IL METODO DI INSEGNAMENTO FLIPPED CLASSROOM

FLI
CREATE

Erasmus+ Programme School sector – Development of Innovation
2019-1-IT02-KA201-063149

Contenuto

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Description of the module

Experiments are being run all over the world about how best to introduce **new, innovative teaching, learning methods** that meet the requirements of the 21st century. One of these methods is the **'Flipped Classroom'** coming out of the US, though increasingly known in Europe too.

The 'Flipped Classroom' (sometimes referred to as 'Flipped Learning') is a shift away from the traditional pedagogical approach to one where direct instruction (e.g. classroom lectures) moves from the group learning space to the individual learning space. This change allows the group space to be transformed into a dynamic, interactive learning environment with the teacher now guiding students in the application of the concepts learned in their own space and time. This allows the group space and time to be used more creatively. Basically, students are introduced to the learning material before a class (e.g. through hand-outs, presentations, videos as homework), with classroom time then being used to deepen understanding through discussion with peers and problem-solving activities facilitated by teachers.

The method is not strictly new: it was being used as early as the beginning of the 19th century, but its worldwide spread is connected to the development of new educational technology over the last ten years or so. Though most likely to be supported by technology (e.g. video), a flipped classroom model does not have an absolute reliance on technology.

Experiences have been favourable, showing **increasing student successes** with the use of flipped classroom methods. There are a number of possible reasons, for example this may be because it signifies a significant **shift** from a traditional teacher-centred teaching model **towards learner-centred**, tailor-made teaching and **active learning.** Though generally coupled to intensive use of new technology, the **focus is** not on the technology but rather **on the pedagogy**.

This video offers a useful summary and introduction to the Flipped Learning model: (https://youtu.be/OOSQFjzsnGY)

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This section gives an introduction to the theoretical background of the flipped classroom (FC) method. It helps you to identify its pedagogical concept and to evaluate its value against the traditional, frontal teaching methods.

Learning outcomes:

After completing this section / module, you will be able:

- to analyse the possibility of applying flipped classroom method in your own teaching context;
- to select the field, topic of the subject relevant for teaching with FC and aligning with the needs and learning attitudes of your students, and
- to describe the technical and pedagogical learning environment of an FC lesson and develop a draft idea of your 1st flipped classroom lesson.

The **topics** dealt within this module cover the:

- brief history of the Flipped Classroom model
- main features of the method
- theoretical background, and other applicable methods within the framework of the FC
- benefits and possible challenges associated with FC
- special relevance of FC to vocational education
- related case studies.

Learning objectives

Key knowledge

- Describe the pedagogical and methodological fundaments of the FC method.
- Summarize conclusions based on the history of the FC.
- Recognise the results and experiences from other European countries
- Identify other methods (e.g. group work, project methods) usable with FC.

Core competencies

The teachers will be able to:

- fit their pedagogical methods to the needs of the age group, learning style of the students.
- build on learners' strengths, potentials and preferences (by taking into account their backgrounds, cultures, interests, goals, skills and prior knowledge) as crucial re- sources and drivers for motivation for creative learning.
- transfer the pedagogical theories into the daily classroom work.
- teach for creativity and teaching creatively.

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- redesign his/her lesson management strategy.
- cooperate with other teachers to share knowledge for testing new methods, for developing.
- recognize and meet the needs of changing groups containing learners of various abilities.

Attitudes

Teachers who can successfully apply the FC method are:

- Open to technical novelties and informs about the latest ICT tools and methods.
- Open to new teaching methods relevant to develop 21st century skills of the students.

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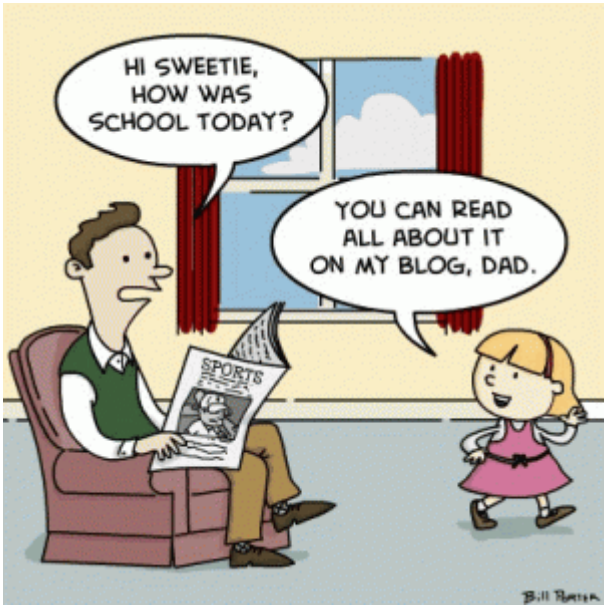
Module content - The Flipped Classroom method

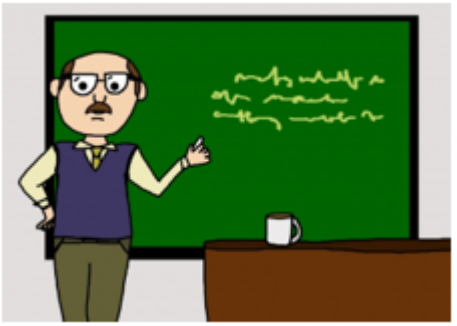
1. Introduction - How it all began…



Students today are different from students of our times (assuming you are over 50!). The experiences of this **net generation** require changes to be made to our teaching methods.

Read more about the net generation…

Quite naturally, it often happens that some **students do not understand** topics explained by the teacher during a lesson.



And what if a **student is ill** and stays at home for days?

How can the teacher help her/him to catch up?

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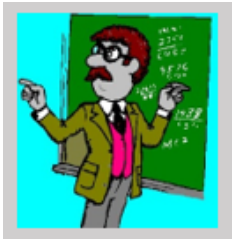
Geographic distance can also cause problems in the teaching / learning process.

All teachers have faced these issues over time, and have been looking for possible solutions and improvements within their teaching practice. Some innovative teachers started trying out, and implementing, novel ways of adapting their teaching - and as an „unexpected" result the **Flipped Classroom method** was formulated, and spread. Read the following tale of the origins of the FC.

The Tale of the FLIP

Once upon a time *there were literature teachers all over the world who gave out texts to their students to read before the classroom lesson. This was a bit different from the traditional teaching methods, though nobody attached a great importance to it. Years went by until….*



…one day a professor at a big university discovered that his students were only memorizing information, instead of actually understanding the topics. So, he started looking for ways to improve his teaching practice. He asked his students to read the material before class, and then he dedicated the classroom lesson to interaction, debate and meaningful thinking. Instead of always „telling", he started „questioning". This way he completely turned the traditional lecturing method upside down. But he was not alone….

