

EdTech Brief: Flipped Classroom in STEM Education

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Goal: To optimize instructional time and foster deeper engagement with STEM content through the flipped classroom model.

The flipped classroom model revolutionizes learning by relocating foundational instruction outside the classroom. Before attending online classes, students interact with key content through short videos, interactive texts, textbook excerpts, simulations, podcasts, self-paced quizzes, or annotated presentations. This approach maximizes classroom time for active learning, problem-solving, collaborative projects, and deeper exploration of STEM concepts.

Benefits of the flipped classroom in STEM education

Time Management and Efficiency:

- Saves valuable instructional time.
- Reduces cognitive overload by breaking content into manageable segments.

Student Engagement and Learning:

- Increases opportunities for active student participation during class.
- Enhances knowledge retention through pre-class engagement.
- Supports personalized and self-paced learning.
- Boosts student motivation by making learning more interactive and student-centered.

Critical Thinking and Flexibility:

- Encourages higher-order thinking by focusing class time on deepening understanding and applying knowledge.
- Offers flexibility in teaching methods to cater to diverse learning needs.

Step-by-step implementation recommendations for Magister

Pre-Class Materials: Provide short, focused materials (5–15 minutes), such as videos (3–7 minutes), interactive texts, or textbook excerpts, to introduce key STEM concepts.

Engagement Checks: Before class, incorporate a brief quiz or reflection activity to assess understanding and reinforce learning.

Classroom Application: Dedicate class time to higher-order skills, such as problem-solving, experimentation, and collaborative learning, building on the foundational knowledge acquired pre-class.

By shifting foundational content outside the classroom, Magister can optimize instructional time, foster deeper student engagement, and promote critical thinking. This model not only supports personalized and self-paced learning but also empowers educators to focus on higher-order skills during class.

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