



# Flipped classroom based e-methodology



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Project “Activating Students in Online Classes”

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## PREFACE

Flipped classroom based e-methodology is the first part of the Erasmus+ Project Activating Students in Online Classes (Active Class)<sup>1</sup> The methodological part of the project contains guidelines for the proper implementation of the principles of e-learning based on methods co-existing with the flipped classroom approach. It also provides a methodological framework for the project's subsequent parts: Teachers training materials, Demo scenarios, Best Practices Package and T4E tracks scenarios. The methodology includes the following parts:

1. Methodology's artifacts: student-centered learning, active learning, universal design, Bloom taxonomy, learning outcomes, students' knowledge and skills evaluation;
2. Methodology's teaching methods: flipped classroom, gamification;
3. Methodology's online tools: catalogue of tools and platforms available;
4. Methodology's principles; it could be: goals, justification, students and teachers responsibility, learn from experience, stages, teaching quality, focus on students and their skills;
5. Methodology' innovations: the novel element and connections;
6. Methodology's limitations: what are the limitations and weaknesses;
7. Other methodology's features.

The main objective of the whole project is to stimulate students' active participation in online learning and teaching processes, helping teachers in online classes by providing them with suitable methods and tools, raising them to a new quality of education. The Covid 19 pandemic revealed that not all teachers were able to cope with the new situation, in which their information and electronic media skills were invaluable. As surveys conducted inside

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<sup>1</sup> Activating Students in Online Classes (Active Class). Project Erasmus+ 2020-1-PL01-KA226-HE-096358  
Call 2020 Round 1 KA2 - Cooperation for innovation and the exchange of good practices  
KA226 - Partnerships for Digital Education Readiness, p. 1.



universities have shown, the biggest problem was the lack of knowledge about the methodology of online classes. Hence, the Active Class project responds to the real need for the kind of study that would fill this gap.

The first part of the project aim was to create a new methodology for eLearning based on the flipped classroom method and gamification. The flipped classroom is crucial here but not the only one as it is the Flipped classroom BASED e-methodology, and this nomenclature is significant. The materials prepared are didactic, and in this sense, the term methodology means the set of methods and techniques leading to the specific goal. The flipped classroom has emerged in blended learning as the strategy for increasing students' engagement in the learning process by encouraging them to have theoretical preparation at home using specially designed materials and then work on live problem-solving during face-to-face classes. It seems to be a very general and narrow understanding of the flipped classroom; however, it provides the basis for defining the whole set of educational concepts linked to the flipped classroom approach thus understood. The following terms are used in the literature to refer to the flipped classroom: the flipped classroom approach, the flipped classroom method, the flipped classroom strategy, the flipped classroom model, the flipped classroom concept as well as flipped learning, flipped teaching or flipped approach etc. In the teaching materials included in the presented methodology, all these notions are treated as synonyms and used interchangeably. The practical nature and implementation of the flipped classroom project do not require rigid definitional boundaries between the expressions adopted.

Similarly, the following are used interchangeably in the materials developed: distance learning, distance education, online learning. It is essential to realise that the conception of the presented methodology implies a broad spectrum of practices related to the flipped classroom strategy. One of the basic techniques is gamification but interpreted as applying game rules and mechanisms in educational processes. Understood as follows, gamification is essentially game-based learning closely related to flipped learning, and the keyword that links both practices directly and closely is motivation. Research on the implementation of games in education shows a change in students' personalities, stimulating them towards self-motivation and self-learning, which are the foundations of the flipped classroom concept. It is why gamification (game-based learning) required similar detailed development as the flipped classroom (section 2).



