Flipped Classroom

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1. Definition

> "Inverting the classroom means that events that have traditionally taken place *inside* the classroom now take place *outside* the classroom and vice versa."[1]

The terms *Flipped Classroom* and *Inverted Classroom* describe a teaching/learning concept in which the traditional in-class **teacher input is replaced by** content conveyed through digital media that students work on **outside of class**. In-class time can then be used for **student-centred methods** and **active learning strategies**.[2]

Therefore, the basic idea of flipped classroom holds the following potential for teaching and learning: The two key elements of teaching — delivering instructional content (input) and the subsequent critical phase of students engaging with the subject individually (independent learning phase) — are reversed using digital media.[3] Inverting the input phase and the independent learning phase has a **long tradition**, however: In the traditional seminar, students read outside the classroom and discuss the readings during class sessions. In addition, flipped classroom systematically uses **interactive technologies**[4] and **active learning strategies**.[5] Online learning and corresponding classroom activities complement each other. Thus, flipped classroom represents a form of blended learning (https://infopool.univie.ac.at/startseite/lehren-betreuen/blended-learning/).[6]

2. Strengths of Flipped Classroom

The effectiveness of this teaching/learning strategy lies in **newly conceived in-class sessions**, rather than merely applying digital media. Using instructional videos out of class makes time and space to include **active** and experience-based **learning** in class.[7]

Instructional videos move the instructional input phase to outside of the classroom. Students may work through the videos individually, which allows them to process the content **at their own pace**. Likewise, students may choose freely the **time** and **place** of **learning**.[8] In the classroom, **student-centred activities** (e.g.: group work or discussions on various problems) replace the teacher-centred input. **Students** independently access, process and present topics, which fosters skills such as synthesis or problem solving.[9] Student-centred teaching can support the **development of critical thinking** and facilitate access to deeper knowledge. This often results in **improved engagement** and heightened **motivation** throughout the learning process,[10] which in turn promises positive effects on the intensity, sustainability and quality with which students explore assignments[11], as well as on their well-being and success in learning[12].

Inverting the classroom holds **solutions** for challenges in university-level teaching. During the input phase, instructional videos can bridge **discrepancies in knowledge, skills, and learning,** especially in heterogeneous students groups. Because of the possibility to fast forward, rewind, pause, or to select the playback speed, instructional videos allow students to **learn at their own pace**. In addition, student-centred teaching and learning can replace teacher-centred teaching and, thus, allow for active learning even in large classes.[13]

3. Requirements and Characteristics of the Flipped Classroom

According to the Flipped Learning Network (FLN), the flipped classroom model is based on four key requirements:[14]

3.1. Flexibility of the Learning Environment

In an inverted classroom, the in-class phase consists of a **variety of active learning methods**. Teachers create a learning environment in which students can independently decide when, where and how they learn. Self-paced learning is an inherent characteristic of a flipped classroom. However, it is critical to have feedback mechanisms in place ensuring that students understand key concepts.[15] Taking into account the course specifics, teachers decide how and to what extent they implement such check-ups. A number of tools are available to serve this purpose. While **class presentations** or **simple discussions** may be useful for small groups, **tests** or **quizzes** may be helpful to ensure learning in large lecture settings. For instance, **student response systems** such as Arsnova (https://arsnova.univie.ac.at) enable teachers to perform quizzes including all the students in class. Discussions following such quizzes allow teachers to respond to difficulties students may have in understanding course content.

3.2. Transformation of the Culture of Teaching and Learning

Transitioning from teacher-centred to student-centred teaching and learning, where **knowledge is constructed collectively and actively**, is a key characteristic of a flipped classroom. Like in other forms of collaborative learning, the teacher is an **organiser**, **supporter** and, eventually, a partner in learning. This shift dismantles long-standing hierarchies,[16] transforming the traditional notion of knowledge delivery along hierarchical lines from *above* to *below*. Students and teachers encountering each other as more-or-less equal actors in the teaching and learning process contribute to a positive atmosphere that can be beneficial for the entire, now cooperative, learning process.[17]

3.3. Structured Teaching/Learning Materials

Teaching/learning materials in the input phase, such as instructional videos, communicate concepts, ways of disciplinary thinking, and other skills on which the in-class phase builds.[18] This lends particular significance to the content of the independent learning phase, as **input and active learning complement each other.** When these two elements are well coordinated, they stimulate successful student learning processes.

