

Empowering Self-Regulated Learning through Technology and the Teacher's Role – A Systematic Literature Review

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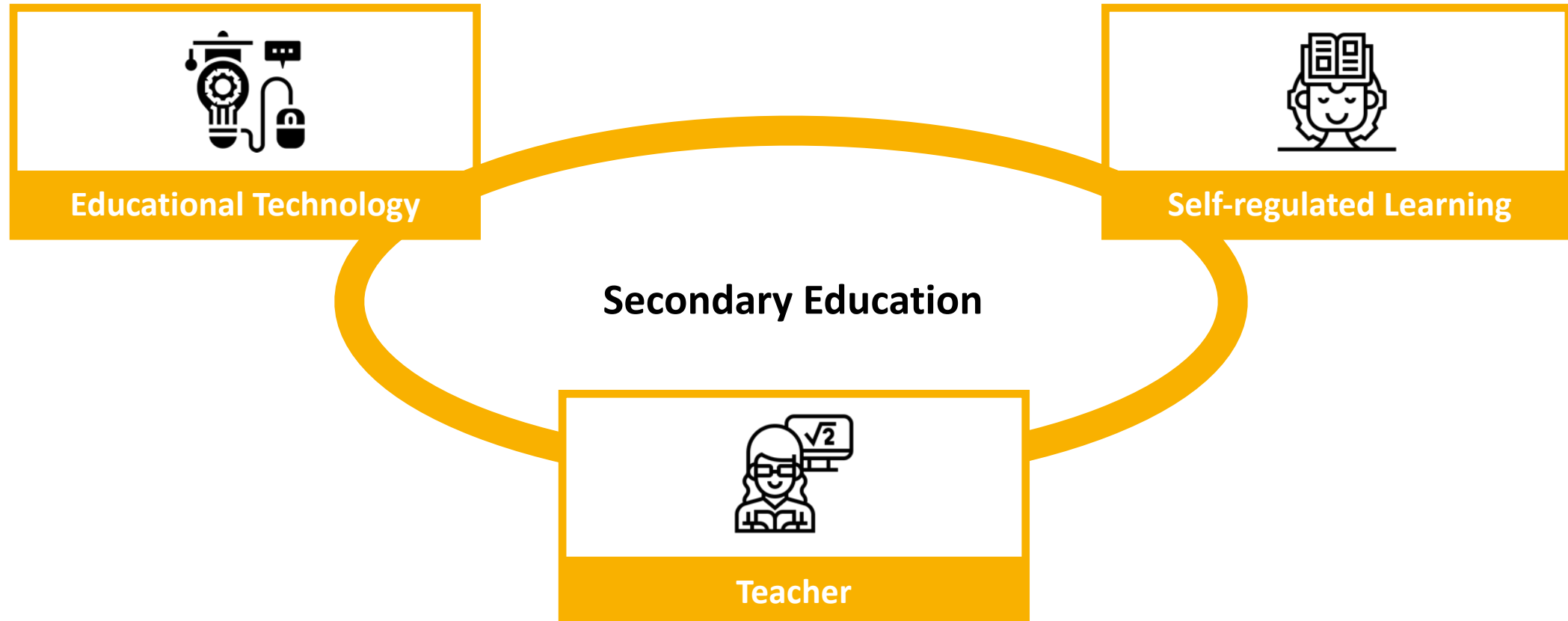
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Research Questions

- **RQ1:** Which teaching methods using digital technologies in secondary education are reported as particularly effective in promoting self-regulated learning?
- **RQ2:** What competencies do teachers in secondary education need to successfully facilitate self-regulated learning with digital technologies?