In another part of the world there were three university teachers who „inverted the classroom" – they took the activities that had previously happened within the classroom, outside of the classroom. And similarly, activities previously undertaken outside of the classroom now happened within the classroom. The lecture was delivered at home, and homework was done in the classroom. What a flip!

However, there was no real change to teaching methods in general – many students still struggled with their studies, and could only proceed with help of private tutors. At this time, S.K. happened to be tutoring one of his relatives, who then moved to a distant place but was reluctant to give up the helpful private lessons. To overcome this problem caused by the geographic distance, S. K. recorded his teaching materials so, with the help of technology, he managed to continue this tutoring at a distance. Soon he started giving out his recorded lectures to other students, and asked them to watch. When they actually met personally, the time was now dedicated to an interactive discussion of the topic. S.K. eventually established a successful Academy based on this model - which is still very popular to this day.

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The real 'flip' happened in the US after 2000. Two chemistry teachers were continually discussing the challenges they faced day after day in their school. One of their recurring problem was that students were often absent due to their participation at sports events.

-It is not good if they always miss the classes. What can we do? I do not want to deliver the same lesson again and again individually to those who were missing…

- Look, I have found some software that is good for recording presentations and for attaching notes to them. Why don't we record our lessons?

Believe it or not, the students who missed out on the lectures actually mastered the materials more effectively than the ones who were sat in the classroom, listening to the „live lecture".

- Amazing! Why don't we try it with more classes?

So step-by-step they stopped all live lectures, as they agreed that students only need them if they got stuck. They gave out the recordings for pre-class homework, and turned the classroom lessons into interactive learning environments where time was dedicated to help explore deeper a understanding of the topics. Soon the videos they published were discovered and used by other teachers and schools, so their approach - now named the Flipped Classroom - started to spread internationally.

Of course, it presented teachers with an extra workload at the beginning of this change, but their dedication and motivation helped them overcome these initial difficulties.

The Flipped Classroom made teachers and students happy all around the world.

If you don't believe this story, discover it for yourself! ☺

As it is often the case with innovation (and tales ☺), it is difficult to be precise about its origins. Most probably such changes in teaching methods – which leading to the examples such as the flipped classroom approach - appear in parallel in different parts of the world.

It is important to note, however, that the FC method in itself might not have developed so extensively without the support of **technology**. The FC approach is generally though of as a **new pedagogic approach** paired up with technology.

2. A little bit of „official" history…

Flipped Classroom approach initially appeared **early in the 19th century**. The United States Military Academy at West Point created a set of teaching methods in which students utilized **sources provided** by their teachers to learn **before class**, while **classroom time was used** for group cooperation **to** jointly **solve problems**. This teaching method perfectly reflects the basic concept that underlie the Flipped Classroom.

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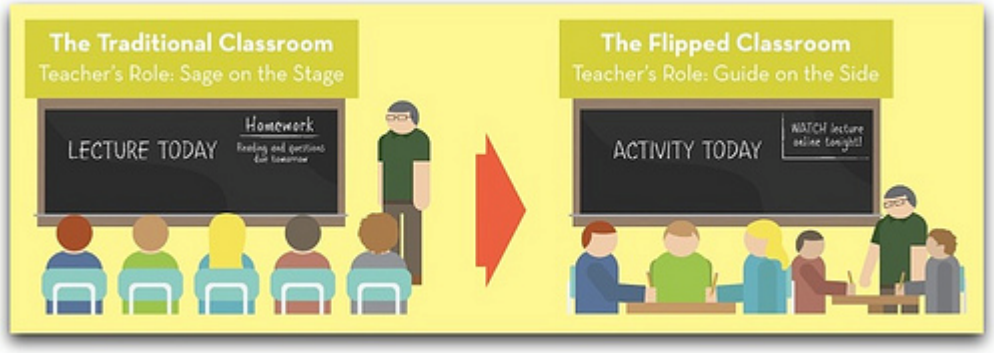
In 2000, Glenn Platt and Maureen Lage introduced a 'new' teaching method while teaching at the University of Miami. In their lessons multimedia and the World-Wide-Web were fully utilized to encourage **students to watch teaching videos at home,** followed by cooperative group work in the classroom. This teaching method was basically a rudimentary version of the Flipped Classroom, but that specific term had not been coined for such a teaching format at that time. In 2001, Massachusetts Institute of Technology developed 'open courseware projects' focused on open educational resources (OER) which laid the foundations for the application of a Flipped Classroom model. In **2004, Salman Khan** made **videos** of coaching materials and **uploaded** them to a website - which soon became hugely popular among learners. Later, he founded the Khan Research Institution and uploaded even more learning materials to the network, driving rapid development of the Flipped Classroom.



The first real practical application of the flipped classroom is said to have begun with two American science teachers, Jonathan Bergmann and Aaron Sams. However, the concept of the flipped classroom was influenced by various strategies over the previous twenty years, including King's concept of the '*sage on the stage*', and Eric Mazur's peer instruction strategy which switched the **transfer of information to outside of the classroom** to allow the lecturer to coach students through the assimilation of information within the classroom.

Research by Lage et al. (2000) sought to meet the needs of students with different learning styles by 'inverting the classroom' and offering lecture material to economics students via digital means. A few years later, Salman Khan, founder of the popular Khan Academy, saw the value in providing videos of lectures and exercises to allow students to learn on demand and at their own pace. Indeed, it was around the time that Khan launched the Khan Academy online platform that Bergmann and Sams began practicing the flipped classroom technique with their own classes by offering their lectures on YouTube to students to study before meeting in class.

3. Flipped Classroom – key features

According to the definition of *Flipped Learning Network*:

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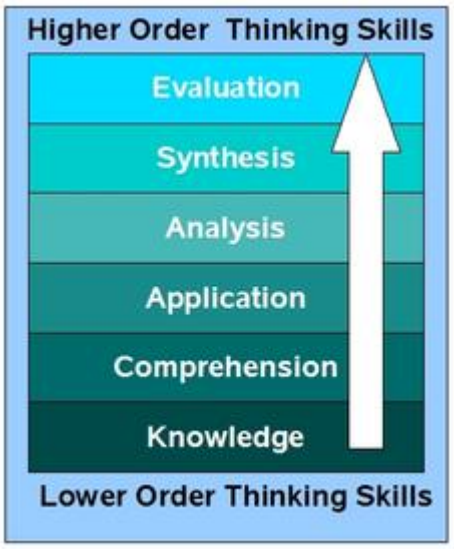
„Flipped Learning is a pedagogical approach in which direct instruction moves from the group learning space to the individual learning space, and the resulting group space is transformed into a dynamic, interactive learning environment where the educator guides students as they apply concepts and engage creatively in the subject matter." (formal definition by the Flipped Learning Network)

Although definitions vary slightly, largely depending on the exact nature of the activities undertaken by students, the flipped classroom is ultimately a more **student-centred approach** to learning whereby **students receive lecture materials before class** - generally in some digital format - and spend the actual class time undertaking more active, collaborative activities. This approach allows students to learn about the topics outside of class, at their **own pace**, and come to class informed and more prepared to engage in discussions on the topic and apply their knowledge through **active learning** (Musallam, 2011; Hamdan & McKnight, 2013). This active learning within the classroom seeks to focus on higher level skills, such as creating, analysing, evaluating.