Features and qualities closely related to the flipped approach are the overarching educational solutions, which also had to be clarified as the roots and background for the developed methodology: student-centred learning, active learning, universal design, Bloom taxonomy, flipped learning outcomes, specific students' knowledge and skills evaluation have been thoroughly described in section 1. with the connections in section 4. The levels of taxonomy: remembering, understanding, applying, analysing, evaluating and creating in achieving teaching outcomes are necessary to show the efficiency and effectiveness of flipped learning. For an analysis of flipped learning and teaching in the philosophy of education, see section 5. Section 6 identifies precisely the limitations and barriers to the implementation of the methodological objectives as well as shows the ways to overcome them. The catalogue of tools and platforms ready to use in practice applying proposed innovative e-methodology as “the combination of didactic methods, opened for new tools”<sup>2</sup>, has been comprehensively elaborated and presented in section 3.

The direct target groups of the developed e-methodology are all teachers at the T4E Alliance universities. “It will be significant due to the planned extension of the offer of subjects that will be presented to all students of the Alliance, as well as to students of the European University Transform4Europe implemented in other universities, schools and teaching centres”<sup>3</sup>. Indirectly, the study can also be used at lower levels of education in primary and secondary schools cooperating with universities. Although the flipped strategy originated from blended learning with the emergence of the Covid 19 era, it gained a new face, a new meaning and new applicability. Online teaching had to be implemented as the only way of working with students on a mass scale. It is the reason why the Active Class project is moving the flipped classroom approach entirely into the realm of online learning. No live face-to-face presence poses new challenges for all participants in the teaching and learning process. However, the basic principles and rules of the application flipped method remain unchanged. The virtual classroom

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2 Activating Students in Online Classes (Active Class). Project Erasmus+ 2020-1-PL01-KA226-HE-096358  
Call 2020 Round 1 KA2 - Cooperation for innovation and the exchange of good practices  
KA226 - Partnerships for Digital Education Readiness, p. 2, 74.

3 Activating Students in Online Classes (Active Class). Project Erasmus+ 2020-1-PL01-KA226-HE-096358  
Call 2020 Round 1 KA2 - Cooperation for innovation and the exchange of good practices  
KA226 - Partnerships for Digital Education Readiness, p. 74.





remains still the classroom, so the terms describing flipped classroom approach expand their meaning without losing their essence. The methodology presented relates to distance learning, but the same techniques can be used in blended learning, only supplemented with other, traditional features specific to face-to-face meetings. It may be noted that the state of research concerns primarily working in the building classroom, but advanced solutions proposed here enable teachers to transform it into the online formula in practice. Each section contains the bibliography created in compliance with the rules for teaching materials following APA 7th style. Teachers using the methodological guide should have the ability to find broader contexts and, the most suitable for them, practical examples of online flipped classroom solutions other than those included in texts.

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# **1. Methodology's artifacts: student-centered learning, active learning, universal design, Bloom's taxonomy, learning outcomes, students' knowledge and skills evaluation**

## **Student-centered learning**

Student-centred learning [SCL] (and student-centred teaching) is an instructional approach in which students influence the content, activities, materials, and pace of learning. This learning model places the student (learner) in the centre of the learning process. The instructor provides students with opportunities to learn independently and coach them in the skills they need to do so effectively. The SCL approach includes such techniques as substituting active learning experiences for lectures, assigning open-ended problems and problems requiring critical or creative thinking that cannot be solved by following text examples, involving students in simulations and role-plays, and rushing self-paced and/or cooperative (team-based) learning. Properly implemented SCL can lead to increased motivation to learn, greater retention of knowledge, deeper understanding, and more positive attitudes towards the subject being taught (Wright, 2011).

