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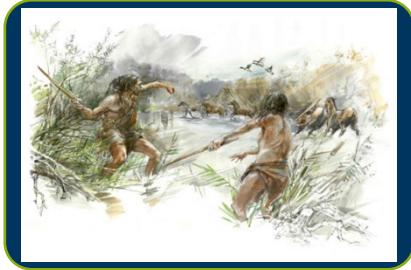
OECD DIGITAL EDUCATION OUTLOOK 2026

**FOSTERING COLLABORATIVE LEARNING AND PROMOTING COLLABORATION SKILLS:  
WHAT GENERATIVE AI COULD CONTRIBUTE**

**Sebastian Strauß & Nikol Rummel**

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# Collaboration



# Collaboration around and with genAI

*Roles of genAI systems*

# Positions/roles of generative AI systems

1. Repository of information
2. Personalized learning material
3. Performing tasks for the group
4. Teacher or facilitator
5. Tutor or dialogue partner
6. Artificial group member

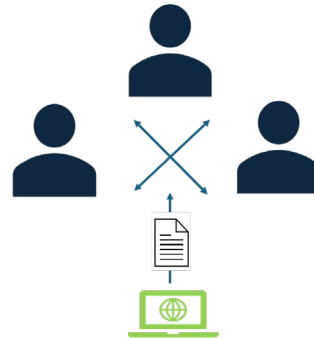
# Positions/roles of generative AI systems

## 1. Repository of information



- Chu et al., 2024, *Proceedings of CSCL*
- Darmawansah et al. (2025), *Educ. and Inf. Tech.*
- Feng et al., 2025, *BJET*

## 2. Generating personalized materials



- Naik et al. (2024), *BJET*

## 3. Performing tasks for the group



- Wei et al. (2025), *Educ. & Inf. Tech*

# Positions/roles of generative AI systems

## 4. Teacher or facilitator



- Cai et al. (2025), *Proceedings CHI Conference*
- Ko & Foltz, in Anderson et al. (2025), *Proceedings CSCLE*

## 5. Tutor or dialogue partner



- Goda et al. (2024), *Proceedings Inf. Tech. & Teacher Ed.*

## 6. Artificial group member



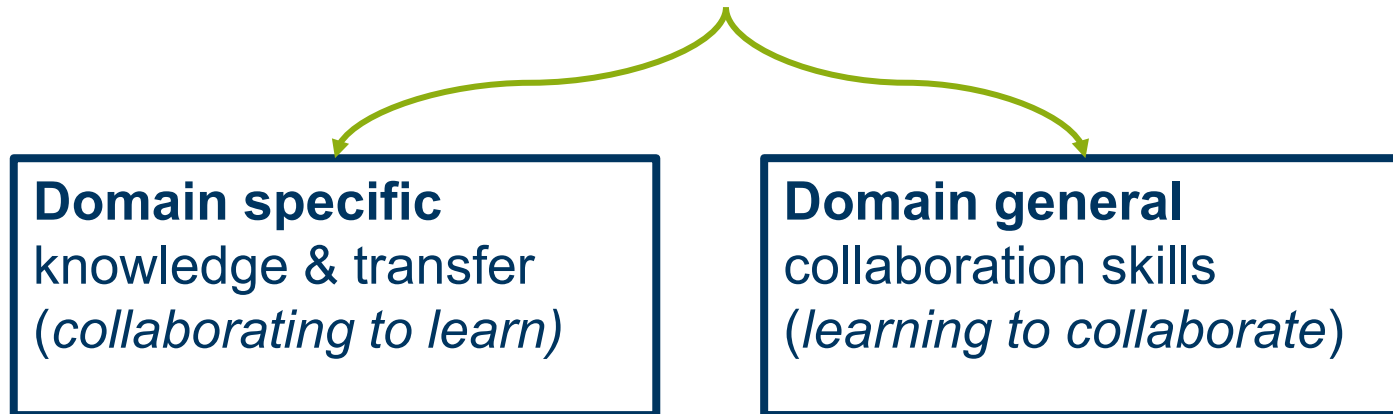
- Wei et al. (2025), *Educ. & Inf. Tech*

