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FLED LEARNING DESIGN FOR FLEXIBLE EDUCATION

Key decisions for an effective flipped classroom

Keywords[1]

Flexible learning, effective teaching, inclusive education, self-regulated learning, collaborative learning, digital tools, personalised learning

Characteristics of the course

This pattern is designed for teachers who have already implemented the flipped classroom (FC) in higher education. This pattern has been specifically tailored for use with a group of 80 second-year students. It can also be a useful tool for teachers who are not familiar with FC, as well as for different educational levels and smaller class sizes. Teachers with previous experience in FC could benefit more from this pattern by selecting the specific actions that need revision. Additionally, students at higher degree levels might benefit more from flexibility, inclusiveness and options for self-regulation. Finally, having fewer students in a group can lead to more personalized practices.

Context and main problem (or motivation) to be solved

The FC has gained popularity in recent years, particularly during the pandemic as a response to the need for online and blended modes of teaching and learning. As a result, teachers have developed digital competences and have broadened their perspective towards flexible forms of learning (Albó et al., 2020; Noguera & Valdivia, 2023). However, FC designs sometimes do not lead to the expected increase in academic performance, motivation or self-regulation. **The main issue with FC is its ineffectiveness when students fail to regulate their own learning, prepare before**

[1] Consult the FLeD patterns glossary to learn more.

class, or collaborate properly, and when the flexibility options make them feel lost (Jones et al., 2021; Lai & Hwang, 2016; Sein-Echaluce, 2022; Silverajah et al., 2022).

One reason for unsuccessful FC is to understand it as a mere adaptation of traditional content-based instruction to online or blended modes of teaching (Weiss & Friege, 2021). Such a traditional approach may overlook the active and social nature of the FC and adopt technologies from a reductionist view. Furthermore, an FC design without adequate guidance for self-regulated learning processes and the intensive use of digital technologies might represent a barrier to students with special needs, special circumstances, or low self-regulation or digital competencies (Baig, 2019; Sosa-Díaz et al., 2021; Sun et al., 2018). All these aspects may affect the correct implementation of FC and harm academic performance, motivation, and self-regulation, leading to unsuccessful learning experiences.

Another reason for failure when implementing FC is to misinterpret the concept of flexibility. Flexible education is not spontaneous; it is planned and requires a detailed pedagogical design to facilitate the customisation of learning (Noguera et al., 2023).

Main need to be addressed

Strategies for effective FC in higher education.

General learning outcomes to be achieved

Engage in interactive learning experiences throughout the flipped experience.

Erasmus+ FLeD Learning design for flexible education

Pattern "Key decisions for an effective flipped classroom"

Solution that could solve the problem and need
Implement strategies for flexible, inclusive, self-regulated and collaborative learning using digital technologies.

	• **Environments**	
ACTION 1. **Offer flexible learning options**	Design your learning scenario profiting from the face-to-face and virtual spaces. Design your course or unit considering which context learning will be most meaningful. Several delivery modes result from the combination of virtual and onsite, and synchronous and asynchronous spaces, such as fully online learning, fully onsite learning, mobile learning, blended learning, or hybrid flexible learning.	o Use **onsite and synchronous spaces**, for instance, when topics need to be discussed, when there is a need for reflection or demonstration, or when you need fluent communication and teamwork. For instance, seminars. o Use **virtual spaces and asynchronous communication** to reach large audiences, for one-way information, to prompt autonomous work and self-reflection, or facilitate communication when students are physically distant. For instance, lectures. o LMSs usually include customizable options for teachers but are limited in flexible learning as students have limited choices regarding the virtual space. Combining them with tools for **microlearning or personal learning** environments could bring personalisation to the learning experience. o **Physical spaces** also need to be flexible to meet the pedagogical approach. It implies the possibility of using the classroom in a variety of ways. It includes moveable furniture, break-out spaces, or diverse seating arrangements and spaces.