Methodology

- Torres-Carrion et al. (2018)
- Search query
 - CIMO-Framework
- Scopus
 - April 09, 2024
- Added Wang et al. (2024)

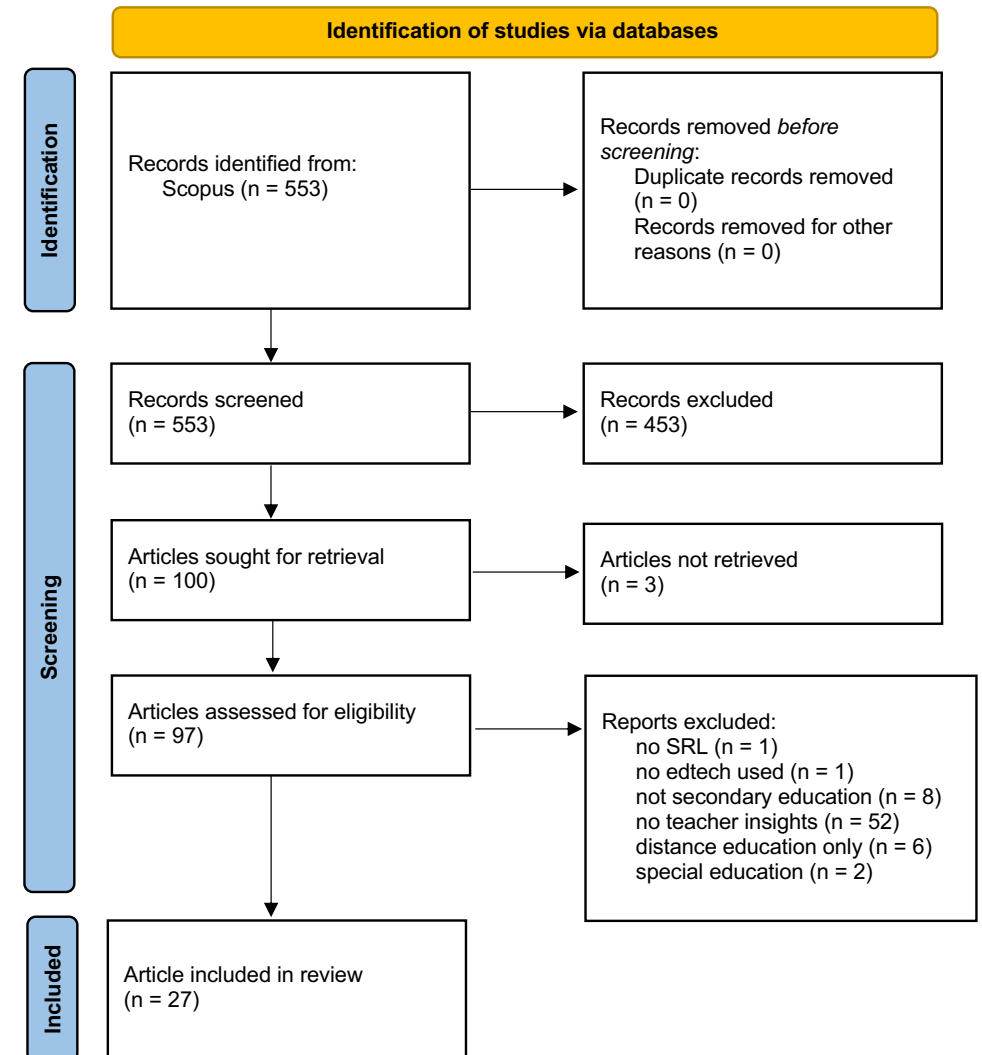


Figure 1: Flow diagram based on PRISMA 2020

Inclusion/Exclusion Criteria

Inclusion criteria	Exclusion criteria
Publications from 2014–2024	No educational technology within the learning process used
Papers written in english or german	No self-regulated learning
Published within a peer-reviewed process	No secondary education
School environment with a face-to-face component	Fully online or distance education

Results - Statistic Characteristics

- Country/Region
- SRL-Model
 - Zimmerman (2002) 10
 - Pintrich (2000) 6
 - Winne & Hadwin (1998)..... 3
 - no concrete model 9

