads to less original, useful ideas and its outputs can be characterised as a kind of pseudocreativity.

RESEARCH

RESEARCH QUESTIONS

RESEARCH

THEORITICAL FRAMEWORK

Creativity Theories

Guilford's Structure of Intellect Theory
(Guilford, 1950; Wilson et al., 1954; Sternberg & Grigorenko, 2010)

Torrance Theory of Creative Thinking
(Torrance, 1974; Runco et al., 2010)

Componential Theory of Creativity
(Amabile, 1983, 1996)

Creative Cognition and Divergent–Convergent Thinking
(Runco & Acar, 2012; Wang et al., 2023)

Human-AI Collaboration

Humans-in-the-Loop Interactive AI
(Wang, 2019)

Human–Automation Symbiosis
(Romero et al., 2021)

Human-in-the-Loop vs AI-in-the-Loop
(Natarajan et al., 2025)

Design Principles for Generative AI Applications
(Weisz et al., 2024)

METHODOLOGY

RESEARCH/ EXPERIMENTAL DESIGN

Mixed-Methods Experimental Design	Quantitative and qualitative data integration
Controlled experimental approach	Measures actual AI impact on Creative Performance Beyond self-reported perceptions
Three experimental conditions	without AI, AI alone, with AI
Repeated-measures design	Same participants across all conditions controls individual differences
Research objective	Compare the effects of AI on the creative process and creative Performance



METHODOLOGY

PARTICIPANTS & SAMPLE DESIGN

- **Participants**
  - Professional Graphic Designers
- **Participant Profile**
  - Years of professional experience
  - Familiarity with AI tools
- **Sample Design**
  - Professional Graphic Designers ($n \geq 10$)
  - Repeated-measures experimental design
  - Each participant completes all experimental conditions (without AI, AI alone, with AI)
- **Purpose**
  - Evaluate AI's impact on professional creative practice
  - Minimise individual differences across experimental conditions

METHODOLOGY

DIVERGENT THINKING EXPERIMENT

First part experimental procedure:

without AI

AI alone

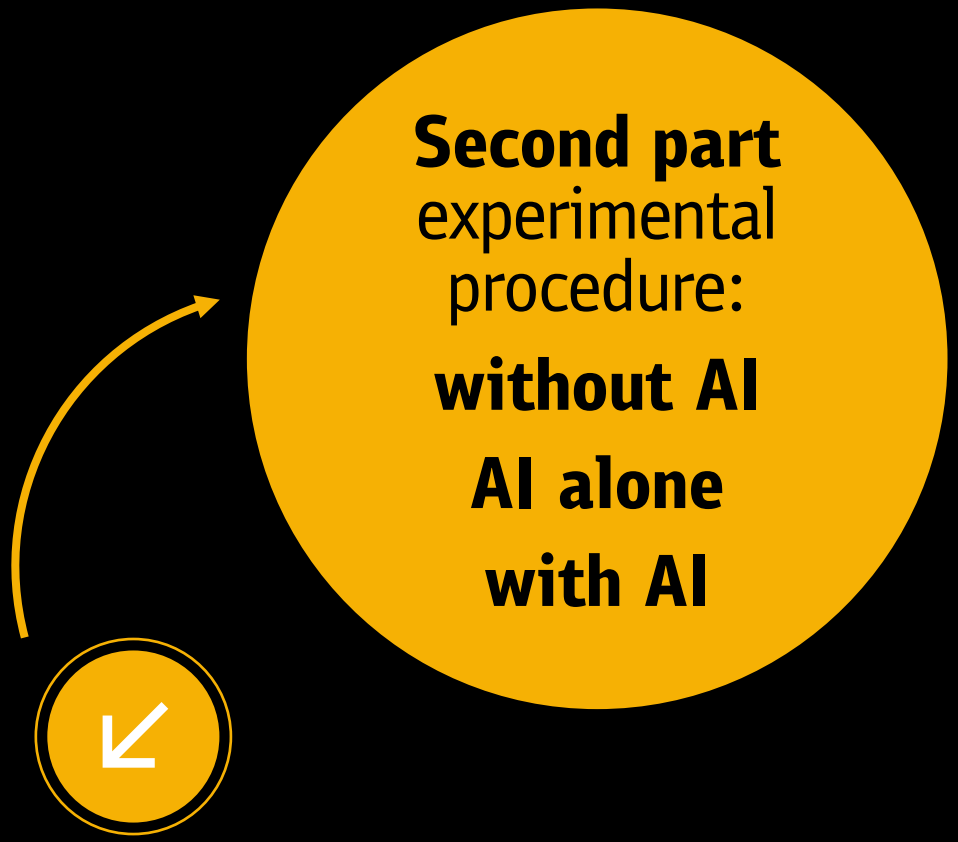
with AI

Ideation tasks assessing:

- Time efficiency
- Fluency (number of ideas)
- Flexibility (variety of styles)
- Originality (novelty of ideas)
- Elaboration (level of detail)
- Pseudocreativity (superficial concepts)

METHODOLOGY

CONVERGENT THINKING EXPERIMENT



Applied design tasks

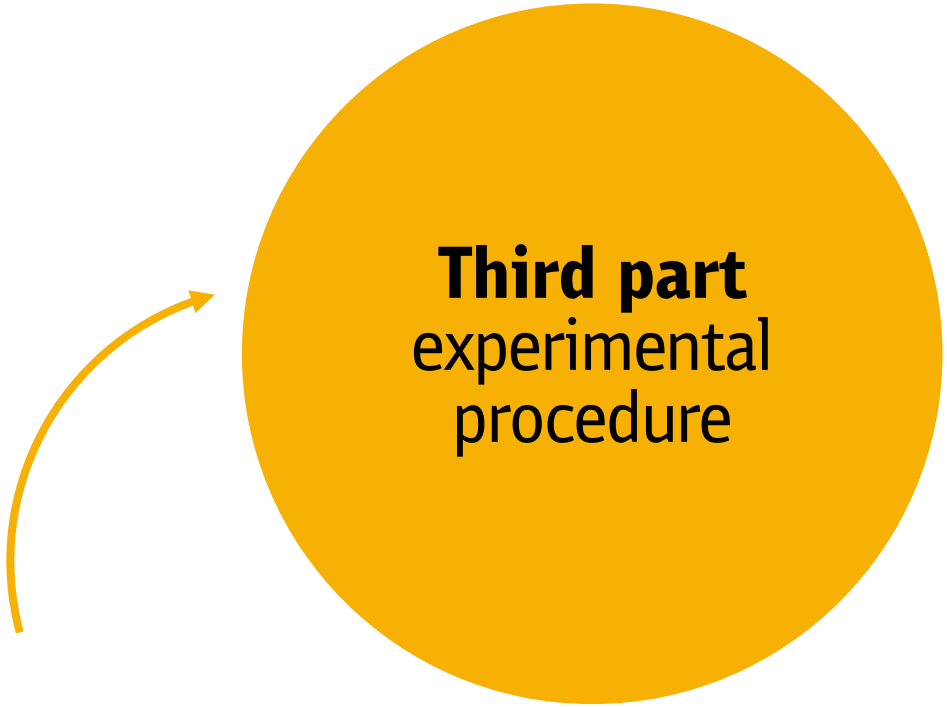
- Constraint-based design production
- Design flaw detection and correction
- Best-fit design selection

Evaluation criteria

- Time efficiency
- Accuracy
- Visual Consistency
- Interpretation
- Rule Application/compliance

METHODOLOGY

POST-EXPERIMENTAL EVALUATION



Questionnaire & Qualitative Feedback

5-point Likert scale and open-ended questions.