<table>
<tr><td rowspan="4">ACTION 1.
Offer flexible learning options</td><td colspan="2">• Time</td></tr>
<tr><td>The FC permits surpassing time constraints. Use synchronous and asynchronous communication appropriately. Not all tasks require all students to be together at the same time</td><td>o Give options to meet synchronously when necessary or at the student's convenience and let students organise their time and work during their asynchronous time.
o In the FC, the time spent out of the classroom has value; it is an active time where they consult resources and perform activities. Give them options to consult resources at any time and from anywhere.
o Agree with your students' time slots and days for synchronous connection in online communication.
o The length of the flipped experience may vary. You can flip a whole course or just a learning unit or topic. To be effective, a minimum of time is required to let students prepare for the session, apply their knowledge, get feedback and reflect. We recommend flipping at least to four sessions or a couple of weeks.</td></tr>
<tr><td colspan="2">• Pace</td></tr>
<tr><td>Prompt self-paced learning. Students have different profiles, learning experiences, needs, and motivations. Give them options to learn considering their own time and schedule.</td><td>o Propose self-assessment activities in the form of diagnostic evaluation to let students be aware of their learning needs.
o Offer different pathways with different deadlines that can be decided based on student's goals.</td></tr>
</table>

ACTION 1. **Offer flexible learning options**	• **Learning resources**	o Offer the possibility to **consult the sources in a different order** to meet the needs or knowledge to be acquired based on each student profile. o Suggest **sets of resources** that students can select to gain different levels of knowledge according to their interests, prior knowledge, or learning goals. o Propose lessons and course materials of **different lengths and formats** that students can select and decide the time period they want to invest in.
	• **Digital technologies**	o Provide a **range of tools** and support to be used and the possibility to use the tools students are more familiar with. o Offer **diverse communication channels** (forum, chat, videoconference, e-mail).
	• **Learning activities**	o Permit delivering activities in **different formats**. o Be **open to rescheduling** the deadline of learning activities when the whole group demands it, and there is a strong reason for it.
	• **Grouping**	o Give students the **choice to work in pairs or small groups** if they need to exchange ideas. o Propose assessment activities with **diverse grouping systems**.

ACTION 1. **Offer flexible learning options**	• **Assessment**
	Students have **diverse abilities**, and it is key to give them the opportunity to demonstrate their learning in diverse forms, such as a test, a case study, a critical essay, or a report.
	• **Teaching delivery mode**
	Be open to **changing the teaching delivery mode** for a period or the whole course if there are teaching or learning needs that support that decision.

ACTION 2. **Design under an inclusive perspective**	o Guarantee that the needs of Special Education Needs and Disabled (SEND) students are considered, and the necessary **adaptations** are made **in the course materials and evaluation**. The intensive use of digital tools and resources may have a negative impact on SEND students. Be aware of the adaptations they need, such as the format of resources, the use of text and images, or the need for subtitles or transcripts. For example, audio or video recordings, their transcripts, course presentations, and other materials can be converted to other modalities from verbal to written so that they can be used by diverse students and in various environments for a multitude of purposes. It is recommended to bear in mind the Universal Design principles. Universal Design principles aim to create products, environments, and systems that are accessible and usable by all people. These principles include equitable use, flexibility in use, simple and intuitive use, perceptible information, tolerance for error, low physical effort, and size and space for approach and use.
	o The FC promotes the consultation of resources prior to in-class activities. It is crucial to provide **electronic resources in advance** to permit students to consult them during a period of time.
	o Implement **person-first language** to be used for people with disabilities.
	o Prompt **diversity** in the groups of students, especially when instruction is only given online.
	o Students with disabilities need to be able to **access all the learning activities** and achieve the equivalent learning outcomes in all participation modes.

ACTION 2. **Design under an inclusive perspective**	o **Accessibility** enabled by course materials and activities accessible to all students is also key to making it possible for students to participate in alternative modes.
	o Students with disabilities need essential **technological facilities** with which they need to be equipped, and the varied learning-mode abilities which help them make legitimate choices about participation.
	o The pedagogical choices of **mode of delivery** (online or face-to-face) and **mode of participation** (synchronous or asynchronous) are essential for students with SEND. Students with SEND are a heterogeneous group, for some, online learning is more appropriate and for others, face-to-face.
	o Providing **choice of participating** for students is fundamental to enabling flexibility.
	o **Incorporate marginalised groups** in the resources and learning activities by: a) prompting co-design, participatory strategies and horizontal dynamics, and b) generating learning resources where they are integrated.
	o Design the learning scenario to be **equal for all genders**. For instance, use forms of address and pronouns that are consistent with gender identity. Questioning the design of your course in terms of androcentrism, ethnocentrism, or heterocentrism could help to identify areas to be improved.