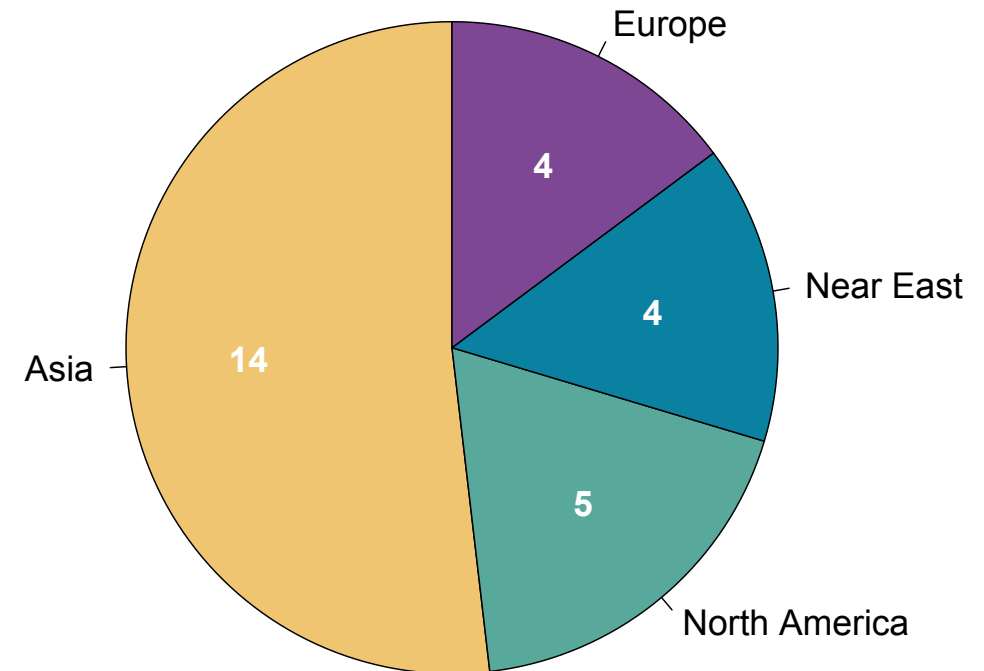


Figure 2: Paper origin

Results - Statistic Characteristics

- Main subject

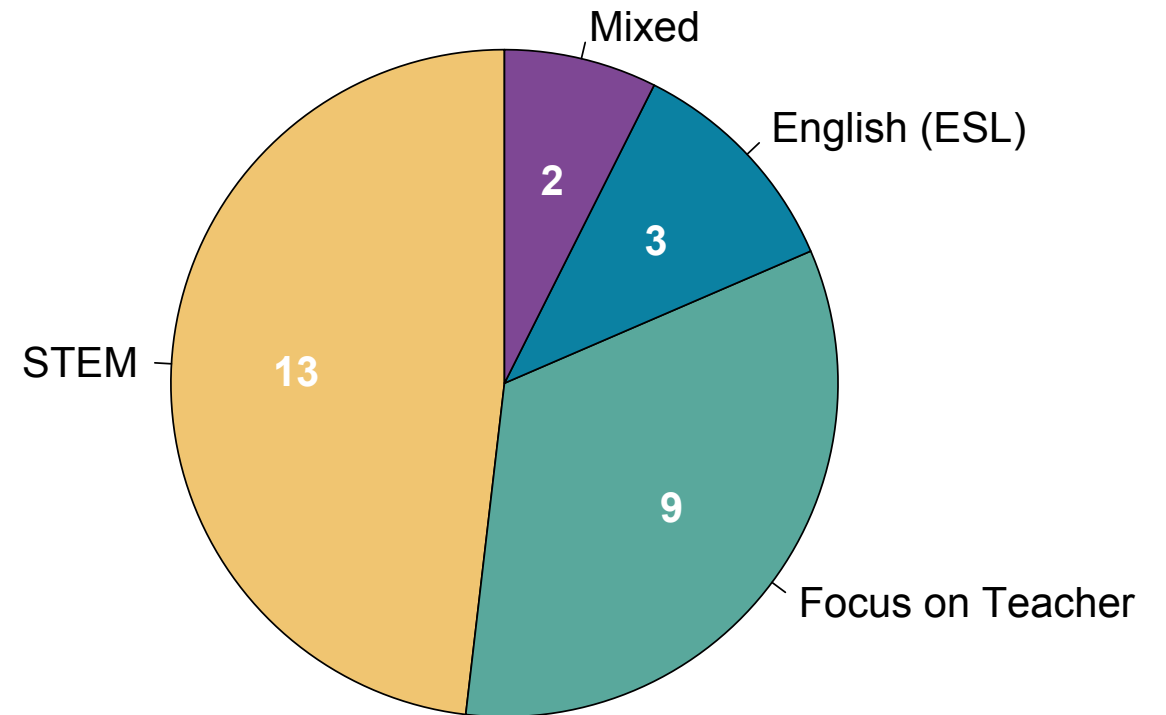


Figure 3: Main subject used within the paper

Results - Teaching Methods

- Blended Learning
 - combination of face-to-face and online phases
 - Blended Learning Classroom (BLC) (Inprashita, 2023)
- Flipped Classroom (Ateş, 2024; Sugrah et al., 2023)
- Additional methods
 - Design-Driven Education (Heikkilä, 2017), Guided Discovery (Hidajat, 2023), Inquiry-based Teaching (Zheng & Chen, 2021)

Results - Teaching Methods

- Teaching with AI