Bloom's taxonomy (Bloom et al., 1956) serves as the backbone to move the teaching process towards **developing skills rather than delivering content**. The emphasis on higher-order thinking is based on the topmost levels of the taxonomy, including analysis, evaluation, synthesis and creation. Bloom's taxonomy can therefore be used as a teaching tool to help balance assessment, and to evaluative questions in class, in assignments and in texts to ensure all orders of thinking are exercised in the students' learning. This should also include aspects of information searching.

Moving from a teacher-led, traditional lecture structure to a student-centred, more active pedagogical approach can help students to analyse and reflect on learning and facilitates the development of **higher order skills** (Mazur 2009; Westermann 2014; Hutchings & Quinney, 2015). Strayer (2012) suggests the **regular and structured use of technology** in this more student-centred approach is what differentiates a flipped classroom from a regular classroom where additional, supplementary resources are used.

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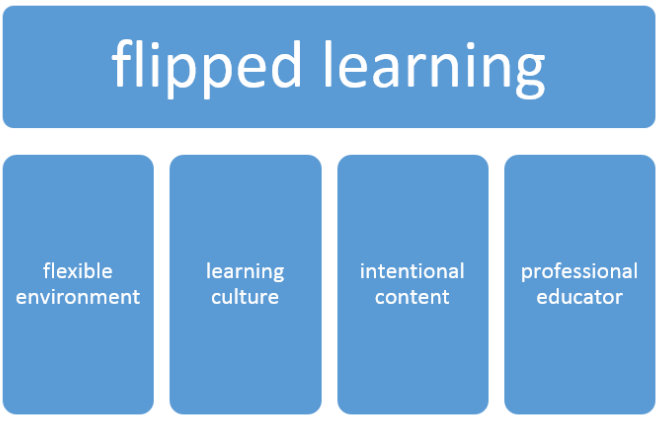
In *A Review of Flipped Learning* (Hamdan & McKnight, 2013) the authors acknowledge that flipped classrooms can differ in methods and strategies, largely due to the fact that "*learning focuses on meeting individual student learning needs as opposed to a set methodology with a clear set of rules*". As such, the authors suggest the following are the key features that foster learning:

- Flipped Learning requires **flexible environments**. As in-class activities in a flipped classroom can vary from collaborative group work to independent study to research, educators often rearrange the physical space in a classroom to accommodate these variants.
- Flipped Learning requires a shift in learning culture. Flipped classrooms shift the focus from teacher-led to **student-centred** learning in order for learners to experience topics in greater depth through active, more meaningful approaches to learning.
- Flipped Learning requires **intentional content**. Educators evaluate which materials should be presented to students in advance and which content should be taught directly to help students "*gain conceptual understanding as well as procedural fluency*" through constructivist approaches.
- Flipped Learning requires dedicated, **professional educators**. The use of the flipped classroom approach, particularly with the presentation of materials through digital media and technologies, is not intended as a replacement for educators. Class time is crucial for the educator to determine if students have, inter alia, gained understanding of a topic.

A Flipped Classroom is when you give out materials before class. However Flipped Learning only happens if the above mentioned **pillars** are also in place.



There ***is no single way*** of applying the FC method as such.

There are as many ways of applying it there are teachers. Discover your own way!

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4. Theoretical background, other

Hannafin & Land (1997) explain that "***student-centred learning environments*** *emphasise concrete experiences that serve as catalysts for constructing individual meaning. This premise is central to the design of many contemporary learning systems*". Although Cook (2003) has found that some students "*make most progress in highly structured environments*", if this approach is considered in the context of a meta-theory such as Bloom's Taxonomy (Bloom et al., 1956), it has as one of its disadvantages the fact that the learner does not necessarily display understanding but rather the ability to recall and memorise, and certainly does not attain the pinnacle of learning - 'creating'.

This shift in focus to the provision of student centred learning, coupled with the pervasiveness of **technology**, has suggested a change in the role of the teacher from a 'knowledge provider' to a 'knowledge resource' due to "*self-access to information*", a key feature of technology (Trebbi, 2011). This shift in focus is nothing new, however, as a move from an instructional to a learner paradigm was suggested by Alison King over twenty years ago in her article on education reform, *From Sage on the Stage to Guide on the Side* (King, 1993).

So, are these the beginnings of how to move to a flipped class? It's not quite as clear cut as this, as we need:

- a strategy;
- the proper supports in place;
- to consider the learner, their abilities and learning preferences.

Student-centred teaching and learning is based on the **constructivist learning theory** which takes the position that learners are active in how they interpret information and build meaning and knowledge through prior experiences using observation, problem-solving and processing (Cooper, 1993; Wilson, 1997; Ertmer & Newby, 1993). Constructivism takes into consideration the influence of content and context in learning to be a truly individual process. It moved away from the more direct, teacher-centred **Behaviourist** theory which critics felt lacked a focus for fostering meaningful learning, and placed too little significance on the positive effects of group work.

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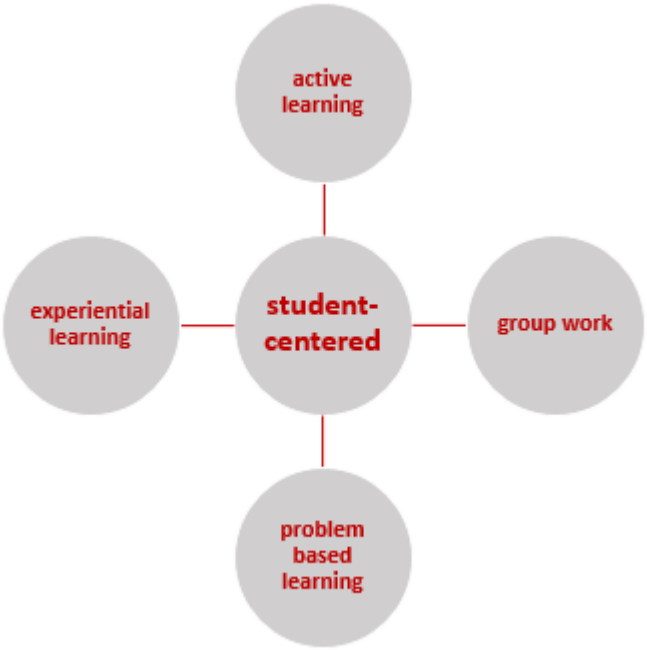