# What does the research say?

# Supporting collaborative learning with genAI

# Goal of collaboration: Learning

Collaboration with the aim of acquiring new knowledge:




# How do groups/group members learn?

**Interaction between group members is crucial for learning during collaboration.**


(e.g. King, 2007; Nokes-Malach et al., 2019; Strauß & Rummel, 2021)

 → Gather information about the group


 → Share and combine information

 → Provide explanations



Making thought processes explicit (thinking aloud) ← 

Monitoring and regulation ← 

Develop and maintain shared understanding (common ground) ← 

# Adaptive support for collaborative learning:

## Previous approaches

### 1. Adaptive collaboration scripts

(e.g., Edwards et al., 2025; Karakostas & Demetriadis, 2011; Rummel et al., 2012)

### 2. Adaptive tutoring systems

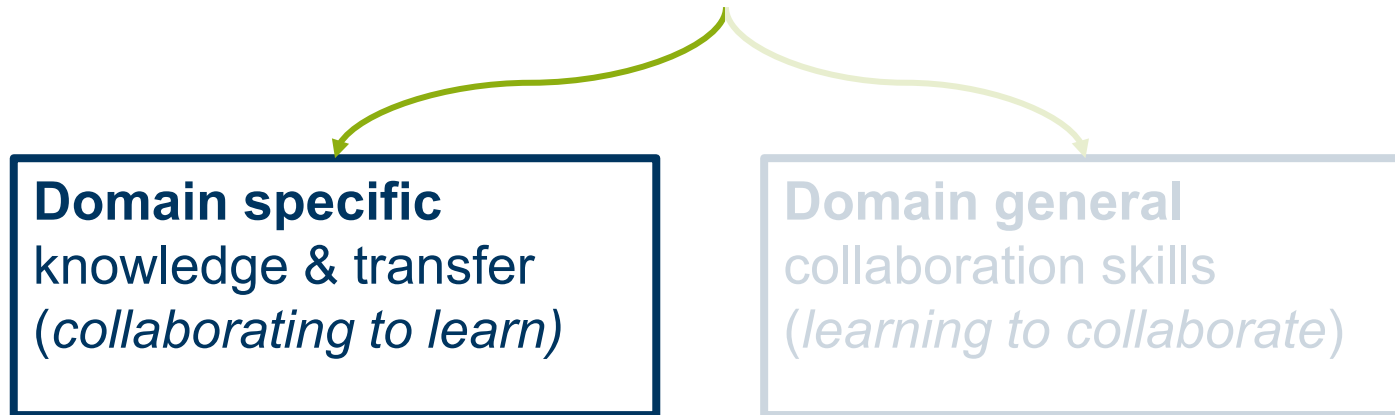
(Diziol et al., 2010; Sottolare et al., 2017; Walker et al., 2009; 2011; 2014)

### 3. Virtual agents

(e.g., de Araujo et al., 2025; Burkhard et al., 2022; Vizcaíno, 2005)

# Goal of collaboration: Learning

Collaboration with the aim of acquiring new knowledge:

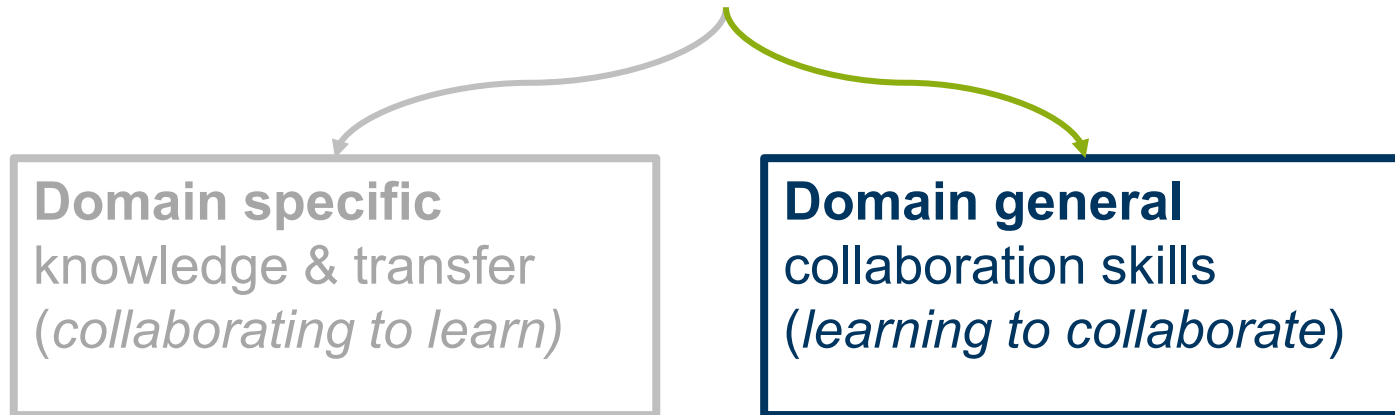


# Acquiring domain-specific knowledge

	<b>Lin et al. (2024)</b>
<b>Dependent variable</b>	Knowledge of Arduino programming
<b>Supported generated by GenAI-System</b>	Chatbot provided information & summary of the group's current understanding of the topic + topics the group should subsequently explore.
<b>Positive effect?</b>	<b>Positive effect</b> on programming knowledge
<b>Effect size</b>	Medium effect ( $\eta^2 = 0.035$ )

# Goal of collaboration: Learning

## Collaboration with the aim of acquiring new knowledge:



# Acquiring collaboration skills

	Darmawansah et al. (2025)
Dependent variable	Argumentative speaking performance & complexity of arguments
Supported generated by GenAI-System	1) Groups queried ChatGPT for topic info and 2) later used predefined prompts to rewrite arguments.
Positive effect?	<b>Positive effect:</b> speaking performance and argument complexity
Effect size	large effect ( $\eta^2 = 0.33$ )



*Imperfect experimental control*

# Conclusions & outlook: Leveraging potentials

# Leveraging potentials

Research in CSCL and AIED has been exploring adaptive collaboration support for two decades.

→ Different *roles* of genAI systems are currently being explored.

GenAI-based support is not (in)effective per se.

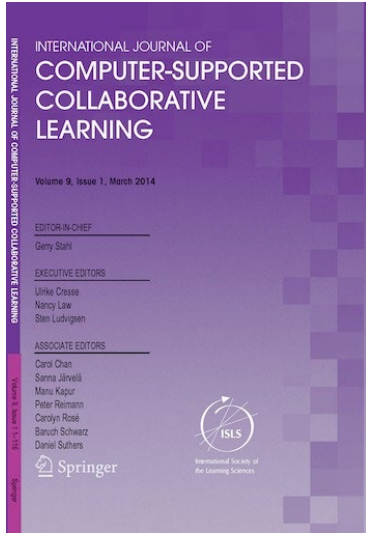
→ The design of genAI systems should *leverage insights from CSCL and AIED* to design and test collaboration support that targets interaction processes.

Evidence is emerging regarding the effectiveness of genAI-based support.

→ We need more *systematic research*.



# Emerging research



## ijCSCL Special Issue

*Artificial Intelligence in CSCL: Discerning Promising Opportunities while Avoiding Pitfalls in Light of Past Accomplishments and Recent Advances*

(to appear in 2026)

# Emerging research



## Festival of Learning

Three conferences in one place:

- International Conference on Artificial Intelligence in Education (AIED)
- Educational Data Mining (EDM)
- Learning @ Scale



## ISLS Annual Meeting

Two joint conferences:

- International Conference of the Learning Sciences (ICLS)
- International Conference of Computer-Supported Collaborative Learning (CSCL)

Grazie mille!    большое спасибо    πολλές ευχαριστίες  
Merci vilmals!    Thank you!    Teşekkürler!  
ありがとうございます    Kiitos!    Я дуже вам дякую  
Muchas gracias!    ऋणं श्रेष्ठं अर्चयामि    Vielen Dank!  
Muito obrigado!    Cảm ơn    Bedankt!  
Merci beaucoup!



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**Prof. Dr. Nikol Rummel**  
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*Fin*

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