 - generative AI tools, especially Chatbots
 - personalized learning (Chang et al., 2023; Chiu et al. 2024; Molenaar, 2022; Ng et al., 2024; Xia et al., 2023)
 - support in developing SRL competencies (Chang et al., 2023; Ng et al., 2024)
 - limitations like students ability or biased information (Chang et al., 2023)
 - higher-performing students benefit more (Chiu et al., 2024; Xia et al., 2023)
 - teacher support important for lower-performing students (Chiu et al., 2024)

Results - Teacher Competencies

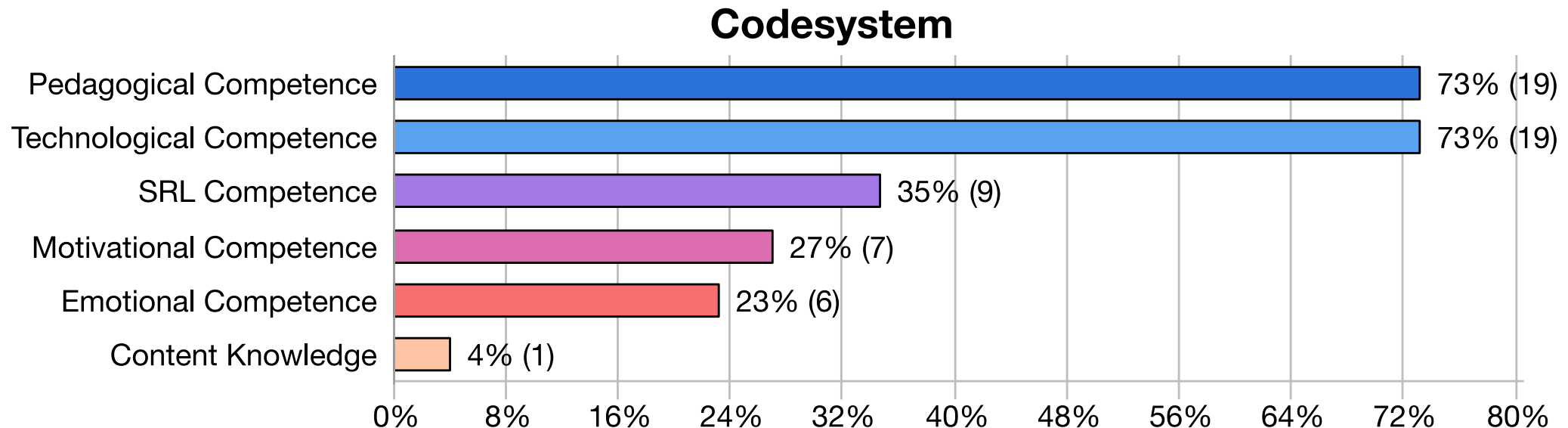


Figure 4: Coding system with the top level codes (competencies) - supporting software: MAXQDA