Jean Piaget, a key figure in the development of the constructivist theory, believed that teaching should **match the needs of the children**, and outlined the four stages of intellectual development:

1. Sensorimotor, Preoperational
2. concrete operational
3. formal operational

which he felt were necessary to construct meaning in one's environment from infancy to adulthood. While Piaget believed in the individualised, social and active learning process for children, the psychologist, Seymour Papert - who built on the constructivist theories of Piaget through his own theory of constructionism - saw the traditional educational system to be too structured to foster this active and inquisitive learning process (Papert, 1993). Papert believed that the **learner**, as an **active participant**, **can be aided by technology** in structuring their own learning experiences. Donald Tapscott (1998) acknowledged that the increasing availability of digital media and technologies has made Papert's beliefs more relevant than ever and that they represent the continuing shift to more interactive learning (fig. 1).

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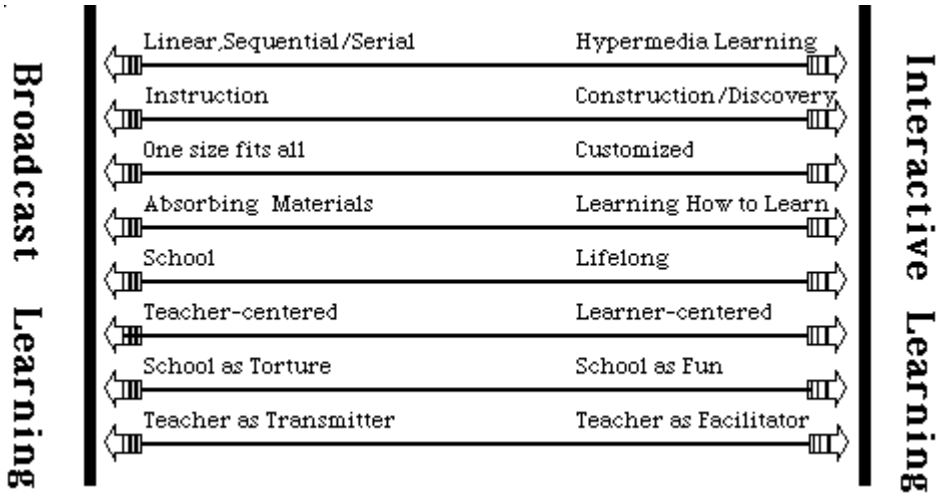

Figure 1 shows Tapscott's continuum in learning technologies from broadcast to interactive learning (Tapscott, 1998)

The theoretical foundations for the justification of flipped classrooms largely focus on research into student-centred learning as a result of the strategic shift towards **actively involving students in the learning process**. Much of this research cites inter-linked theories and approaches related to active learning, problem-based learning and peer-based strategies. A frequent caveat in these student-centred strategies is the importance of the educator in guiding the students in these self-directed and **collaborative activities**.

Studies into current workforce skill requirements give weight to the constructivist approaches of peer-based or cooperative learning with an increasing need to prepare students for a workforce that requires higher order thinking and collaborative skills to solve novel problems, often through digital collaboration environments (Bentley, 2016).

The following figure shows how the Flipped Classroom fits into constructivist learning theory, and how it is compatible with different approaches and techniques in

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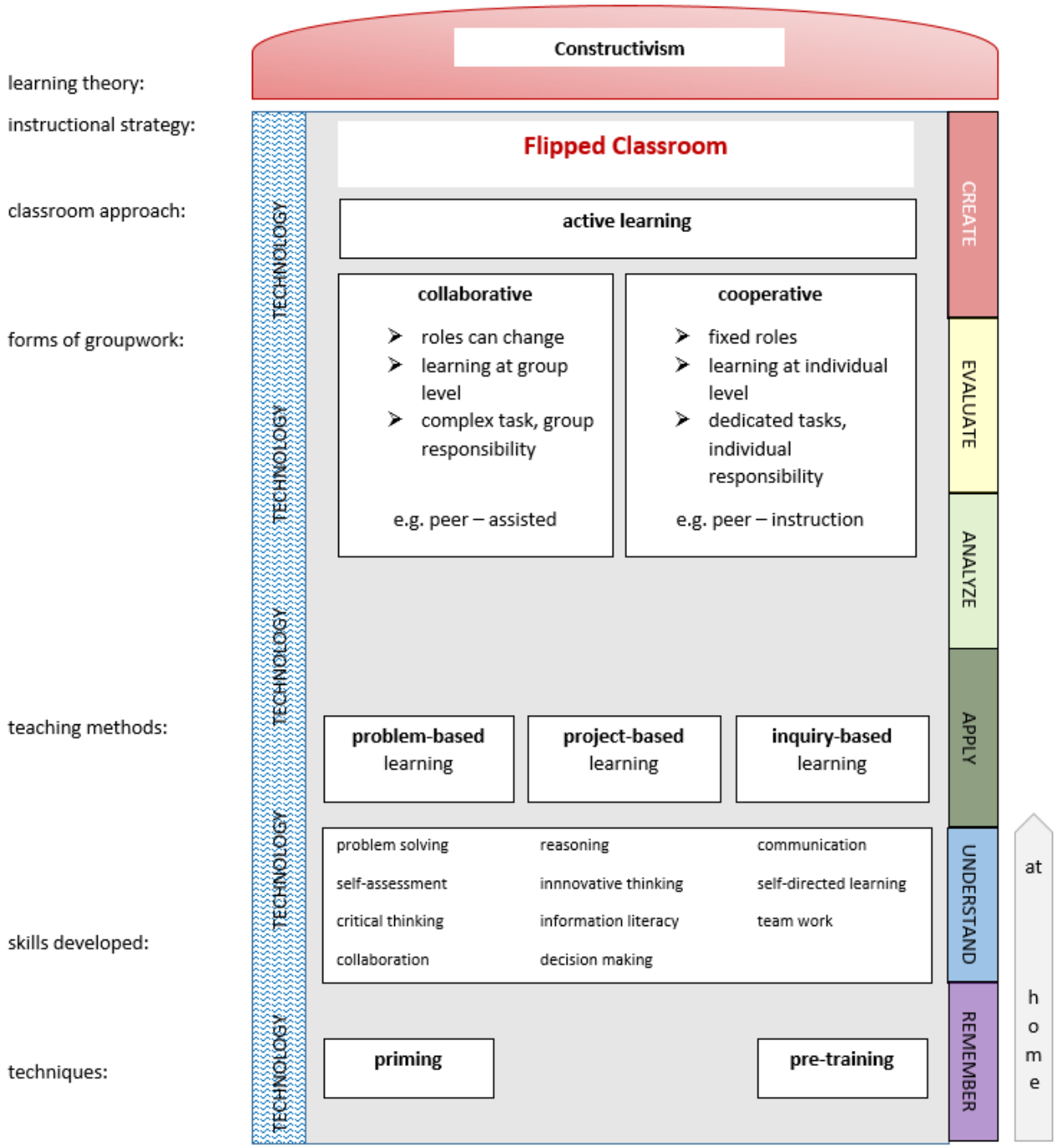

