ARTIFICIAL INTELLIGENCE IN SELF-REGULATED LEARNING: A CROSS-NATIONAL PILOT STUDY OF ESTONIA AND SERBIA

Janika Leoste, Slavko Rakić, **Jaanus Pöial**, Meidi Sirk, Andres Käver, Einar Kivisalu

Tallinn University of Technology, Tallin University, University of Novi Sad

ICERI 2025

Research Objectives & Questions

This pilot study investigates the intersection of artificial intelligence (AI) and self-regulated learning (SRL) across two national contexts. It aims to assess how students in Estonia and Serbia engage with AI tools in relation to SRL skills.

- RQ1: *How do SRL-related difficulties differ between Estonian and Serbian students?*
- RQ2: *What are the typical patterns of AI tool usage?*
- RQ3: *What institutional support do students expect for responsible AI use?*

Theoretical Framework & Methodology

The study is grounded in Zimmerman's SRL model, which emphasizes forethought, performance, and self-reflection. AI tools offer potential support in SRL but also pose risks, such as reduced student agency and overreliance. Responsible integration of AI, informed by ethical frameworks (e.g., DigCompEdu 3.0, EU AI Act), is critical to supporting lifelong learning skills.

The research employed a mixed-methods design:

- **Instrument**: Adapted from Dawson & Guare and Strait et al.
- **Participants**: 70 higher education students (Estonia: 48, Serbia: 22)
- **Tools assessed**: ChatGPT, Grammarly, GitHub Copilot, etc.
- **Survey**: 6 Likert-scale items + open-ended questions

The data collected addressed SRL difficulties, tool usage patterns, and expectations for institutional support.

Key Results - SRL Difficulties

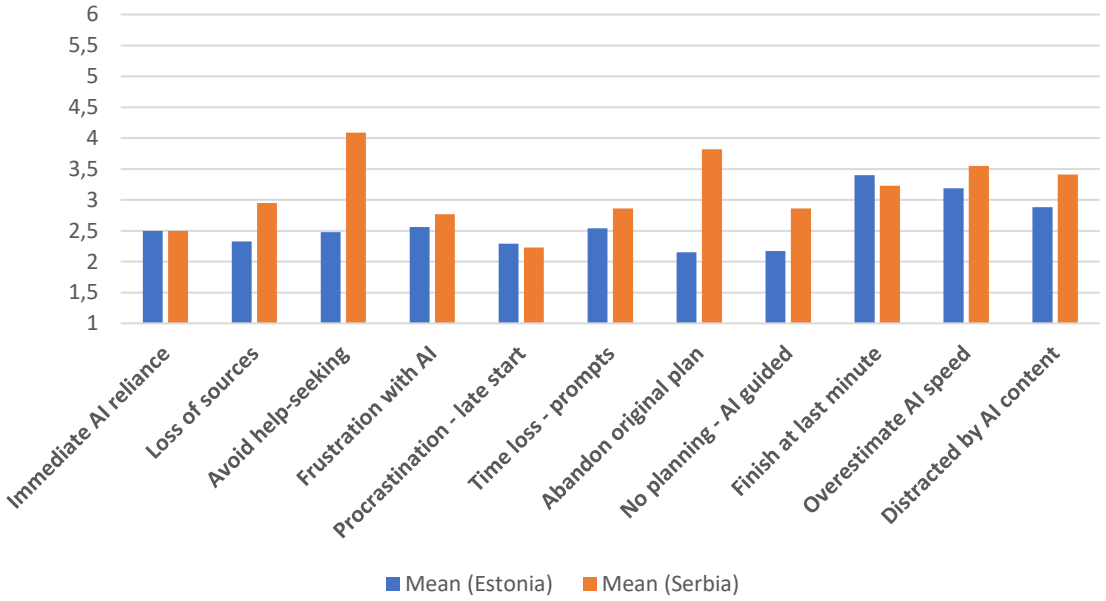

Figure 1. Cross-National Differences in SRL Challenges Related to AI Tool Usage

- **Estonian students** demonstrated stronger planning, behavioral regulation, and academic independence.
- **Serbian students** exhibited higher procrastination, impulsivity, and emotional frustration.

The results indicate varying degrees of SRL competency shaped by digital maturity and educational culture.

Key Results - AI Use Patterns

Table 1. Frequency of use AI tools in studies

Frequency of use AI tools	Percentage (%)
Several times a week	52.86
Daily	32.86
Several times a month	12.86
Never	1.43

Table 2. Usage of AI specific tools

AI Tool	Percentage (%)
ChatGPT	54.84
GitHUB Copilot	11.29
Gemini	10.48
Grammarly	7.26
Other	16.13

Student Perceptions & Institutional Expectations

Students recognized both benefits and challenges of AI:

Benefits: *Increased productivity, simplification of complex content, improved writing.*

Risks: *Loss of critical thinking, overreliance, reduced interaction with teachers. There is a nuanced awareness of the balance between assistance and autonomy.*

Students requested clearer guidance from institutions:

- **Ethical** and consistent policies for AI use
- Training in effective and **responsible** AI practices
- Access to **premium AI tools** across all faculties
- They emphasized the need for **support structures that preserve academic integrity** while leveraging AI's benefits

Theoretical and Practical Implications

Theoretical Implications

- Confirms that **AI tool use directly interacts with core self-regulated learning (SRL) dimensions**: planning, time management, organization, behavior, and emotion regulation .
- Extends SRL theory by highlighting **AI-induced procrastination and over-reliance**, especially in cross-national comparison (Estonia vs. Serbia) .
- Supports the distinction between **cautious AI adoption (Estonia)** and **AI-dependent learning patterns (Serbia)**, reinforcing cultural/educational context as a moderating factor.

Practical Implications

- Educational institutions must **provide guidelines, policies, and training** to foster ethical and effective AI use .
- AI can **enhance productivity and academic writing** but requires **structured integration** to prevent procrastination and dependency.
- Cross-national findings suggest **tailored interventions**:

Estonia → focus on maintaining balance and avoiding complacency.
Serbia → focus on mitigating procrastination and over-reliance.

Conclusion & Future Implications

Conclusion

- This research introduces and validates a **new instrument to measure the relationship between AI tool use and self-regulated learning**, allowing for cross-cultural comparisons (Estonia vs. Serbia).
- AI tools are a **double-edged sword**: they foster efficiency and support learning but risk undermining SRL skills if overused.
- Students demonstrate **cultural and contextual variations** in how AI affects their learning autonomy and time management.
- The study underscores the urgency of **embedding responsible AI use** into higher education curricula and institutional strategies.

Future Implications

Larger-scale studies needed to confirm cross-national patterns beyond Estonia and Serbia.

Longitudinal research to examine long-term effects of AI reliance on SRL and lifelong learning skills.

Exploration of AI-SRL balance in diverse disciplines and educational levels, including vocational and adult education.

Artificial Intelligence in Self-Regulated Learning:
A Cross-National Pilot Study of Estonia and Serbia

https://cm.taltech.ee/