Examines perceptions of:

- AI-assisted creativity
- Efficiency and cognitive effort
- Design quality
- Confidence and creative freedom
- Challenges and limitations of AI use

METHODOLOGY

QUANTITATIVE DATA ANALYSIS

1

Divergent Thinking Experiment

Comparison of performance across the 3 conditions:

- without AI
- AI alone
- With AI

2

Use of descriptive statistics

3

Repeated-measures to examine differences between conditions

- ANOVA

4

Correlation analysis between creativity variables and AI outcomes

Pearson/ Spearman

5

Measurement of variables

- Fluency
- Flexibility
- Originality
- Elaboration
- Time efficiency
- Accuracy
- Rule compliance

METHODOLOGY

QUALITATIVE ANALYSIS & **INTERGRATION** OF FINDINGS

1

Thematic analysis of questionnaires & semi-structured interviews.

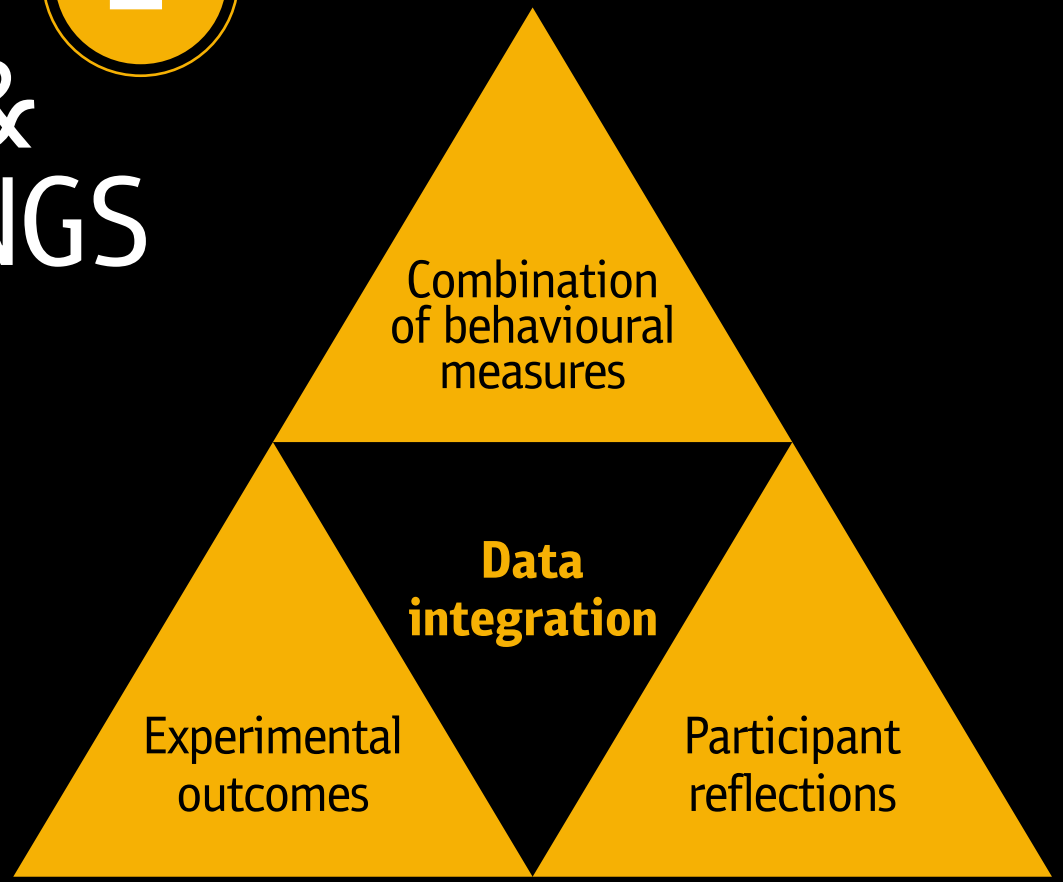
Exploration of:

- Creativity perceptions
- Authorship
- Cognitive effort
- Ethical considerations of AI use