5. Benefits of flipping the classroom

The flipped classroom is a **student-centred** model aimed at increasing student engagement, understanding and retention by reversing the traditional classroom teaching approach. Cole (2009) argues that this model is a **more efficient use of class time,** by focusing on the **practical application of knowledge** during class. Educators with large classes can particularly benefit from the technique, as Schullery et al. (2011) suggest, whereby a move from a passive, lecture model for 300 business students was flipped to active learning with groups of 24 students to result in a more

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engaging experience. As a result, student efficiency was increased by providing them with the opportunity to **come to class more prepared**, having been primed for the learning with pre-class instructional material (Bodie et al., 2006).

Gannod et al. (2008) point to the increased **opportunities for active learning** during class time, and this approach in itself offers key benefits for students. As Prince (2004) and Bonwell & Eison (1991) note, "*active learning requires students to do **meaningful learning activities** and think about what they are doing*". The literature frequently discusses active learning with respect to collaborative learning, cooperative learning and problem-based learning, all of which promote meaningful learning and foster student engagement in the learning process allowing students to increase their **learning autonomy** (Overmyer, 2012).

The potential to increase **student engagement and motivation** is a significant driving force in the provision of flipped classrooms. Innovations and advances in technology have allowed educators to create resources to foster meaningful engagement (Schullery et al., 2011) and many platforms and services provide a means of collating useful **resources for re-use by educators and students**. This increased or adapted use of technology coupled with a more student-centred approach can help to facilitate learning for students with **varying learning preferences** or styles (Gallagher, 2009; Gannod, et al., 2008).

The flipped classroom model provides **more** opportunities to offer **one-to-one interaction** with students (Lage et al., 2000) to increase the **development of higher-order skills** through analysis, evaluation and creation (Bloom et al., 1956), critical thinking and problem solving. This interaction is often peer-to-peer, providing educators with more opportunities to ensure knowledge acquisition and understanding, particularly in large groups. By focusing on the quality of the interaction rather than the quantity **student performance can be improved** (Pierce & Fox, 2012).

The flipped classroom model has the potential of **benefitting diverse learners** due to the student-centred approach that is the focus of the model. By providing students with foundational information asynchronously, which they can access on demand and review as many times as they need, they have more opportunities to "*understand and improve their recall before they come to class*" (Hamdan & McKnight, 2013). Arnold-Garza (2014), referencing Overmyer (2012) suggests that students can benefit from reflecting on the material and specific concepts "*through questions and discussion with their teacher, by working with their peers to solve problems based on lecture content, by demonstrating or arguing their own solutions to classmates and the teacher, by checking their understandings through in class experimentation and lab work, and by peer tutoring or creation of learning objects*".

According to the *Flipped Learning Network*, the majority of teachers who have flipped their class noticed improvement in the grades as well as the attitudes of their students. Almost every teacher who tried this model wants to flip classes again. Let us summarize the key benefits that are behind this success:

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Before class:

students learn at own pace:

- ✓ watch video at any time of the day
- ✓ as many times as needed
- ✓ note down questions or key concepts
- ✓ no more frustration with homework
- ✓ if absent, can catch up fast

teachers create content:

- ✓ supported by technology
- ✓ good tool for motivating students
- ✓ can be re-used
- ✓ if absent, can still deliver the lesson

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In the classroom:

Active learning

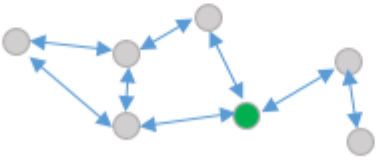
students

- ✓ apply new knowledge
- ✓ ask questions and get immediate answers
- ✓ better understanding

the teacher

- ✓ can really differentiate
- ✓ decides how much time to spend with each student
- ✓ better classroom management

✓ increased interaction (student-teacher, student-student)



win-win situation

- ✓ students have more control over their own learning process
- ✓ higher order skills are developed
- ✓ better results
- ✓ transparency for parents.

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Of course, besides pros there are always cons as well, so in the next section we are going to look at the possible challenges you might face when flipping your class.

6. Challenges you have to be aware of…

Despite the increasing popularity of the flipped classroom model, particularly at tertiary (Higher Education) level, a number of challenges have been identified.

One of these challenges, the notion that the educator may be relegated to a 'guide on the side', has been greeted with arguable criticism (Kirschner et al, 2006). While this criticism is not solely directed at the flipped classroom model (it began as a criticism of constructivist, student-centred learning) it has deterred some from adopting this approach in their own teaching and prompted proponents of student-centred models to highlight the importance of the educator in any of these approaches.

Organisational challenges have also been experienced from management and support staff who do not understand or have a desire for this cultural shift towards a more student-centred pedagogy. Some of this can be identified as a concern for student performance, particularly for student groups that comprise diverse learners. And students themselves may be slow to support a more active role in their learning, with a fear that it means adding to their workload.

Many point to **logistical issues** when they discuss the challenges of implementing the flipped model. These issues relate to classroom space, design and resources as obstacles to achieving a more active learning approach. In addition, technical issues in schools and in homes can be found to impede the provision of pre-training materials and resources in areas where there is inadequate connectivity or hardware. A related issue points to the possible need for educators to upskill in technology or the pedagogy and the time required to change a teaching strategy or the learning materials themselves.

Last but not least, while technology may be considered a deeply-embedded element within the flipped classroom approach, an important consideration is that **pedagogy should lead requirements**, rather than technology. To include technology in the flipped classroom without first **considering its pedagogical purpose** will not lead to effective teaching or learning.

Watch this video about *Overcoming Common Hurdles* for further practical recommendations from Jon Bergman, a pioneer of the FC movement:

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(https://youtu.be/bwvXFlLQClU)

7. Why FC is especially important for VET in the EU?

The potential of the flipped classroom approach to ensure quality of provision and quality of graduates in the European Vocational Education and Training (VET) sector is considerable.