	• **Help students self-regulate**

ACTION 3. **Give guidelines for self-regulation and diversify feedback**	Provide opportunities to monitor their earning by using cognitive, metacognitive, motivational, behavioural and emotional strategies. Self-regulated learners are able to move from the forethought phase (task analysis) to the self-reflection phase (evaluation of performance) through the performance phase (active monitoring of the progress).	o Offer them **opportunities to reflect** on their goals, interests, or planning during the forethought phase (e.g., ask how much time they will need to accomplish this task or facilitate a rubric) o Give instructions to **self-record** their **performance** during the performance phase (e.g., ask which difficulties they encountered during the performance of an activity, propose to create a portfolio or give examples of excellent projects) o Provide instruments for **self-evaluation** in the self-reflection phase (e.g., peer or co-evaluation instruments or completing a quiz).feedback and reflect. We recommend flipping at least to four sessions or a couple of weeks.
	• **Consider regulation profiles**	
	In the FC, self-regulation plays an important role, especially during preparation time (consult the "Prior preparation" pattern to learn more). Different regulation profiles can be summarised as follows: students with self-regulation skills, students that need external regulation (i.e., teacher, colleague, resource) and students without regulation skills.	o For those students with self-regulation skills, the FC will be more profitable. However, to get the most out of their learning experience, it is crucial to provide them with minimum **indications** of what is expected from them in the course, unit or activity. For instance, inform them about time dedication or assessment criteria. o Students with external regulation skills will need support to follow the FC experience. They can get lost if there are no specific process or content **guidelines**. For instance, you can create video lessons enriched with questions for reflection, give instructions to

ACTION 3. **Give guidelines for self-regulation and diversify feedback**		guide the consultation of a resource, or propose creating concept maps of the resources consulted. o The most challenging part is supporting students without regulatory skills. They will probably need more **external regulation** than other students, activities to be conscious of their need for regulating learning, and personalised guidance to achieve their learning goals. Help them by proposing tasks to plan their work and goals or offering complementary instructional resources.
	• **Design and plan feedback**	
	In the FC, there is an increase in the personalisation of learning and more evidence of the work done at home. Invest more effort in designing and planning opportunities for formative and continuous feedback to help students progress by informing them about their strengths and weaknesses. The feedback can be given by the teacher, peers (consult the "Feedback exchange pattern" to learn more), the student itself, or a computer system. Furthermore, this feedback can be delivered in various ways.	o **Immediately/delayed** (e.g., questionnaires with automatic response/qualitative feedback). o **Single/multiple tries** (e.g., an assignment/a project that can be delivered several times, and the feedback incorporated to improve the learning product). o **Adaptive or nonadaptive form** (e.g., feedback that is personalised to students according to their response to a task/general feedback given to the whole group) o **Unimodal or multimodal form** (e.g., written form/combination of modes).

ACTION 4. **Promote active, social, and collaborative learning**

- **Organise onsite and out-of-class moments**

The FC transforms onsite and out-of-class moments. Facilitate students actively participating in the course by proposing resources and activities outside the classroom. Therefore, it is important not to offer just resources to consult but tasks or activities linked to these resources to acquire knowledge, reflect, and develop competences. You can follow Bloom's Taxonomy to organise the moments where thinking skills are implemented (although all skills could be developed at any moment if desired). In this manner, the student continuously participates in his/her learning in and outside the class. Examples of active learning approaches usually integrated into FC models are gamification, problem-based, and project-based learning.

- **Low-order thinking skills** (remembering, understanding) are developed through activities before the class.
- **Middle-order skills** (applying, analysing) are done in class.
- **High-order thinking skills** are demonstrated after class (evaluating, creating).