The student-centred approach is based on several Basic principles: learning is personalised, engaging, competency-based and not restricted to the classroom. This method engages students in achieving individual goals but also teaches them to work in a team – each one of them complements the project team with a different set of competences and information. However, this process must be property moderated by the teacher. Each student engages in a given task on a different level, learns in his own rhythm and needs slightly different conditions for



effective learning. That is why it is so important not only to prepare students for what they will learn but also to show them how to achieve their goals. Students should know how to obtain information and subject it to a critical analysis, draw conclusions, and apply it in practice. It is also very important to prepare adequate space. The teacher standing under the blackboard, on a dais, talking to the students seated in the rows, will not involve the students in any process. In this kind of arrangement, there will be no space for working in groups, moving from one place to another – for example, Turing tasks based on the snowball method or using the Word Cafe method. Students should learn together, search for information and discuss it, evaluate it; because the teacher does not have complete knowledge, teachers should have the ability to process it, select, convert information into knowledge and practice (Brush, 2000).

Maryellen Weimer's working thesis is that classrooms at the college/university level are extremely instructor-centred and that this situation works against students becoming successful, mature learners. She says that many instructors recognise this and try to make changes in the direction of more student-centeredness, even though their level of awareness of the problem varies from those who know what the specific problem areas are to those who simply have a sense that all is not right in the educational process (Weimer, 2002).

Student-centred learning environments are designed to provide students with opportunities to take a more active role in their learning by shifting the responsibilities of organising, analysing, and synthesising content from the teacher to the learner. These environments allow students to examine complex problems using a wide variety of resources, develop their own strategies for addressing these problems, and present and negotiate solutions to these problems collaboratively. There are difficulties associated with supporting student-centred learning. The content and activities used to promote student-centred learning often do not provide enough structure to adequately guide students toward successful completion of classroom activities, thus increasing student disorientation and frustration. Furthermore, for students to actively participate in their own learning, they must possess self-monitoring and other metacognitive skills that are not necessarily inherent in every individual (Emaliana, 2011).



Student-centred learning often referred to as Project-Based Learning (PBL), is often correlated with PBL. Students solve the problem independently using the acquired and analysed knowledge, with the support of the teacher and the tools prepared by him. The concept of student-centred learning is to bring the classroom and students to life. The teacher is considered a “guide on the side”, assisting and guiding students to meet the students and the teacher’s goals. This type of grouping brings out each student’s strengths: challenging them in a non-threatening environment to meet higher levels of critical thinking. Also, grouping students of all academic levels, mixing the males and females, the athletes, the popular, and the socially awkward, breaks down the social structure of “cliques” often found within schools. This learning structure leads to higher self-esteem, better communication skills, and unifying students in the diverse, multicultural society they live in. The teacher must properly allocate roles in the group and, from time to time, monitor whether these roles are fulfilled or there are no gaps in the group work. (Michael, 2006)

In this approach, students’ activities are important indicators in the learning process and quality of the learning product. This approach links with flexible learning, experiential learning, and self-directed learning in teaching and learning English. Therefore, a student-centred virtual classroom is a place where teachers consider the needs of the students, as a group and as individuals, and encourage them to participate in the learning process all the time. The teachers’ roles are more that of facilitators than instructors. The students are active participants in the learning process, and teachers help to guide the students, manage their activities, and direct their learning.

Simply put, student-centred learning is a model where students are placed at the core of the learning process. Students’ needs, opinions, backgrounds, and goals are acknowledged and incorporated within the learning environment. In this model, teachers are guided by what is best for the students when helping them to learn or make decisions. The concept of student-centred learning derives from several models (Overby, 2011).

Terry Heick has developed 15 principles on which student-centred learning should be based:

1. Being clear about how you will evaluate students’ work.



2. Modelling ‘**how to think**’ for students (it is necessary to prepare students to develop materials independently, choose examples, distinguish scientific information from untested and scientifically unsupported).
3. Helping students understand what is worth understanding.
4. Diversifying what you accept as evidence of understanding.
5. Creating curriculum and instruction around a need to know.
6. Collaborating with students to create the rubric or scoring guide.
7. Letting students choose the project’s purpose.
8. Choosing ‘power standards’ from your curriculum after meeting with students, parents, and community members voice their unique social and cultural needs.
9. Letting students choose their own media form that reflects the purpose of the reading.
10. Preparing choice boards.
11. Placing struggling readers in a lit circle that gives them an authentic role that they can be successful in allows them to hear oral fluency and reading speed model and keeps them from feeling ‘broken’.
12. Starting class with a story.
13. Using the on-demand writing prompt as the summative assessment.
14. Framing learning in terms of process and growth and purpose.
15. Choosing what is graded carefully and considering other work as practice.

