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Slow Tech Innovation

AI, Ethics and

New Teaching Methods

Reorganising Spatial-Temporal Classroom Dynamics via the Flipped Classroom Model

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OER 6.1.1: Reorganising Spatial-Temporal Classroom Dynamics via the Flipped Classroom Model
Reference Module: Module 6 - Classroom Practice and Authentic Assessment
Related Video-Pill: Video 6.1 - Active Methodologies & Flipped Classroom
Authoring partner: Panevėžys "Vyturys" Progymnasium - Lithuania
Topic / Thematic Focus: Flipped classroom, active methodologies and space-time reorganisation

Introduction and Learning Objectives

This resource accompanies, together with OER 6.1.2, video-pill 6.1 (Active Methodologies & Flipped Classroom) and constitutes its teaching-oriented in-depth study. Its subject is a reconfiguration, not the addition of a digital tool: the shifting of the times and spaces of learning. The *flipped classroom* brings preliminary access to content home and gives the classroom back the time for interaction, cooperative inquiry and formative assessment.
The text connects to the evidence on active learning (Freeman et al., 2014) and to the two main syntheses on the effects of the *flipped classroom* model (van Alten et al., 2019; Strelan et al., 2020), as well as to the historical reference that defined its framework (Lage, Platt & Treglia, 2000; see also Bergmann & Sams, 2012). The invitation for the teacher is to read the model not as a method for distributing videos, but as a design choice: what is worth doing together, face to face, and what can be prepared beforehand, at home?
By the end of the reading, the teacher will be able to:

- recognise the paradox of classroom time and describe how the *flipped classroom* reorganises it;
- reconstruct the historical roots of the model and the empirical evidence supporting it;
- design the diagnostic-laboratory-debriefing sequence, safeguarding the equity of the home phase.

1. The paradox of classroom time

Let us start from a scene every teacher recognises. In a traditional lesson, the simplest activity - listening to an explanation - enjoys the expert supervision of the teacher: there is someone who clarifies, corrects and exemplifies in real time. The cognitively most demanding activity - applying a concept, solving a problem, building an argument - is instead entrusted to the solitude of the evening, when that help is no longer there. It is a paradox: we give the most support when it is least needed and withdraw it precisely when it is needed most.
The *flipped classroom* intervenes here. The question that guides it is not how to introduce technology, but how to redistribute supervision: to move the first-exposure work home, which the student can do at their own pace and repeat as many times as they need, and to reserve classroom time for what requires the presence of the teacher and classmates. The classroom becomes the place where the hard part is done, not where one listens passively.
A consequence follows that protects the model from a frequent misunderstanding: the video recording is not teaching, it is the medium that carries the content. What changes is not the presence of a video, but the joint design of the home phase and the face-to-face phase, conceived together as a single pathway. In this sense, inverting times and spaces is an act of design before it is a technological choice.

2. The roots of the *flipped classroom* model: from Lage, Platt and Treglia to Bergmann and Sams

The formula of the *flipped classroom* has its roots in an experience documented at the end of the 1990s: Lage, Platt and Treglia (2000) describe the inversion of the classroom in a university course, where expository material is made available before the lesson in order to

free up face-to-face time for active work and inclusion. It was therefore not born as a technological innovation, but as a reorganisation of the relationship between the teacher's time and the student's time.
The best-known dissemination of the model is due to the popularising work of Bergmann and Sams (2012), who turned it into an everyday school practice: short videos as a point of access, classes as laboratories. The merit of their work is having shown that the model is sustainable in secondary school too, provided it is not reduced to a change of medium. Recording a frontal lesson and uploading it online does not produce a *flipped classroom*: it produces a longer frontal lesson, watched at home.
This genealogy matters on the pedagogical level. It shows that the object of change is not the tool, but the design: what deserves shared time, what can be tackled autonomously, how one verifies that the home preparation has taken place. These are questions of teaching method, not of technology; and this is why the model, decades later, remains relevant even when the devices used to implement it change.