- **Encourage collaborative learning**

Transfer the consultation of contents to the autonomous time release in-class time for interaction-based activities. It is crucial to **profit** from the **synchronous time** to exchange ideas, negotiate with others, and build knowledge together. In social learning, students learn by observing others. In collaborative learning, students share a common goal and negotiate and build knowledge together. Some tips to encourage collaborative learning under a flexible approach are:

ACTION 4. **Promote active, social, and collaborative learning**	o **Group formation**: give the opportunity to students to form their groups to ensure more motivation and sense of ownership. o **Goal setting:** transmit the need to focus on the process of working together to achieve a common goal or complete a task. It is crucial to give indications, assess and monitor group progress rather than focusing on the product. The design of the learning tasks should facilitate diverse processes and accommodating various orientations to meet each group's goal. To that aim, it is recommended to provide complex (I.e., require diverse minds to be solved, real world situations, imply higher-order skills) and open-ended tasks (i.e., allow diverse solutions to a situation or problem). o **Individual accountability**: each individual is responsible for their own learning and contributions to the group. To this aim, it is important to offer possibilities for initial and continuous self-reflection (e.g., self-questioning, self-assessment test, learning journals, one-minute papers). Furthermore, it is recommended to establish roles and responsibilities within groups. This can lead to effective communication and increase the focus on tasks. o **Ideas exchange:** at the beginning of the collaborative learning activity, set clear expectations for how students should communicate and share ideas (e.g., listen actively, ask questions, and provide constructive feedback to their peers). Facilitate group work by providing prompts or questions for students to discuss, monitoring group progress, and providing feedback or guidance as needed (including elements for improvement and good performances). Using digital whiteboards or brainstorming tools can help to structure and visualise initial approaches to a topic. o **Negotiation**: a collaborative task needs to be established in an atmosphere of respect for others and consideration of others' views. Groups must make joint decisions about the process and goals, share meanings, and clarify

ACTION 4. **Promote active, social, and collaborative learning**	misunderstandings. Provide them spaces (e.g., tutoring sessions or block some slots in class), scaffolding (e.g., models, examples, sentence starters, clear instructions) and feedback to orientate the negotiation process. o **Knowledge building**: encourage students to build on each other's ideas and to work together to develop new insights and solutions. To encourage knowledge-building and discussion, motivates students to ask questions or reflect on the topic. Some examples of transitioning from individual reflection to group discussion include: "What do you think about this idea?", "What evidence do you have to support your evidence?", "How does this relate to what we have learned before?", "How does your idea connect with what your teammate just said?", "Can you build on your classmate's idea?", "Can you provide an example to illustrate your classmate's point?, "Can you summarize what your classmate just said in your own words? Furthermore, asking students to summarise and contrast their ideas (e.g., visual representations) or to write agreements or common viewpoints (e.g., doing minutes of their meetings) can also prompt deeper understanding and knowledge building. o **Planning and monitoring**: in long-lasting collaborative processes (e.g., project-based learning) it is fundamental that teams develop a plan distributing tasks and responsibilities (e.g., reporter, resource manager, recorder, timekeeper) to achieve common goals (consult the "Team regulation and management pattern" to learn more). Digital tools for managing teams, such as Trello, can be useful. To ensure effective collaborative processes and learning outcomes, it is essential that the teacher sets up multiple checkpoints and monitoring moments to assess the progress of the groups.

ACTION 4. **Promote active, social and collaborative learning**	• **Organise Interaction** o Propose **group techniques** where students interact with others (e.g., brainstorming, mind mapping, group discussion, round table, role-play) or incorporate collaborative instructional methods (e.g., project-based learning, case-based learning, problem-based learning, simulation). These techniques and methods can be implemented in physical or virtual spaces. o Grouping students and reducing the interaction into **smaller groups** facilitates student learning and teacher monitoring in big group sessions.