2

Combination of performance data and participant experiences through methodological triangulation

Aim: Understanding how Human-AI collaboration influences creative thinking in graphic design



METHODOLOGY

RESEARCH LIMITATIONS



Discipline-specific (graphic design only)



Sample size constraints

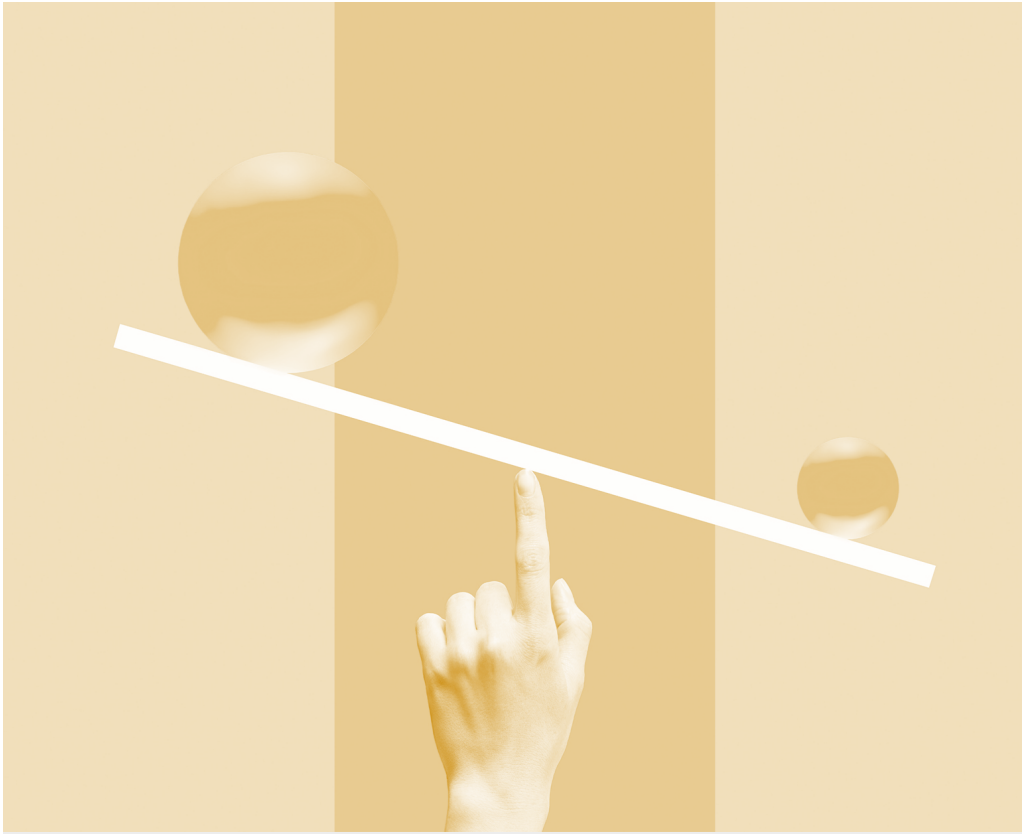


Rapid AI evolution may affect relevance

METHODOLOGY

ETHICAL CONSIDERATIONS

- **Ethical** considerations in human-AI research, including informed consent, anonymity, and confidentiality.
- **Ensures** transparency in data collection and usage.
- **Considers** AI-related issues such as Intellectual Property, authorship and ownership of outputs.
- **Treats** AI as a computational support system, not an autonomous creator



CONCLUSION

EXPECTED ORIGINAL CONTRIBUTION TO KNOWLEDGE



The proposed research is expected to contribute by:

- Developing a **new conceptual framework** for Human-AI Creativity
- Extending the concept of **Pseudocreativity** in AI-assisted Graphic Design
- Providing **empirical evidence** through an experimental study in Graphic Design
- Contributing to **Creativity Theory and Human-Computer Interaction (HCI) research**



THANK YOU FOR YOUR ATTENTION