At a general level, the adoption of the flipped classroom provides an opportunity for renewal of the educational approach being utilised in EU VET education, away from the traditional 'Sage on the Stage' identified by Alison King over twenty years ago. This is important on two levels, as it ensures against any stagnancy in the VET pedagogical approaches being implemented and provides a new and flexible means of delivery for "new types" of learners, such as **adult learners**, **independent learners**, etc. These elements are evident in the Bruges Communiqué on enhanced European Cooperation in Vocational Education and Training for the period 2011-2020 (2010) where it is noted that there is a strong requirement "*...to respond to the changing **requirements of the labour market**. Integrating changing labour market needs into VET provision in the long term…we must regularly review occupational and education/training standards which define what is to be expected from the holder of a certificate or diploma.*" The Bruges Communiqué also notes that "*adults – and in particular, older workers – will increasingly be called upon to update and broaden their skills and competences through continuing VET. This increased need for lifelong learning means we should have **more flexible modes of delivery**, tailored training offers and well-established systems of validation*". The utilisation of the flipped classroom provides a dynamic and alternative pedagogical approach and a highly flexible mode of delivery with established systems of validation.

With regard to empowering graduates, the Bruges Communiqué notes that: "*This means enabling people to acquire knowledge, skills and competences that are not purely occupational…VET has to give learners a chance to catch up, complement and build on key competences without neglecting occupational skills*." The flipped classroom approach can facilitate multiple aspects of this through

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the **movement away from** repetition, rote learning and **traditional 'chalk and talk' classrooms** to an engaged classroom experience which builds additional competences around communication, teamwork, critical thinking, design thinking, etc. through **in-class activities** such as experimentation, self-directed learning, peer-learning, discussion, etc. and **pedagogical approaches** such as problem-based learning, work-based learning, cooperative learning, etc. Additionally, using the flipped classroom approach, **ICT skills** are naturally enhanced through application and use of digital tools such as screencasts, podcasts, videos, OERs, etc. to access pre-classroom training.

This element of the flipped classroom approach in VET - the provision of an approach involving multiple pedagogical methods and activities - provides the opportunity to address another key aspect of VET outlined in the Bruges Communiqué, to "*Encourage practical activities and the provision of high-quality information and guidance which enable young pupils in compulsory education, and their parents, to become acquainted with different vocational trades and career possibilities*." Furthermore, the flipped classroom approach offers the opportunity to move away from singular theory-based summative assessment methods to more **practical activities and assessments** based around developing graduates with **real world skills** - and element of note in the Bruges Communiqué ("*VET curricula should be outcome-oriented and more responsive to labour market needs. Cooperation models with companies or professional branch organisations should address this issue and provide VET institutions with feedback…*").

As students learn by doing, particularly in Vocational Training for trades (e.g. in fields such as Construction or Hospitality, etc.) which demand the mastery of a wide range of practical skills, a flipped classroom approach allows an educator **more time in a face-to-face setting** to concentrate on elements such as the context of the learning and the application of the learning that is extremely important for the student. That is class time can be given over to how to apply the learning to a practical (e.g. work-orientated) scenario. Flipping the class familiarizes students with crucial content and 'how-to' knowledge before a class, so they have more time to immerse themselves in **real-life, hands-on learning during the class**. In this way, students get much more of practical tuition, as many of the **theoretical concepts** have already been reviewed behind the scenes by the student **outside of the classroom**.

*The flipped classroom also provides an opportunity for the implementation of work-oriented activities, which can provide students with the ability to develop workplace relevant skills and knowledge. The flipped classroom model naturally lends itself to methodologies based around work placement, work-based learning, 'learning by doing', etc., as well as many similar elements for cognitive apprenticeships. Educators applying this model have the opportunity to develop work-ready graduates, conforming to the suggestions of the Bruges Communiqué which notes that "**Work-based learning** carried out in partnership with businesses and non-profit organisations should become a feature of all initial VET courses" and that "Participating countries should support the development of apprenticeship-type training and raise awareness of this".*

Watch the following video about *Laying the table for four* (created by VET students of the Hansági Ferenc Vocational School, Hungary). It will hopefully increase your appetite to try and apply the FC method with your own students:

(https://youtu.be/4JGg8lO__pc)

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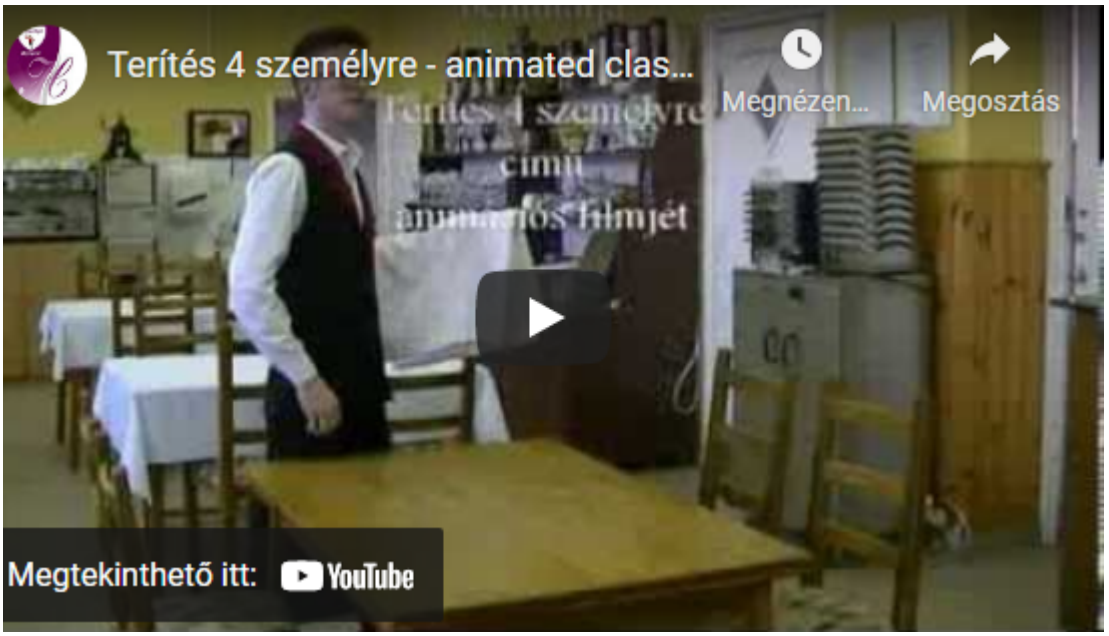

Another example worth watching is the video about *Making a bouquet of flowers*, created by a Hungarian VET teacher:

(https://youtu.be/ospmxz4cx3c)

8. Are there evidences of effectiveness? - Case studies

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Research about the effectiveness of the application of the Flipped Classroom model is not extensive, however data provided by Clintondale High School (in Michigan) demonstrate a considerable impact on learning effectiveness. http://www.flippedhighschool.com/ourstory.php

There are summary studies that report favourably: "*in one survey of 453 teachers who flipped their classrooms, 67 percent reported increased test scores, with particular benefits for students in advanced placement classes and students with special needs; 80 percent reported improved student attitudes; and 99 percent said they would flip their classrooms again next year* (Flipped Learning Network, 2012)." (Goodwin-Miller 2013)

Hopefully this very course will produce additional cases about its mastery by teachers from various schools in the participating five countries. Until then, this section presents two European case studies of note.