ACTION 5. **Propose the use of digital tools to extend learning**	• **Levels of adoption of technologies** The adoption of the technologies can be divided into three levels: low, medium and high. However, other models are available for integrating technology into education, such as SAMR, TPACK or the RAT models. There are different levels of adoption of technologies:	o At a **low level**, technologies can be used to support teaching and learning by providing a space to upload content and deliver activities (in a LMS) or as a tool to perform a task (e.g., a tool to answer quizzes such as Mentimeter, Socrative, Polleverywhere, or SurveyMonkey). To enhance this level, it is advisable to engage in activities that are timely and have plain instructions. Such activities encourage participation both inside and outside the classroom. These activities are particularly helpful in activating students' previous knowledge. It is recommended to propose them at the beginning of a module or session. o At a **medium level**, digital technologies can be used as context for learning (e.g., using a videoconferencing tool such as Teams to prompt a debate). It also includes tools to simplify the process of learning or teaching (e.g., shared document or space for monitoring students' contributions or Artificial Intelligence to search for information) or to promote active learning (e.g., tools for developing interactive presentations such as H5P, Edpuzzle, or Nearpod). Some tools can make learning more meaningful like professional software (e.g., Autodesk, Wolfram Alpha), simulators (e.g., flight simulators, architecture simulators), and virtual and augmented reality (e.g., to explore ancient civilizations or to practice medical processes). Guidelines for interacting with tools in case they are complex or unknown, are necessary. In some cases, prior preparation is needed.

ACTION 5. **Propose the use of digital tools to extend learning**		o At a **high level**, digital technologies expand learning by giving opportunities to learn whenever and wherever needed (e.g., by using mobile technologies to learn in the street or at a museum, for instance). Furthermore, at this level, technologies are used to learn differently, break barriers and connect with people or spaces outside the course (e.g., using Twitter to discuss a topic or find topical information). This level is ideal for longer projects that involve group work, are situated and require diverse minds to complete. It is fundamental that digital resources are accessible and mobile-friendly, as well as to providing multimedia resources to support diverse learning styles. Technical support and training should be provided to help students and instructors effectively use mobile devices and digital resources. o The different levels of technology adoption can be combined in a learning context. Implementing strategies that simultaneously address these levels could potentially increase overall engagement and participation.

Challenges	Solutions
One of the evidenced impacts of the FC is the engagement of students and the increase in motivation (Prieto et al., 2021). However, such **motivation** may decrease as the flipped process progresses.	Teachers must find ways to continuously motivate students to engage with the FC and help them understand the usefulness of the suggested learning process. One way to support students is by acknowledging and **celebrating their academic achievements** at each stage. Additionally, providing opportunities for students to **solve practical problems** can help them see the relevance of what they are learning for their future profession.
Not all students have equal access to technologies or equal digital competences. You must support all students, whether they are highly skilled or not, in using **digital technologies** to help them get the most out of their learning experience.	Offer **multi-modal formats and diverse technological tools** to ensure every student finds the one that corresponds with his/her learning style and capacity. Follow universal design principles to ensure inclusiveness in using digital technologies.
Sometimes the adaptations made to resources for **SEND students** are not helpful. In the FC, access to and understanding of resources is crucial. Sometimes the lack of adequate learning resources for students with SEND, results in the inability of these learners to carry out the same learning activities as students without SEND. Multimedia presentations, presenting information simultaneously through too many media and elements, can overload learners' sensory systems. Furthermore, frequently there is unavailable content for students with SEND on many of the educational sites.	Therefore, teachers must define moments to ensure the adaptations to resources meet SEND students' needs. This is where pre-lectures briefing is essential, as it allows the teachers to **diagnose** their **learners' needs**. This will also inform the choices of instructional resources to deploy and the format of pre-class engagement to present to the students. The beauty of FC for SEND students is that it offers lessons' flexibility and pacing that other methods might not give. Pre-class diagnostic assessment and diverse instructional resources will be game-changers.

Pattern "Key decisions for an effective flipped classroom"

