

Exploring genAI Chatbots in MOOCs: Student Interactions and Self-Regulated Learning

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9th European MOOCs stakeholders Summit 2025, Paris, France

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Outline

1 Introduction

2 Chatbot Integration

3 Methodology

4 Results

5 Discussion

6 Conclusion

Why AI in MOOCs?

- MOOCs democratize learning but challenge engagement (Khalil & Ebner, 2014)
- Self-Regulated Learning (SRL) is essential in this asynchronous format (Brünner et al., 2025; Zimmerman, 2008)
- Inverse Blended Learning (IBL) integrates structure via in-person sessions (Ebner & Schön, 2019)
- AI chatbots may support SRL processes (planning, monitoring, reflecting) (Brünner & Ebner, 2025)

SRL and Lai's Process-Action Framework (2024)

- Defining – goals, problems
- Seeking – search, selection
- Engaging – reviewing, organizing, rehearsing
- Reflecting – evaluation, feedback

SRL and Lai's Process-Action Framework (2024)

Table 1. Process-action framework containing the definitions and examples of conversations associated with the process-action.

Process	Action	Code	Description	Conversation Examples
Defining	Identification	D.I	Identifying problems or providing a problem.	These are important ...; I am given a problem ...
	Goal-set	D.G	Setting educational goals or sub-goals.	I need to achieve ...; I want to learn ...; Create a checklist ...
Seeking	Search	S.S	Securing information from a chatbot.	Tell me about ...; Please recommend some resources ...; What is ...
	Select	S.SL	Recording important information or results.	What are the key points ...; Extract the main idea of ...
Engaging	Review	E.RV	Re-engaging with curated material or checking for cor-	This does not seem to be correct ...; Does this mean that

Source: [CC BY 4.0](#) Joel Weijia Lai (2024)

Research Question

- ➔ **How do learners interact with AI-powered chatbots in MOOCs, and to what extent do these interactions support SRL?**
- Analysis based on Lai's (2024) process-action framework

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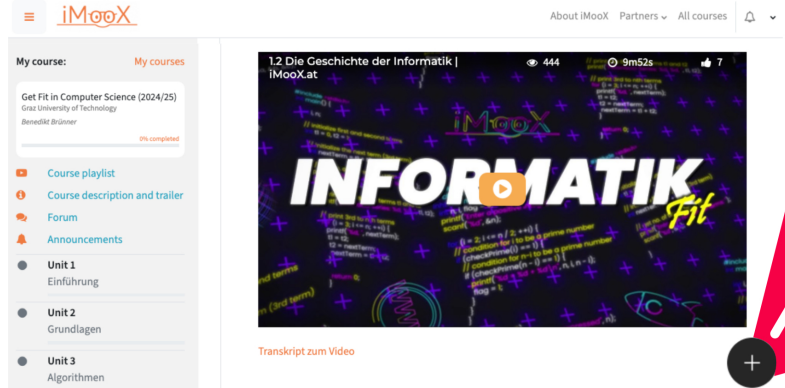
5 Discussion

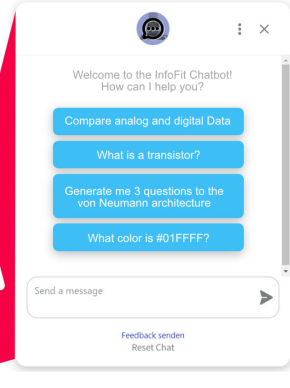
6 Conclusion

Chatbot Architecture

- RAG-based chatbot using GPT-4o-mini
 - Custom system prompt
 - Context-aware replies
- Data: iMooX.at course content
- GDPR-compliant, EU-hosted backend

Low Barrier Integration





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Study Design

- 2 Austrian MOOCs
 - InfoFit - introduction into basic computer science
 - GADI - social aspects of information society
- 1,302 logged chatbot interactions
- Manual coding using Lai's (2024) framework
- GDPR-compliant - anonymized usage logs