It is worth remembering these principles when designing a course. You do not have to implement them all, but first of all, you should remember to give students responsibility for their development, focus on supporting their motivation and commitment, let them choose the most appropriate form of learning for them.



## Active learning

### Main concepts

There are many definitions of active learning:

Active learning consists of the short course-related individual or small-group activities that all students in a class are called upon to do, alternating with instructor-led intervals in which student responses are processed and new information is presented (Felder and Brent, 2016).

Active learning is generally defined as any instructional method that engages students in the learning process. In short, active learning requires students to do meaningful learning activities and think about what they are doing. While this definition could include traditional activities such as homework, in practice, active learning refers to activities that are introduced into the classroom. The core elements of active learning are student activity and engagement in the learning process. Active learning is often contrasted to the traditional lecture, where students passively receive information from the instructor (Prince, 2006).

Having students engage in some activity forces them to reflect upon ideas and how they are using those ideas requiring students to regularly assess their own degree of understanding and skill at handling concepts or problems in a particular discipline. The attainment of knowledge by participating or contributing. The process of keeping students mentally and often physically active in their learning through activities that involve them in gathering information, thinking, and problem-solving (Michael, 2006).

However, it seems that the most simple definition is:

“...students doing things and thinking about what they are doing” (Bonwell and Eison, 1991).

Many teachers argue that all learning is associated with some form of activity, so students are also “active” when listening to lectures and presentations. Research indicates, however, that students must do more than just listen to be able to create knowledge and skills: they must read, write, discuss, or engage in problem-solving. Crucially, students need to function in the domain



of higher-order thinking tasks such as analysis, synthesis and evaluation. In this context, the use of strategies that promote active learning is proposed. Berry further postulates that four key elements characterise all active learning approaches (Berry,2008):

1. Critical thinking;
2. Individual responsibility for learning;
3. Involvement in open-ended activities;
4. Organisation of learning activities by the professor.

By the 1980s, almost all developers of mathematics and science (STEM) curricula intuitively knew that students benefited from hands-on activities, so most created programs combined with lectures and labs. However, these guesses remained unproven. The idea of learning from interesting, engaging tasks has also taken hold in other areas like foreign languages. Of course, performance-based classes in areas like music and art have existed for millennia. No one expects to learn to play the oboe simply by listening to someone tell them how to do it. Also, during this time, medical schools, for example, began testing what is now called problem-based learning or PBL. Students practised hypothetical-deductive reasoning by solving complex, often real-world medical cases. This approach, now accepted as standard practice in medical education, has since been applied to teaching in all scientific fields, although not as widely. Emerging in increasing numbers in the 1990s, research began to provide irrefutable evidence that students in lectures simply did not learn as much as their teachers expected. Numerous authors provided frighteningly consistent indicators of students' poor understanding of conceptual knowledge when taught in the form of passive lectures. Perhaps recognising the futility of trying to change lecture-based teaching, or perhaps realising that more significant gains could be made by improving the laboratory experience, a large group of creative people began developing and testing new teaching technologies for the laboratory. One example was a series of sensors and accompanying software for what came to be called Microcomputer-Based Labs or MBLs. These became extremely popular in US universities and essentially revolutionised what could be done in a laboratory setting. They required only



the provision of space and electricity for computers, later also an internet connection. Many studies have shown that MBLs and their modification, Video-Based Labs, helped students learn much more than sitting and listening to simple lectures (Beichner,2014).