Instructional videos can be combined with **additional online activities**. Since direct interaction between students and teachers is limited during the input phase, we recommend establishing channels of digital communication (e.g. a Moodle forum). Questions that may arise during an out-of-class lecture can be addressed through such channels. It is also possible to integrate short

assignments and **activities** in the videos. These enhance students' attention, as they watch the videos, and encourage them to **actively engage** the material already during the input phase.[19] Such activities may include learning paths, short online quizzes, small research assignments, and essays, among many other possibilities.

3.4. No Inverted Classroom Without Teachers

The role of teachers in the flipped classroom model is often misunderstood: Teaching/ learning materials, such as videos, could replace teachers or face-fo-face teaching. However teachers play a pivotal role in a flipped classroom, which is also highlighted by the **significance of the in-class phase**. Teaching an inverted class can be even more challenging than the traditional teacher-centred approach.[20] Teachers create the **appropriate active and student-centred class environment**, in which students, mostly by themselves, explore course content.[21] Teachers reflect on and evaluate their courses, provide students with detailed and specific feedback, and create a balance between their students' self-directed and guided learning.[22]

4. Scenarios for Implementation and Expansion

The following section describes some scenarios for implementing flipped classroom. However, these represent just a small number of the variety of inverted teaching possibilities, as there is no **fixed set of rules** nor a simple recipe for designing a flipped classroom. As with any method, the conception and specific application depends on the **discipline**, the **teaching situation**, and the **teacher's own approach to teaching and learning**.[23] The **variability** of the flipped classroom method enables teachers to **adapt teaching/learning methods, learning theories** and **concrete methods** according to the disciplinary conditions, their own **teaching preferences,** as well as to student **needs.** Eventually, both teachers and students should feel comfortable.[24]

For study law-related reasons, the choice of **course format** heavily influences the possible activities within a flipped classroom. In courses with non-continuous assessment, it can be difficult to motivate students to come to class prepared. In courses with continuous assessment, in which assignments take on the form of preparatory tasks and create more accountability, teachers have considerably more leeway. The following segment will illustrate this point, using the Inverted Classroom Mastery Model as example.

4.1. The Inverted Classroom Mastery Model (ICMM)

The requirement for students to come to class prepared, i.e. all students having watched and understood the instructional videos before class, can be a significant challenge.[25] Since the in-class phase builds on the preparatory content of the independent learning phase and confronts students with cognitively challenging tasks, these demands may be too difficult for unprepared participants.[26]

Many teachers rely on a simple method to ensure that students come to class prepared using short **online tests** (*E-Assessments*) based on the video content. Jürgen Handke called this the ***Inverted Classroom Mastery Model* (ICMM)**.[27] These E-Assessment results provide students with insights into their own learning progress, while teachers get a sense of the knowledge levels of the entire class.[28] If students show difficulties in understanding, teachers can address and solve these problems immediately. Thus, the Mastery Model allows teachers to **react to the needs of their students**, i.e. it makes possible an adaptive approach to teaching and learning.[29]

However, students may experience regular tests as **stressful and burdensome**,[30] which should be taken into account in the decision whether to use the Mastery Model.

4.2. "Shuffling the Classroom"

Clemens Möller expanded the inverted classroom concept to include problem-based learning, which he named the **Inverted^2 Classroom (I^{2}CM)** or **"Shuffled Classroom."** Instead of an input phase, the learning process begins with **a problem from everyday life**, followed by videos that deliver instructional content. Contrary to classical inverted teaching, this model requires the use of application-based knowledge from the start of the learning process.[31] These initial activities function as stimuli.[32] Students work in groups to solve complex problems,[33] which helps them to acquire and apply knowledge, as well as to develop problem-solving skills.[34]

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