Results - Pedagogical Competence

- Essential to support SRL
- Supportive learning environment (Chiu et al., 2024; Ng et al., 2024; Wang et al., 2024; Xia et al., 2023)
- Foster SRL skills
 - metacognitive strategies (Wang et al., 2024)
 - learning strategies (Adıgüzel et al., 2023; Wang et al., 2024)
- Distractions caused by technology (Yang et al., 2023)

Results - Technological Competence

- Indispensable for teachers to foster SRL
- Knowledge on functionality and usage of educational technologies
 - design und use of digital learning environments (Ateş, 2024; Majitol & Yunus, 2023)
 - creation of educational videos (Rasheed et al., 2020)
 - working with online tools and apps (Chang et al., 2023; Linde et al., 2023)
 - technical issues (Inprasitha, 2023)

Results - Technological Competence

- Learning Analytics (Taub & Azevedo, 2023)
- AI tools
 - knowledge of potentials and limitations (Chang et al., 2023; Chiu et al., 2024; Molenaar, 2022; Ng et al., 2024; Xia et al., 2023)

Results - SRL Competence

- Teachers' SRL competence is important (Chen & Jang, 2019; Huang et al., 2021; Taub & Azevedo, 2023)
 - teacher as role model
- Self-regulated Teaching (Kramaski & Heaysman, 2021)
- Teacher Professional Development (TPD)

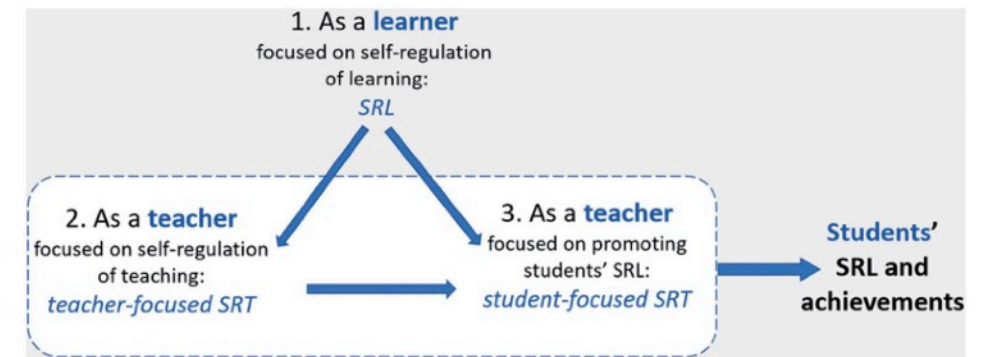


Figure 5: Self-regulated teaching model from Kramaski & Heaysman (2021)

Results - Motivational & Emotional Competence

- Emotional support (Sugrah et al., 2023; Viberg et al., 2023; Wang et al., 2024)
- Positive student emotions → greater use of SRL strategies (Huang et al., 2022)
- Motivation
 - important role of teachers (Chiu et al., 2024)
 - driving force for learning (Ng et al., 2024; Sugrah et al., 2023)

Results - Content Knowledge

- Limited direct evidence
- Essential for effective teaching in general

Results - Additional Findings

- Teacher Role
 - knowledge transmitter → facilitator of learning
 - renew teaching vision (Adıgüzel et al., 2023; Kramaski & Heaysman, 2021; Linde et al., 2023)
- Teacher Professional Development (TPD) (Adıgüzel et al., 2023; Chen & Jang, 2019; Huang et al., 2021; Huang et al., 2022; Linde et al., 2023; Rasheed et al., 2020; Wang et al., 2024)

Discussion/Conclusion

- Educational technology can support SRL
- Teacher's role is a critical factor
 - decision making (e.g., teaching method, educational technology, learning environment)
 - TPD
- Various teacher competencies necessary
 - especially pedagogical, technological and SRL competence

Limitations

- One database (Scopus)
- Secondary education
- Period from 2014 - 2024
- Other languages