8.1. Case study 1 - Czech Republic

A pedagogical experiment was conducted from September 2013 to January 2014 in the Czech Republic, with the main focus being the Flipped Classroom model in the teaching of **mathematics** at **upper primary school** level.

Methodology

The project focused on the application of a flipped teaching method, with students learning basic chapters of **mathematics** through **animated video**.

The aim of the research project was to implement training through using of the flipped classroom model and to find out whether the animated video used can help to increase students' academic performance.
The research involved 54 pupils - 27 of them in a control group and 27 in an experimental group. The average age of students was 13.5 years.

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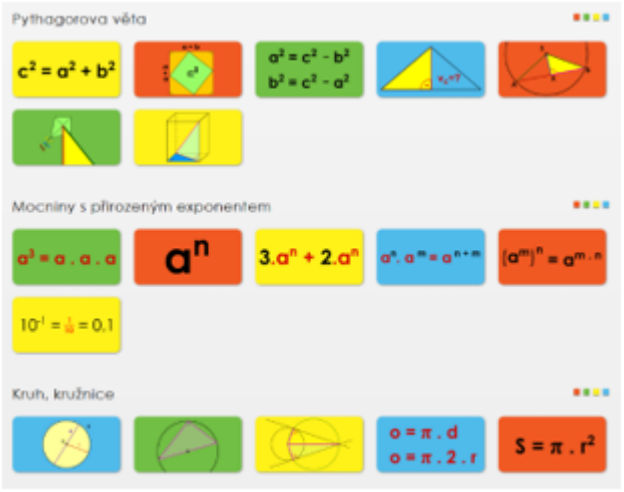
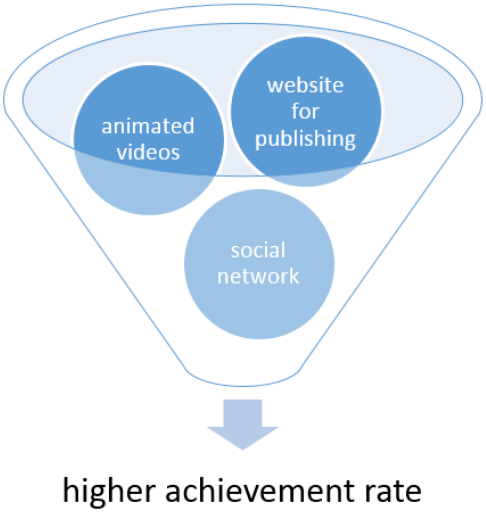


A long term, classical pedagogical experiment was used to verify the effectiveness of the animated video created for the experiment. The **control group** of pupils (one class) progressed through **traditional teaching methods** - presenting new topics during school lessons. The **experimental group** (one class of the same school year) had an animated video at their disposal, specifically created for the purpose of the experiment. **Websites** (prevracenatrida.cz) were created for the **distribution of the educational videos**. Pupils were informed about the nature and intent of the flipped classroom teaching model, then studied the animated videos during their home preparation. Each student was assigned a login name and password, and given the opportunity to comment on each video and to discuss problematic parts of the subject matter on the **social networks**. Brief summaries of the topics and explanations of the problematic parts were given in classes. The emphasis was placed on independent work and on the enlarging and deepening of the students' knowledge.



At the start of the experiment both the control and the experimental group undertook a didactic test (**pre-test**). At the halfway point of the experiment the students undertook a **mid-test**, and at the end of the experiment both the groups then undertook a final didactical test (**post-test**). The researcher

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(a math teacher for the experimental group) created twenty-five educational videos that covered the first half of the eighth-grade mathematics curriculum. At the end of the pedagogical experiment, students of the experimental group filled out a simple questionnaire, consisting of three closed questions. The questionnaire was chosen to give rapid feedback from pupils about the new method.

Results

The final conclusion of the pedagogical experiment was that the **performance of students in mathematics was significantly higher** in the student group where Flipped Classroom methods were introduced.

> "*After evaluating the long term pedagogical experiment we can conclude, that there was **significant difference in achievement** (evaluated based on post-test) between pupils of experimental and control groups in the selected thematic unit of mathematics. Flipped classroom method, when students are studying a new educational material using educational animated videos, did significantly affect academic performance of students. Creative videos were evaluated positively. We assumed that the new method of teaching pupils interested, especially because the use of modern technology. Which was confirmed.*"
> (Špilka R., Maněnová M., 2014).

Reference

ŠPILKA, Radim a Martina MANĚNOVÁ. Flipped classroom, web-based teaching method analysis focused on academic performance. In: *Proceedings of the International Conference on Education Technologies II*. Praha, 2014, s. 95-100. ISBN 978-1-61804-234-7.

8.2. Case study 2 - Hungary

This experiment took place in a secondary vocational school (Central Hungarian Regional Agricultural **Vocational Training Center** - FM KASZK - Táncsics Mihály Agricultural Technical School, Vác) in January 2016. Participants were aged 17-18 were in the 4th grade at school, and covered the topic of **Globalization**, as part of their **Social Studies** curriculum.

Methodology

Globalisation as a topic is generally familiar to most students, as they can come across it in films and news reports. A specific and distinct course book for Social Studies did not exist, but this **topic** is **covered** in the relevant chapters of the **History course book** that students use. The text,

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however, is not particularly motivating for the students, partly because it is poorly supported with captivating images and graphic illustrations, so many students subsequently lack an interest in the subject. Though the underlying topic is important, the text for this course does not enthuse students. Fortunately, many **good videos are available** on the internet to alleviate this problem.
This experiment focused on studying the results and effectiveness of **two different teaching methods** for this topic – the FC model and a traditional one.

Practical implementation

The two groups were separated into two different physical classrooms, with the students being instructed by two different teaching methods. For both, the topic for the next day was revealed on the day before and the students told that their knowledge would be tested by a set of questions.

The students of the **FC Group** met in the IT classroom – not the normal venue for their Social Studies class. However, on the previous day these students were asked to find and **watch a video** on the internet, focus on its keywords, and be prepared to take a test on the topic. At the beginning of the lesson the aim of the video was emphasized again, and students given 20 minutes to make further inquiries on an individual basis on the net. When tested, the group was given a limited time - of 20 minutes – to answer all questions.