3. What the research says: Freeman, van Alten, Strelan

The model does not rest on intuitions alone. The meta-analysis by Freeman and colleagues (2014), conducted on a large corpus of studies in the scientific disciplines, compares the outcomes of active learning with those of passive lecturing and documents a consistent advantage in terms of performance and a reduction in failure rates. The point of interest here is one of method: it is active methodologies, not the medium, that make the difference, and this shifts attention from technology to the design of activities.
On the specific side of the *flipped classroom*, two syntheses converge. van Alten and colleagues (2019) show that the positive effects tend to be accompanied by two conditions: entry tests linked to the preparatory material and no reduction in the overall number of hours of commitment. It is not the viewing of the video, in itself, that produces learning. Strelan, Osborn and Palmer (2020) confirm on an even larger scale the existence of a positive effect, but urge caution in reading the variability between contexts: effectiveness depends on how the model is designed, not on its label.
The lesson for the teacher is twofold. On the one hand, the *flipped classroom* is not a fashion: it has behind it a body of converging evidence. On the other, it is not a recipe: it works when the home phase is safeguarded (checks, entry tests) and when classroom time is genuinely engaged in activities with high cognitive demand. Adopting the name without adopting the design is the quickest way not to obtain its benefits.

Study	Design	Main outcome (careful paraphrase)
Freeman et al. (2014)	Meta-analysis of active-learning studies	Active methodologies improve performance and reduce failures compared with passive lecturing.
van Alten et al. (2019)	Meta-analysis of the effects of the *flipped classroom*	The positive effects are accompanied by entry tests and the maintenance of the overall number of hours.
Strelan et al. (2020)	Confirmatory meta-analysis on a large corpus	Positive effect confirmed, but variable according to the teaching design.

4. Redesigning times and spaces: the diagnostic-laboratory-debriefing sequence

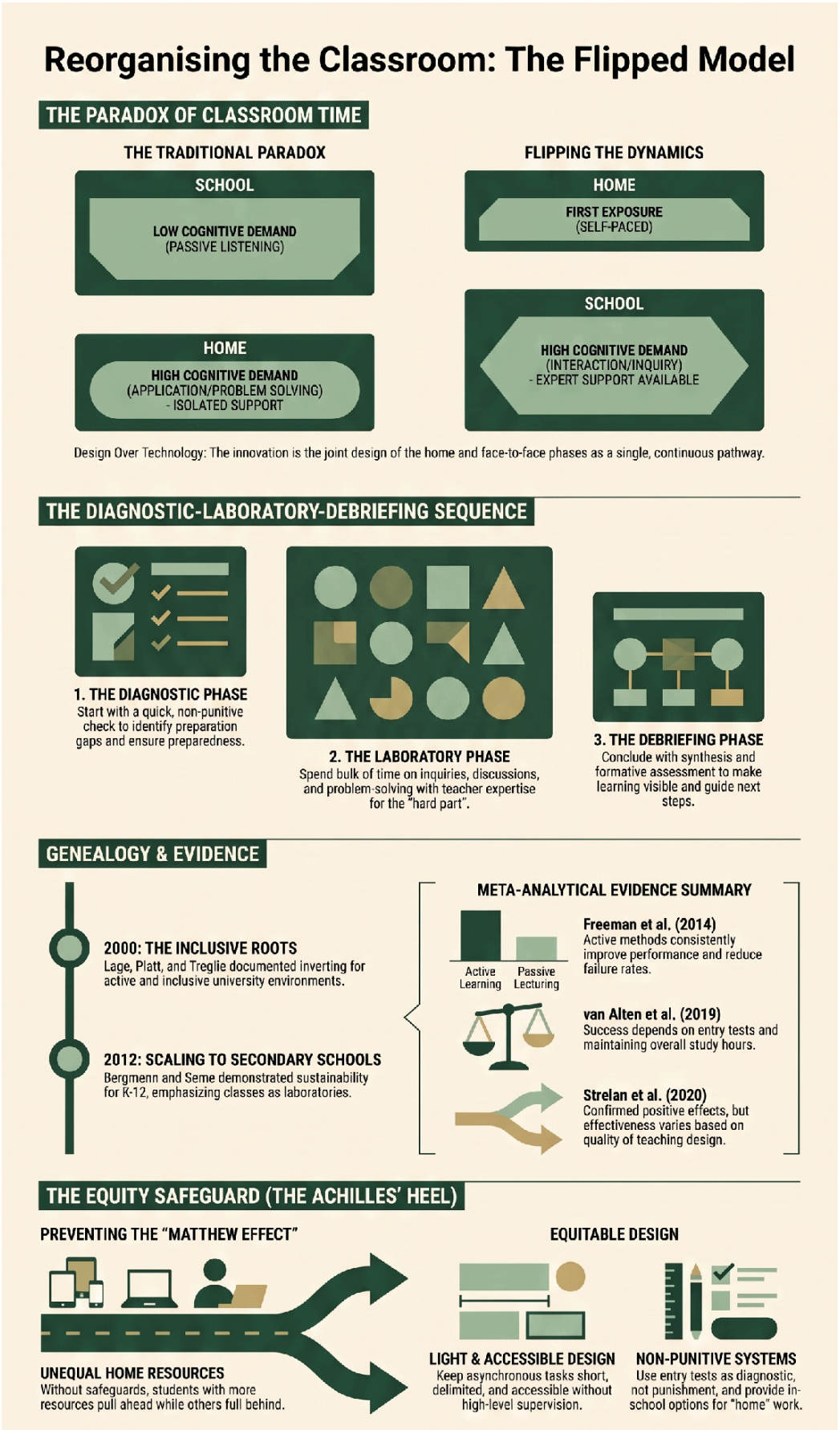
Translating the model into practice requires a clear sequence. The first phase is diagnostic: at the start of the lesson, two quick questions verify whether the home preparation has taken place and where the gaps are. Heavy tests are not needed; what is needed is a