Challenges	Solutions
SEND students may encounter incompatibilities among the learning management system, electronic resources and assistive technologies.	It is crucial to provide them with the necessary **adaptations** to resources and course **instructions** to ensure equal access to education.
The FC is time-consuming for both teachers and students. Generating ad-hoc resources, monitoring students and increasing **feedback** can generate work overload.	This is where collaboration and team forming are necessary. Teachers can resort to **group leadership, peer review and assessment** in managing the primary feedback stage to reduce the workload at the initial stage. Furthermore, **procedures and digital tools** can be agreed on by both the teacher and the students to adjust them to students' capacities and needs.
Some students with SEND can have extreme **difficulty learning online**, which can isolate them and, in some cases, even make it difficult for them to complete their education.	Providing **accessible materials, assistive technology, accommodations and frequent communication** can mitigate isolation situations.
In the case of hybrid sessions, **cognitive load** in students and teachers might appear.	Providing **pre-session materials, simplifying the use of digital tools, providing feedback, eliminating distractions or repeating key concepts** might be of help to reduce cognitive load.
Changing modalities (online and face-to-face) can provoke feelings of **anxiety** in some students with SEND.	Therefore, providing **advance notices** of any changes in the modality of instruction, offering orientation sessions and providing clear instructions might help.
Not all students are **motivated** to do out of the class activities and consult resources.	This challenge can be solved by employing the **division of learning and task distribution techniques.** Each student can be assigned a component of content and asked to explore it before the classroom, in anticipation of presenting or solving a problem in the larger group.

Pattern "Key decisions for an effective flipped classroom"

Challenges	**Solutions**
In highly self-regulation processes like the FC, it is usual to reinforce those students with fewer **self-regulation skills** and give less support to those more skilled.	Teachers must **attend** to all students **equally** to give them opportunities to progress in their learning whatever their level of self-regulation is.
Students might mislead the request for peer **feedback** with evaluation. It must be made clear that giving and receiving feedback is part of the learning process and is different from evaluating (which is a teacher's responsibility). The more students practice feedback exchange, the more abilities students will develop in feedback processes.	Therefore, teachers must design the FC to ensure **recurrent** moments for **feedback** exchange. 360-degree feedback could be a guide for maximising learning improvement.
Flipping teaching and learning needs to be learned. The role of the teacher and the students change, as well as the responsibilities.	Proficiency in teaching and learning in a flipped context is gained through **time and repetition**. The FC works better at higher educational levels and with students and teachers that have previously experienced it (Aydin & Demirer, 2016).
Not everything can and must be **flipped.**	FC works better with **small groups** of students (about 25) and in **practical contexts**. FC is one of the most appropriate methods for achieving these 1st skills. Adopt it to develop critical thinking, collaborative learning, global awareness, communication or digital literacy.
Electronic resources are key in FC.	All **formats** of resources (e.g., written, video, audio, audiovisual, visual) must be generated with **quality**.
Students with low **self-regulation skills** can be disadvantaged in front of students with high self-regulation skills in a FC context.	To that end, generating a t**eam culture of mutual help and role distribution** can benefit all students. Furthermore, providing guidance and support, and encouraging self-reflection and feedback might reduce inequalities.

Challenges	Solutions
University students are not used to being active and planning their **autonomous time**. They may react negatively to the demand for preparation and self-regulation.	The collaboration and engagement part of FC is something every student looks out for during learning periods. **Playful methods** can also be adopted to spark learners' interest while positive reinforcement should be adopted. The **needs and individuality** of learners should also be considered in preparing a FC, so that every student is included.
Using **digital technologies** may negatively impact students with special needs or low digital competences.	Some tips to dealing with that challenge are to provide **training and support** to students with low digital competences, ensure that all digital **resources** used are **accessible** to students with special need, **personalise learning** by offering alternative assignments and assessments, and foster a **supportive environment** that encourages students to seek help and collaborate with peers.

Examples and/or related patterns

- **Related patterns**
  - Self-regulation and prior preparation in online flipped classrooms.
  - Team regulation and management in blended flipped classrooms.
  - Exchange of constructive feedback in face-to-face flipped classroom.

- **Related references**

  - Prieto, A., Barbarroja, J., Álvarez, S., & Corell, A. (2018). Effectiveness of the flipped classroom model in university education: A synthesis of the best evidence. *Revista de Educación, 391*, 143-170. https://doi.org/10.4438/1988-592X-RE-2021-391-476
  - Noguera, I., Albó, L., & Berdsley, M. (2022). University students' preference for flexible teaching models that foster constructivist learning practices. *Australasian Journal of Educational Technology, 38*(4). https://doi.org/10.14742/ajet.7968