A selection of a few studies from a large body of research confirms these suggestions and observations. One study made a direct-controlled comparison between a standard lecture format and a cooperative learning format in an introductory college-level biology course. It was apparent that students choosing the cooperative format option showed significantly higher levels of satisfaction with the course than those choosing the traditional format option. Similarly happens in a study of role-playing simulations in an industrial psychology course. Student responses were very positive both immediately after the simulation and in follow-up interviews conducted eight months later. Similar results were obtained in a study where Kolb's "experiential learning model" was applied to a school board simulation used in an introductory education course. It was concluded that "the simulation not only energised the students but also personalised an in-depth understanding of education and its problems". This research indicates that active learning strategies and techniques help create a more stimulating and enjoyable class environment for students (McCarthy and Anderson, 2000).

The literature points out many advantages of active learning. When it comes to learning a new concept or skill, instruction is essential, but practice makes perfect. Traditionally, lectures teach students new concepts, and active learning helps students master them. Active learning works because it engages students in the learning process. More specifically, active learning has distinct advantages:

- reinforces important material, concepts and skills;
- provides more frequent and immediate feedback to students;
- provides students with an opportunity to think about, talk about and process course material;
- creates personal connections to the material for students, which increases their





motivation to learn;

- allows students to practice essential skills, such as collaboration, through pair and group work;
- build self-esteem through conversations with other students;
- create a sense of community in the class through increased student-student and instructor-student interaction.

There are many open licence sources like Active Learning Strategies for Higher Education: the Practical Handbook<sup>4</sup>, where active learning methods are explained with useful examples.

Example of active learning methods used in higher education:

- case studies or simulations;
- peer-review;
- reflective diary;
- interview with experts;
- group discussions;
- student presentations;
- experiments/projects;
- quizzes;
- problem-solving;

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<sup>4</sup> <https://arrow.tudublin.ie/cgi/viewcontent.cgi?article=1000&context=cherrpbook>



- role-play;
- games.

Before implementing any active learning solutions into the class, there are a few key things to consider:

- what method will fit the subject, the activity, and the group?
- will students understand the purpose and importance of the planned activities for their development? (use an icebreaker at the beginning of the activity to help students get to know each other and become comfortable with each other);
- how can the process be streamlined/facilitated at each stage?
- how to introduce/introduce students to the activity?
- whether to use visual aids? what will be their role? Do you need visual aids with directions?
- how much time will it take to complete the activity?
- how to conduct the debriefing part? Smaller groups may be easier to manage than larger ones.
- whether the activity used and its outcomes link to the learning outcomes?

It is believed that before implementing specific solutions and activation methods, it is worthwhile to review and consider a few key issues, such as:

- it is worthwhile to become familiar with several active learning techniques. Some are easier to implement than others and also gives you more freedom to act;
- it is good to start with small, simple and quick tools, choose one or two techniques and modify them to suit the learning objectives of your classroom;



- exercises can be used to draw students' attention to issues that you think are most important;
- group work and exercise execution should be defined by rules or a contract;
- present the activity as having a specific learning benefit for the students;
- define a time limit for completing the task;
- choosing places to stop the activity and summarise;
- choosing technology that can be used in the classroom for the planned exercises.

The use of these techniques in online teaching is essential because of their powerful effects on student learning. For example, several studies have shown that students prefer strategies that promote active learning over traditional lectures. Assessments of student achievement have shown that many strategies that promote active learning are comparably effective to lectures that promote content mastery but produce better thinking and writing scores. Therefore, a thoughtful and scholarly approach to skilful teaching requires that faculty members become familiar with the many ways to apply strategies that promote active learning across disciplines effectively. In addition, each faculty member should engage in self-reflection by examining his or her personal willingness to experiment with alternative approaches to teaching.