safeguard that prevents the classroom from taking for granted acquisitions that are not there. The *flipped classroom*, like any active teaching method, starts off lame if students arrive unprepared and nobody knows it.
The second phase is the laboratory: face-to-face time is spent on activities with high cognitive demand - problems, inquiries, discussions, productions - with the teacher and classmates as resources. This is where the model keeps its promise: expert help arrives at the moment when the task is most difficult. The third phase is the debriefing: a moment of synthesis and formative assessment in which what has been learned and what remains to be consolidated are made visible, with indications for the next step.
The sequence also has an equity effect, if carefully designed: it moves interaction into a supervised context, where differences in home background weigh less. But its success depends on a factor that often remains implicit: preparation at home must be possible for everyone, and home is not a neutral environment. This is the model's Achilles heel, to which we devote the final section.

5. The equity of the home phase: the Achilles heel

Entrusting preparation entirely to the home means betting on an environment that not everyone has. Connection, devices, a quiet space, an available adult: resources that are not evenly distributed. In a class with strong socioeconomic heterogeneity, the risk is what the literature calls the Matthew effect: those with more resources start off advantaged and widen that advantage, those with fewer fall behind. The model designed to free up quality time risks, in the absence of safeguards, increasing inequalities.
The measures suggested by the research run counter to the increase in homework: short and delimited asynchronous tasks, light and accessible materials, a quick and non-punitive check at the start of the lesson, the possibility of completing the home phase at school for those who cannot do it at home. It is not a matter of giving up the model, but of not offloading onto the family work that the school is not supervising.
Here the bridge to the next resource opens. If the fragility of the home phase lies in the student's solitude, part of the answer may come from support available precisely in that phase: a tutor able to reformulate, explain and bring out the reasoning - and not to give the solution. This is AI as a home tutor, the subject of OER 6.1.2, which must however be delimited with precise constraints, so as not to turn help into delegation.