Outlook

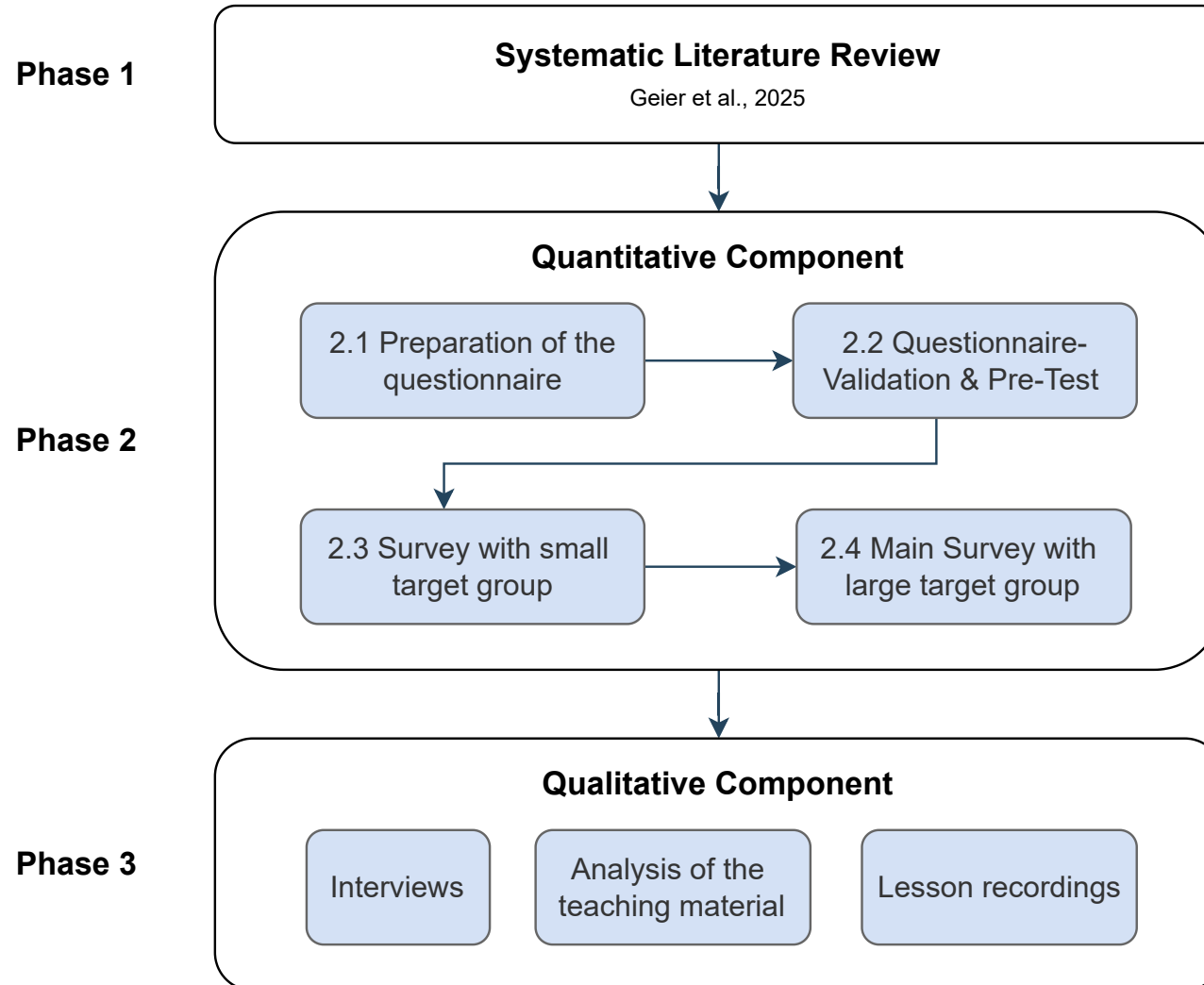


Figure 6: Overall research process

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Questions?

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