

Motivation and Self-Regulated Learning in Secondary Schools with Flipped Classrooms

Katja Urak **Benedikt Brünner** Gerald Geier Martin Ebner

2026-05-28

EdMedia 2026, Edinburgh

ed-tech.at

Slides & License

These slides may be used under the terms of the CC license CC BY 4.0 International (<https://creativecommons.org/licenses/by/4.0/>).
Please use the links and references as sources for individual illustrations, if applicable.

Slides available at <https://doi.org/10.3217/9jzkd-w6x71>



Katja Urak, Benedikt Brünner,
Gerald Geier, Martin Ebner
Graz University of Technology
ed-tech.at



Outline

1 Motivation

2 Method

3 Findings

4 Implications

Why this review?

- Flipped classroom models shift content acquisition out of class and reserve classroom time for active work. (Han & Røkenes, 2020; Lai & Hwang, 2016)
- Motivation and self-regulated learning matter because students must prepare independently (Zimmerman, 2008)
- Secondary school evidence remains thinner than evidence from higher education and teacher education (Brünner et al., 2025)

Research Question

Literature Review

How do flipped classroom approaches in secondary education influence student motivation, and what types of motivational strategies or technological supports are most commonly implemented to support this outcome?

Outline

1 Motivation

2 Method

3 Findings

4 Implications

What was reviewed

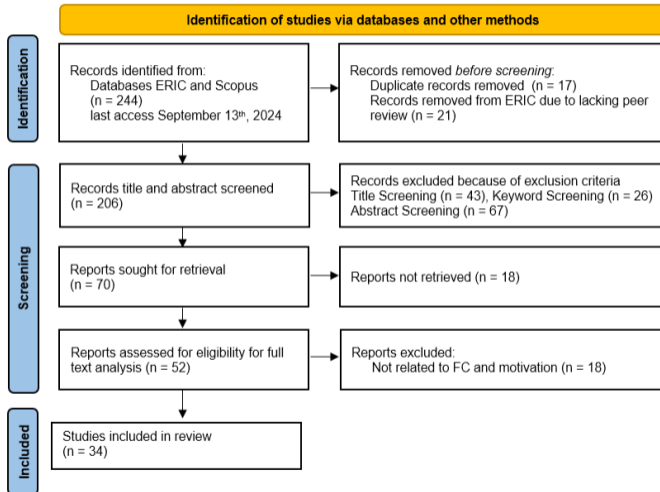
Search

- PRISMA-based review process (Page et al., 2021)
- Databases: ERIC and Scopus
- Query combined flipped classroom with gamification, reward, motivation, and school terms
- Last search: September 13, 2024
- Languages: English and German

Focus

- Secondary school students, ages 10–18
- Empirical FC implementations
- Motivation-related outcomes, supports, or barriers
- Excluded: teacher training, university, primary school, technical-only reports

Study selection




Evidence base

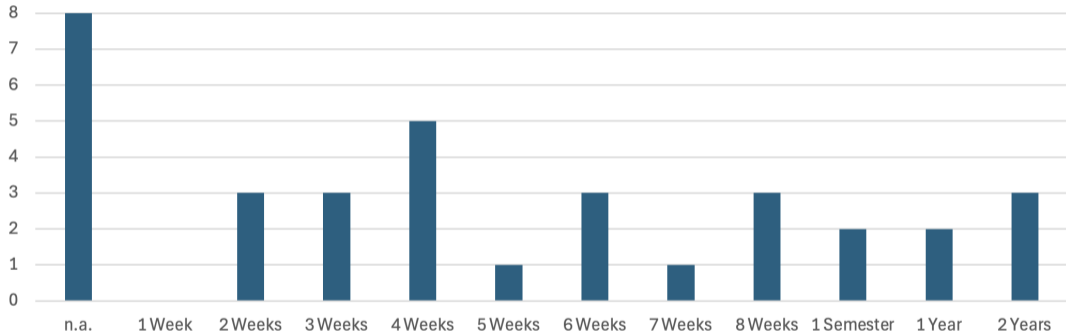
Included studies

- 34 studies in final synthesis
- 17 from ERIC and 17 from Scopus
- Diverse designs, subjects, technologies, and contexts
- Motivation was measured inconsistently across studies

School subjects

-  STEM fields dominated
 - 21 studies
- Mathematics
 - 9 studies
- Language and natural sciences
 - 6 each
- Social sciences: 4; ICT and PE: 3 each

Intervention duration



Studies ranged from very short interventions to one- and two-year implementations; eight studies did not report experiment length.