The other group had a 30-minute lesson using a **traditional frontal teaching** model and learning environment. They were given less time for the test (15 minutes), but consequently they had fewer questions to answer. In addition to the teacher's classroom explanation they could make use of their history course book to analyse and interpret its pictures and illustrations. Due to the lack of time given they could not take notes or make an outline of the lesson.

With the FC Group a slightly modified version of the flipped classroom was applied: voluntary students were to watch an eighteen-minute **video** about globalisation **at home** before the lesson. This modification was deemed to be reasonable as not all Secondary VET students necessarily have access to ICT tools or the internet outside of the school. Another reason for changing the method slightly was down the very low level of student motivation.

The lessons took place as follows: The FC Group students were seated in the IT classroom, each at a desk with a PC. After distributing the test sheets the students had 20 minutes to do individual research on the internet. Some students elected to finding the relevant information by only reading, others took notes in their exercise books. After switching off the computers they had 25 minutes to answer 10 questions in the test.

The control Group was taught by traditional teaching methods. Students were asked to write down the title of the topic (Globalisation) then, with the help of the teacher's explanations and through discussion, they started to familiarise themselves with this topic in the curriculum. The students were asked to take notes individually and pay particular attention to the keywords. Specific attempts were made to break the monotony of the lesson – to maintain student attention - by detailed explanation of the pictures and graphic illustrations. At the end of the 30-minute lesson the students took a 15-minute test. Since they had less time than the other group, they were given only eight questions.

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Results

The two tables below show a **significant difference** in the results of the students instructed by traditional, frontal teaching and of the ones instructed by a flipped classroom method. The latter were more successful in tasks which required previous knowledge (Task 2: local problems, Task3: multinational companies, Task 4: drawbacks of globalisation). Individually, without the help of the course book or pre-studying, the former were unable to figure out important keywords and phrases. In the case of IT-supported learning there was not a huge difference among the tasks. If a concept or phenomenon was unknown, the students could easily check its meaning on the internet and remember it more efficiently from **their research** than from the teacher's explanation.

Thus **visualisation** seems to help with memorising information. Students could remember the drawbacks of globalisation more successfully, since they were discussed in detail by the lecturer in the video and emphasized with relevant **images**.

Group 2 (traditional frontal teaching method)

Number of task	1.	2.	3.	4	5.	6.	7.	8.	Total score
Total available scores per task	2	2	2	5	4	2	2	2	21 points
Total score of all students per task	20	20	20	50	40	20	20	20	210 points
Student 1	0	0	0	0	0	0	0	0	0 points
Student 2	0	1	0	3	0	0	0	0	4 points
Student 3	0	1	0	4	0	0	0	0	5 points
Student 4	0	1	0	4	0	0	0	0	5 points
Student 5	0	1	0	4	0	0	0	0	5 points
Student 6	1	0	2	1	0	2	0	0	6 points
Student 7	1	2	2	3	0	1	0	0	9 points
Student 8	1	2	2	2	2	1	2	0	12 points
Student 9	1	2	2	3	2	1	2	0	13 points
Student 10	1	2	2	3	2	1	2	1	14 points
Total	5	12	10	27	6	6	6	1	73 points
Percentage	25%	60%	50%	54%	15%	30%	30%	5%	**34 %**

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Group 1 (flipped classroom method)

Number of task	1.	2.	3.	4	5.	6.	7.	8.	9.	10.	Total score
Total available scores per task	4	4	2	3	2	5	4	2	2	2	30 points
Total score of all students per task	56	56	28	42	28	70	56	28	28	28	420 points
Student 1	1	1	1	0	0	1	0	1	0	0	5 points
Student 2	1	1	1	0	2	4	2	0	0	0	11 points
Student 3	1	1	1	0	0	4	1	1	2	2	13 points
Student 4	0	0	2	2	0	4	0	1	2	2	13 points
Student 5	1	2	2	0	2	5	0	1	1	0	14 points
Student 6	1	3	2	1	0	4	2	1	1	0	15 points
Student 7	2	1	2	1	1	5	1	1	1	0	15 points
Student 8	2	1	2	1	2	5	1	0	1	0	15 points
Student 9	2	1	1	2	2	5	1	1	1	0	16 points
Student 10	1	0	2	1	0	5	2	1	2	2	16points
Student 11	2	1	2	2	2	4	2	0	2	0	17 points
Student 12	2	1	2	2	1	5	3	1	0	0	17 points
Student 13	1	1	2	1	2	4	2	1	2	2	18 points
Student 14	1	1	2	0	2	5	4	2	1	2	20 points
Total	18	15	24	13	16	60	21	12	16	10	205 points
Percentage	32	26	85	30	57	85	37	42	57	35	**48 %**

Assignment 1 – My 1st idea on Flipped Classroom

Description of the task

After reading the content of this first module, share your first ideas and impressions about applying flipped classroom (FC) method in your classroom.

Before answering the following questions, give a short introduction about your teaching environment (your school, your subject/s, the grades of your students)!

1. What are your first impression about the FC model? Have you heard about it before? If you had earlier experiences with it, please share them!
2. How essential do you think the role of technology is with the FC model? Could you imagine applying FC without ICT?
3. How might you use the FC in your specific field of teaching? What age group and which topic would you choose for a first experiment, and why?
4. What would be the special pedagogical (didactic) goals that could be reached more effectively by FC than with the traditional method?
5. What would be the most difficult task for you if starting this method in your classroom?

Submission

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- Use the attached Word template, including answering the questions.
- Size: 1-2 A4 pages
- Use this name for your file: YourName_Module_1.docx
- Upload it and click the "Add submission" button below the text to submit it.

Evaluation

- Reflects the relationship of the FC method and technology. **3 points**
- Subject, age group and chosen subject is defined and reasons for choice are included **3 points**
- At least 2 pedagogic objectives are mentioned, where applying the FC method can be more effective than traditional approaches. **4 points**
- **Max.** points achievable: **10 points**

Assignment 1 - template

Your name:

Your school:

Your subject(s):

Age group you are teaching:

1. What are your first impression about the FC model? Have you heard about it before? If you had earlier experiences with it, please share them.

...

2. How essential do you think the role of technology is with the FC model? Could you imagine applying FC without ICT?

...

3. How might you use the FC in your specific field of teaching? What age group and which topic would you choose for a first experiment, and why?

...

4. What would be the special pedagogical (didactic) goals that could be reached more effectively by FC than with the traditional method?

...

5. What would be the most difficult task for you if starting this method in your classroom?

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