



Data-Driven Business

REBO, THE REFLECTION GUIDANCE CHATBOT FOR APPRENTICES

USE CASE & MOTIVATION

Styrian enterprises need an online learning platform for their apprentices in mechatronics, metal and electrical engineering.

Research opportunities:

- Designing educational technology in the overlap between workplace learning and more formal learning settings
- Developing the first reflection guidance chatbot

RESEARCH QUESTIONS

RQ1: How do apprentices use computers and how self-efficacious are they regarding computers?

RQ2: How apt is the dialogue structure Rebo Junior to lead successful reflective conversations with apprentices?

RQ3: To what extent is reflective learning improved by transitioning the dialogue structure into the adaptive conversational agent Rebo?

RQ4: Do apprentices' reflection competence and self-regulated learning skills improve with repeated interactions with Rebo / Rebo Junior?

METHODS

1. **Apprentices & Computers: Usage and Self-Efficacy**
Mixed-methods case study: questionnaire, in-depth interviews
2. **Designing** a dialogue structure that leads apprentices through successive levels of reflection: **Rebo Junior (RJ)**
 - Experimental field studies (2x 3 months)
 - User acceptance; interactions: reflectivity & coherence
3. **Designing Rebo, the Reflection Guidance Chatbot**
 - Experimental field studies (2x 1 month, 1x 3 months)
 - Reflection Analytics for immediate feedback
4. **Measuring Apprentices' Reflection Competence & SRL Skills**
 - Pre- and post-tests and surveys (3-month field studies)

RESULTS

RQ1 (Paper in peer-review)

1. Apprentices' computer usage and self-efficacy indicate sufficient competence to use computer-mediated learning tools
2. Apprentices are motivated to use educational technologies

RQ2 (Wolfbauer et al. 2020)¹

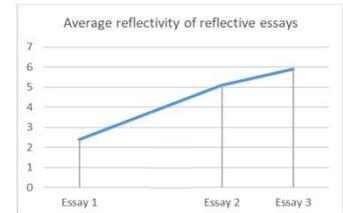
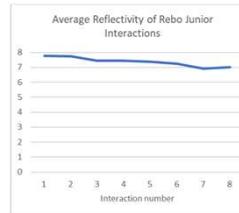
The dialogue structure works!

1. Apprentices (n = 18) like texting with Rebo Junior!
 - Workshop feedback: 94% like Rebo, 70% see benefit in reflection chat
2. Interactions with RJ (n = 153) are coherent and reflective

RQ4 (Wolfbauer et al. 2022)²

Coding of reflection aspects 2-5: 0/1/2 for each → total scores: 0-8

1. Significant improvement of apprentices' reflection competence
 - Paired-samples t-test Essay 1 - Essay 3: $t_{11}=4.89$, $p<.001$
2. Significant drop of reflectivity in RJ interactions 1-8
 - Paired-samples t-test: $t_7=2.50$, $p=.041$; $n=8$



RQ3 (Paper in preparation)

Adaptive turns implemented for various scenarios:

- Reflection on given aspect not achieved, explanation too short, "fake reflection", empathic reactions, feedback comment

1. Adaptive turns improve individual reflection sessions
2. Significant improvement of apprentices' reflection competence
 - Wilcoxon signed-rank test: $z = -2.820^b$, $p<.001$, $n = 14$, $r = 0.75$
3. No drop of reflectivity in repeated Rebo interactions

One step further – Rebo at Work

Reflective Practice with Rebo extended

- Official learning goals rephrased as comprehensible competences, structured in a rainbow widget
- Rebo helps to connect work tasks with learning goals
- Rebo helps to attend to problems and ask questions
- Supervisors see their apprentices' reflections and self-assessments



(9-month field study ongoing, late-breaking work paper in preparation) <https://rebo-at-work.know-center.at/>

REFERENCES

¹ I. Wolfbauer, V. Pammer-Schindler, and C. Rose, "Rebo Junior: Analysis of Dialogue Structure Quality for a Reflection Guidance Chatbot", In *Proceedings of the Impact Papers at EC-TEL (2020)*

² I. Wolfbauer, V. Pammer-Schindler, K. Maitz, and C. Rose, "A Script for Conversational Reflection Guidance: A Field Study on Developing Reflection Competence with Apprentices", *IEEE Trans. on Learning Technologies (2022)*