Outline

1 Motivation

2 Method

3 Findings

4 Implications

How motivation appeared in the studies

Motivational constructs Engagement indicators Indirect outcomes

- | | | |
|--------------------------------------|--|---------------------------|
| ■ Intrinsic and extrinsic motivation | ■ Video viewing | ■ Academic performance |
| ■ Self-efficacy | ■ Preparatory tasks | ■ Reduced anxiety |
| ■ Interest, attention, confidence | ■ Participation in quizzes, badges, leaderboards, stamps | ■ Enjoyment of group work |
| | | ■ Student feedback |

➔ **Implication:** positive motivational effects are promising,
⊖ but comparability is limited.

Motivational design patterns

Social

- Peer collaboration
- Group work and discussion
- Supportive classroom climate
- Reduced anxiety through interaction

Gamified

- Badges and points
- Ranking boards
- Stamps and stars
- Quiz-based feedback

Cognitive

- Choice and autonomy
- Flexible pacing
- Real-world relevance
- Responsibility for learning

Encouraging pre-class video engagement

Make viewing active

- Embed quizzes and short interactive tasks
- Connect video tasks to in-class activities
- Use immediate feedback to keep attention high

Make preparation visible

- Digital points, badges, and progress bars
- Teacher feedback stamps or comments
- Reminders through learning platforms or messages

➔ **Teacher effect:** preparation increased when videos felt useful, carefully produced, and connected to in-class support.

Who benefits most?

- Low-achieving and low-confidence students often showed the strongest gains in motivation, participation, and performance.
- FC structures can create repeated exposure, personalized assistance, and feedback-rich active learning.
- Average-achieving students also benefited through effort, engagement, and classroom participation.

Enabling conditions

- ✓ Accessible materials
- ✓ Clear routines
- ✓ Teacher monitoring
- ✓ Peer support
- ✓ Manageable workload

Risks and negative impacts

For students

- Technical access barriers
- Homework load and time pressure
- Initial resistance to unfamiliar routines
- Boredom with repetitive videos

For implementation

- Noisy or poorly coordinated group work
- Bypassing online tasks without deeper engagement
- Higher teacher workload for content, monitoring, and technology

Teacher and peer dynamics

Teacher role

- Content creator and curator
- Facilitator of active learning
- Monitor of preparation and progress
- Source of individualized feedback and encouragement

Peer role

- Collaborative problem solving
- More comfortable help-seeking
- Community and accountability
- Support from high-performing peers for struggling students

➔ **Core shift:** teaching moves from delivery toward orchestration, support, and feedback.

Outline

1 Motivation

2 Method

3 Findings

4 Implications

Discussion

- FC approaches can support secondary students' motivation when they combine structured preparation with active, feedback-rich classroom work.
- The strongest promise appears for students who struggle in conventional settings and benefit from repeated exposure, teacher guidance, and peer interaction.
- Gamification can increase engagement, but only when it reinforces meaningful learning rather than replacing it.
- Motivation gains depend on practical implementation: access, workload, classroom routines, and teacher capacity matter.

Limitations

- Search was limited to ERIC and Scopus and to English or German publications.
- Motivation was measured inconsistently and often indirectly through participation, video completion, performance, or self-report.
- Subjects, intervention lengths, technology setups, and classroom contexts were heterogeneous.
- Device access, informal learning contexts, and long-term effects were often underreported.
- Publication bias toward positive outcomes cannot be ruled out.