Visual Scaffolding



Conclusions and Metacognitive Reflection Prompts

This resource has shown that the *flipped classroom* is, above all, a reconfiguration of times and spaces: it moves preliminary access to content home and gives the classroom back the

time for interaction and formative assessment. Its historical roots (Lage, Platt & Treglia, 2000; Bergmann & Sams, 2012) and the empirical evidence (Freeman et al., 2014; van Alten et al., 2019; Strelan et al., 2020) indicate that what counts is not the medium but the design: the home phase must be safeguarded with checks and entry tests, and face-to-face time must be spent on activities with high cognitive demand. The critical point remains the equity of the home phase.

To transfer these core ideas into one's own practice, the following reflection prompts are proposed:

- In your teaching, which high-cognitive-demand activity do students currently do on their own, without supervision, and how would it change if you moved it into the classroom?
- If you adopted the diagnostic-laboratory-debriefing sequence, which quick check would you use at the start to verify the home preparation?
- Which equity safeguard do you consider indispensable in your class, where the home is a heterogeneous environment, in order to avoid the Matthew effect?

Technical Metadata Sheet

Metadata Field	Specification / Parameter Value
Identifier	OER 6.1.1
Title	Reorganising Spatial-Temporal Classroom Dynamics via the Flipped Classroom Model
Creator	Panevėžys "Vyturys" Progymnasium - Lithuania
Description	The resource addresses a reconfiguration rather than the addition of a digital tool: the shift of the times and spaces of learning. It reconstructs the historical roots of the flipped classroom — from Lage, Platt and Treglia to Bergmann and Sams — and the empirical evidence that supports it (Freeman, van Alten, Strelan). The practical focus is on designing the diagnostic–laboratory–restoration sequence while guarding the equity of the home phase, the model's Achilles' heel.
Keywords	flipped classroom; active methodologies; in-class time; diagnostic sequence; empirical evidence; home study equity; learning spaces; instructional design
Language	EN (English)
Affiliation	Panevėžys "Vyturys" Progymnasium - Lithuania
Contributor	STIAEM Transnational Scientific Board (peer review, Rhodes validation protocol)
Media Format	Text; Infographics
Genre	Training Manual; Educational Guide
URL	
Citation	Bergmann, J., & Sams, A. (2012). Flip your classroom: Reach every student in every class every day. ISTE / ASCD. Freeman, S., Eddy, S. L., McDonough, M., Smith, M. K., Okoroafor, N., Jordt, H., & Wenderoth, M. P. (2014). Active learning increases student performance in science, engineering, and mathematics. Proceedings of the National Academy of Sciences (PNAS), 111(23), 8410-8415. https://doi.org/10.1073/pnas.1319030111 Lage, M. J., Platt, G. J., & Treglia, M. (2000). Inverting the classroom: A gateway to creating an inclusive learning environment. The Journal of Economic Education, 31(1), 30-43. https://doi.org/10.1080/00220480009596759 Strelan, P., Osborn, A., & Palmer, E. (2020). The flipped classroom: A meta-analysis of effects on student performance across disciplines and education levels. Educational Research Review, 30, 100314. https://doi.org/10.1016/j.edurev.2020.100314 van Alten, D. C. D., Phielix, C., Janssen, J., & Kester, L. (2019). Effects of flipping the classroom on learning outcomes: A meta-analysis. Educational Research Review, 28, 100305. https://doi.org/10.1016/j.edurev.2019.05.003
Educational Level	Secondary School
Associated Module / MOOC Video Lesson	Module 6 - Classroom Practice and Authentic Assessment / Video 6.1 - Active Methodologies & Flipped Classroom
Learning Objectives	recognise the paradox of classroom time and describe how the flipped classroom reorganises it; reconstruct the historical roots of the model and the empirical evidence supporting it; design the diagnostic-laboratory-restoration sequence, safeguarding the equity of the home phase.
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References and Webography

Bergmann, J., & Sams, A. (2012). Flip your classroom: Reach every student in every class every day. ISTE / ASCD.

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