- **Cited references**

- Albó, L., Beardsley, M., Martínez-Moreno, J., Santos, P., & Hernández-Leo, D. (2020). Emergency Remote Teaching: Capturing Teacher Experiences in Spain with SELFIE. In C. Alario-Hoyos, M. J. Rodríguez-Triana, M. Scheffel, I. Arnedillo-Sánchez, & S. M. Dennerlein (Eds.). *Addressing Global Challenges and Quality Education* (pp. 318-331). Springer Nature Switzerland. https://doi.org/10.1007/978-3-030-57717-9_23.
- Aydın, B., & Demirer, V. (2016). Flipping the Drawbacks of Flipped Classroom: Effective Tools and Recommendations. *Journal of Educational and Instructional Studies in the World, 6* (1), 33-40. https://arastirmax.com/tr/system/files/dergiler/116392/makaleler/6/1/arastirmaxflipping-drawbacks-flipped-classroom-effective-tools-and-reccomendations.pdf
- Baig, M. (2019). To study the barriers in implementing flipped classroom: A review of selected literature. *Journal of Emerging Technologies and Innovative Research, 6*(5), 498-507.
- Jones, E. P., Wahlquist, A. E., Hortman, M., & Wisniewski, C. S. (2021). Motivating Students to Engage in Preparation for Flipped Classrooms by Using Embedded Quizzes in Pre-class Videos. *Innovations in Pharmacy, 12*(1). https://doi.org/10.24926/iip.v12i1.3353.
- Lai, C. L., & Hwang, G. J. (2016). A self-regulated flipped classroom approach to improving students' learning performance in a mathematics course. *Computers and Education, 100,* 126–140. https://doi-org.are.uab.cat/10.1016/j.compedu.2016.05.006
- Noguera, I., Robalino, P. E., & Ahmedi, S. (2023). The Flexibility of the Flipped Classroom for the Design of Mediated and Self-regulated Learning Scenarios. *RIED-Revista Iberoamericana de Educación a Distancia, 26*(2). https://doi.org/10.5944/ried.26.2.36035
- Noguera, I., & Valdivia, P. (2023). Teachers' and students' perspectives on the intensive use of technology for teaching and learning [Perspectivas de profesorado y alumnado sobre el uso intensivo de la tecnología para la enseñanza y el aprendizaje]. *Educar, 59*(1), 213-229. https://doi.org/10.5565/rev/educar.1551.
- Prtieto, A., Barbarroja, J., álvarez, S., & Corell, A. (2021). Effectiveness of the flipped classroom model in university education: a synthesis of the best evidence [Eficacia del modelo de aula invertida (flipped classroom) en la enseñanza universitaria: una síntesis de las mejores evidencias]. *Revista de Educación, 391*, 143-170. http://doi.org/10.4438/1988-592X-RE-2021-391-476
- Sein-Echaluce, M.L., Fidalgo-Blanco, Á., Balbín, A.M. et al. Flipped Learning 4.0. (2022). An extended flipped classroom model with Education 4.0 and organisational learning processes. *Univ Access Inf Soc*. https://doi.org/10.1007/s10209-022-00945-0

- Silverajah, V. S. G., Wong, S. L., Govindaraj, A., Khambari, M. N. M., Rahmat, R. W. B. O. K., & Deni, A. R. M. (2022). A systematic review of self-regulated learning in flipped classrooms: key findings, measurement methods, and potential directions. *IEEE Access, 10,* 20270-20294. https://doi.org/10.1109/ACCESS.2022.3143857
- Sosa Díaz, M. J., Guerra Antequera, J., & Cerezo Pizarro, M. (2021). Flipped Classroom in the Context of Higher Education: Learning, Satisfaction and Interaction. *Education Sciences, 11*(8), 416. MDPI AG. http://dx.doi.org/10.3390/educsci11080416
- Sun, Z., Xie, K., & Anderman, L.H. (2018). The role of self-regulated learning in students' success in flipped undergraduate math courses. *The Internet and Higher Education, 36*, 41-53. https://doi.org/10.1016/j.iheduc.2017.09.003
- Weiss, L.-F., & Friege, G. (2021). The flipped classroom: Media hype or empirically based effectiveness? *Problems of education in the 21st century, 79*(2), 312-332. https://doi.org/10.33225/pec/21.79.312