Outlook

Research needs

- Long-term effects
- Subgroup and socioeconomic differences
- Informal learning environments
- Better access and infrastructure reporting

Design needs

- Accessible and flexible materials
- Robust teacher training and support
- Careful workload management
- Adaptive feedback technologies with attention to equity

Takeaways & Learning Experience Design principles

- 1 Treat pre-class work as an actively supported routine, not just homework.
- 2 Keep videos purposeful, varied, and tightly connected to classroom tasks.
- 3 Use gamification as feedback and visibility, not as decoration.
- 4 Plan for access barriers before assigning home preparation.
- 5 Build in teacher monitoring and individualized feedback.
- 6 Design peer interaction deliberately so it supports struggling learners.

Motivation and Self-Regulated Learning in Secondary Schools with Flipped Classrooms

Katja Urak **Benedikt Brünner** Gerald Geier Martin Ebner

2026-05-28

EdMedia 2026, Edinburgh

ed-tech.at

References I

- Brünner, B., Burgsteiner, H., Schön, S., & Ebner, M. (2025). **The synergy of educational technologies and self-regulated learning: A systematic scoping literature review.** In M. E. Auer & T. Rützmann (Eds.), *Futureproofing engineering education for global responsibility* (pp. 301–315). Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-85649-5_30
- Brünner, B., Ebner, M., & Burgsteiner, H. (2024). **Distance learning in times of covid-19 at austrian schools: A rapid systematic literature review.** In C. J. Bonk & G. H. Marks (Eds.), *Proceedings of e-learn: World conference on e-learning in corporate, government, healthcare, and higher education 2024* (pp. 544–549). Association for the Advancement of Computing in Education. <https://www.learntechlib.org/p/225045>

References II

- Ebner, M., Schön, S., Khalil, M., Ebner, M., Aschemann, B., Frei, W., & Röhler, D. (2018). **Inverse blended learning in der Weiterbildung für erwachsenenbildner_innen: Eine mooc-fallstudie.** *Zeitschrift Hochschule und Weiterbildung*, 2018(1), 23–30. <https://doi.org/10.4119/zhwb-239>
- Geier, G., Ebner, M., & Burgsteiner, H. (2025). **Empowering self-regulated learning through technology and the teacher's role – a systematic literature review.** In *Emerging technologies and pedagogical shifts* (pp. 61–76). Springer. https://doi.org/10.1007/978-3-031-93567-1_5
- Han, H., & Røkenes, F. M. (2020). **Flipped classroom in teacher education: A scoping review.** *Frontiers in Education*, 5, 601593. <https://doi.org/10.3389/feduc.2020.601593>

References II

Lai, C.-L., & Hwang, G.-J. (2016). **A self-regulated flipped classroom approach to improving students' learning performance in a mathematics course.**

Computers & Education, 100, 126–140.

<https://doi.org/10.1016/j.compedu.2016.05.006>

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., ... Moher, D. (2021). **The prisma 2020 statement: An updated guideline for reporting systematic reviews.** *BMJ*,

372, n71. <https://doi.org/10.1136/bmj.n71>

References IV

Zimmerman, B. J. (2008). **Investigating self-regulation and motivation: Historical background, methodological developments, and future prospects.**

American Educational Research Journal, 45(1), 166–183.

<https://doi.org/10.3102/0002831207312909>

Acknowledgements

This research was done as part of the
FutureDEAL – Future of Digital Education and Learning
initiative within the doctoral program
Bildungsinnovation braucht Bildungsforschung,
supported and partially funded by the Austrian Federal Ministry of Education and the
Austrian Federal Ministry of Women, Science, and Research.



Open Questions



Benedikt Brünner
bruenner@tugraz.at

Gerald Geier
gerald.geier@phst.at

Martin Ebner
(Head of Educational Technology team)
martin.ebner@tugraz.at

Slides & License

These slides may be used under the terms of the CC license CC BY 4.0 International (<https://creativecommons.org/licenses/by/4.0/>).
Please use the links and references as sources for individual illustrations, if applicable.

Slides available at <https://doi.org/10.3217/9jzkd-w6x71>



Katja Urak, Benedikt Brünner,
Gerald Geier, Martin Ebner
Graz University of Technology
ed-tech.at