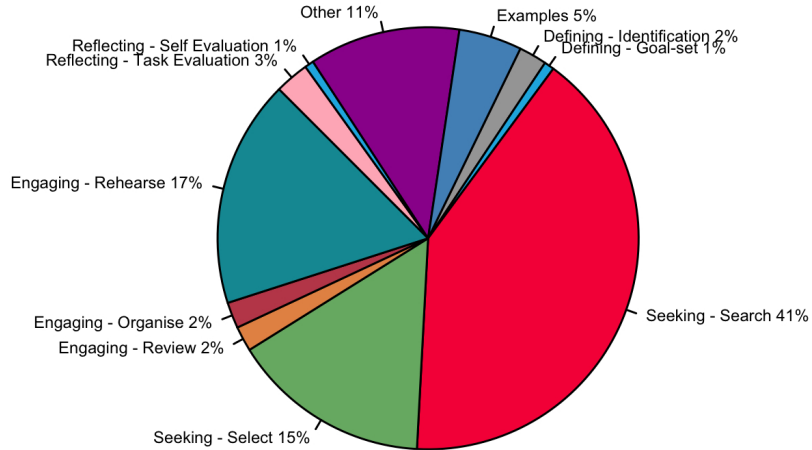
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Chatbot Use in Two MOOCs

- InfoFit
 - 928 prompts
 - 136 MOOC completions
- GADI
 - 374 prompts
 - 170 MOOC completions
- Usage highly varied across students

SRL Interaction Categories



Top Interactions

- **41%** Search (S.S): factual queries
- **17%** Rehearse (E.RH): custom quiz questions
- **1–3%** Reflecting and Goal-setting, Goal-identification

Beyond the Framework

- 11% of queries did not fit SRL categories in Lai's (2024) framework
- Prompts like
 - Casual/Human chat (e.g., "Hi", "What's your name?")
 - Prompt injection attempts
 - Course logistics
 - Requests for translation or reformatting

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Key Insights

- Chatbot supports search and rehearsal
- Low engagement with metacognitive SRL
- Some interactions indicate further requirements
 - translation
 - image generation

Framework Refinement

- Add **Reformatting (E.RF)** – translate, sketch, list
- Add **Information Evaluation (S.EQ)** – check quality/source
- Expand Goal-setting to include **Requirement Clarification**

Process: Defining

Action (Code)	Description	Conversation Example
Identification (D.I)	Identifying problems or defining an issue to be solved.	I need to understand recursion in Python.
Goal Setting and Requirement Clarification (D.G)	Setting learning goals or clarifying course requirements.	What do I need to pass this MOOC?

Process: Seeking

Action (Code)	Description	Conversation Example
Search (S.S)	Retrieving information from the chatbot.	What is a Core Router.
Select (S.SL)	Extracting key points or requesting summaries.	Summarize the main take-aways from lecture 3.
Evaluation of Information Quality (S.EQ)	Checking the credibility, reliability, or sources of information.	Where do you get your information from?

Process: Engaging

Action (Code)	Description	Conversation Example
Review (E.RV)	Revisiting materials or verifying correctness.	Why is this answer correct?
Organize (E.O)	Structuring content, categorizing information.	List the advantages and disadvantages in order.
Reformatting (Reworking) (E.RF)	Transforming content into a different format (e.g., translation, diagrams, alternative explanations).	Translate this into English. Can you create a flowchart for this?
Rehearsal (E.RH)	Practicing learned concepts, generating quiz questions.	Give me a quiz about Green IT.

Process: Reflecting

Action (Code)	Description	Conversation Example
Task Evaluation (R.ET)	Assessing quality of work or readiness to move forward.	Which topic in this lecture has not yet been covered?
Self-Evaluation (R.ES)	Checking for learning gaps or self-reflection.	What is the best way to study for the InfoFit exam?

Design Recommendations

- Use AI for logistics + content, but clearly scoped
- Encourage SRL via subtle design nudges
- Include structured AI quizzes
- Continue refining safeguards against misuse

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Final Thoughts

- RAG-chatbots effective for retrieval + practice
- Less effective for motivation, goal-setting
- Revised framework better captures chatbot-specific SRL
- Future: richer interactions, multimodal support, personalization

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