Even by modifying traditional lectures, it is possible to incorporate active learning into online classes. Simple but effective ways to engage students during a lecture include short demonstrations or short, ungraded writing exercises followed by discussion. Some alternatives to the pure lecture format further enhance student engagement:

- lecture with instruction, which consists of two mini-lectures separated by small-group study sessions built around prepared instruction;
- lecture with feedback, in which students listen to a 20-30 minute presentation without taking notes, then write for five minutes and spend the rest of the class in small groups



explaining and developing the content (Bonwell and Eison, 1991).

This approach to modifying traditional lectures raises the frequent question, “Is a large class a special case where little can be done?” Although it is widely believed among faculty that large classes preclude significant student participation, accounts indicate that other methods are possible. The use of even simple strategies that promote active learning has been shown to benefit student attitudes and achievement. For example, visual instruction can provide a helpful reference point for other interactive techniques. In-class writing across disciplines is another productive way to engage students in doing things and thinking about what they are doing. Two popular instructional strategies based on problem-solving models include the case study instructional method and Guided Design. Other active learning methods worthy of use by instructors include cooperative learning, debate, theatre, role-playing and simulation, and peer teaching. In short, the published literature on alternatives to traditional classroom presentations provides a rich menu of different approaches that faculty can easily add to their repertoire of instructional skills.

Instead, it is worth considering why there continues to be a reluctance in some quarters to embrace activity-based learning even in classes designed for this type of activity. Many university teachers still prefer one-way teaching and passive reception by the students. Several reasons for this can be identified:

- the powerful influence of educational “tradition”;
- faculty self-esteem and self-defining roles;
- the discomfort and anxiety that change creates;
- limited incentives for faculty to change.

However, there are some specific obstacles associated with the use of active learning:

- inability to choose core from optional content;



- viewing active methods as childish and an unnecessary waste of time;
- feeling a loss of control over activities and students;
- focusing only on the content aspect (knowledge) without paying attention to skills;
- lack of distinction between learning and memorising;
- the assumption that the teacher is the source of the knowledge and not the student who acquires it through contact with the teacher;
- difficulty inadequately covering the assigned course cd. in limited class time;
- possible increase in class preparation time;
- difficulty/lack of ability to use active learning in large classes;
- lack of materials, equipment or resources;
- fear that students will not participate or will not learn enough;
- being criticised for teaching in an unconventional way.

Nevertheless, every obstacle, barrier, and type of risk can be successfully overcome with careful, thoughtful planning. Reforming teaching practices in higher education must begin with faculty efforts. An excellent first step is to choose strategies that promote active learning that teachers and students will feel comfortable with. Such low-risk strategies tend to be short, structured, and planned, focusing on topics that are neither too abstract nor too controversial and familiar to both faculty and students. Conversely, a higher level of risk occurs when one or more of these dimensions changes. Faculty can successfully overcome each of the major obstacles or barriers to using active learning by gradually incorporating teaching strategies that require more student activity and/or more risk into their regular teaching style. Faculty developers can help stimulate and support faculty members' efforts for change by emphasising the instructional importance of active learning.



Moreover, the use of active learning should become the focus of both faculty development workshops and the instructional method used to facilitate such programs. Furthermore, faculty developers must recognise the need to continue and support faculty members' change efforts. Academic administrators can support these initiatives by recognising and rewarding excellent teaching in general and innovative teaching in particular. Comprehensive programs demonstrating this kind of administrative commitment should address institutional employment policies and practices, allocation of adequate resources for instructional development, and development of strategic administrative action plans.

Equally important is the need for more rigorous research that provides a scientific basis to guide future classroom practices. In retrospect, it appears that earlier classroom initiatives and written materials on active learning were too often isolated and fragmented. The resulting pedagogical efforts thus lacked coherence, and the goal of interactive teaching techniques remained unattained. However, with the coordinated efforts of individual faculty, faculty developers, academic administrators, and educational researchers, higher education in the coming decade can make interactive teaching techniques a reality and realise the promise of active learning.

## Universal design

The 1990s have seen architects, businesses, communities, and schools place more attention on accessible design of physical space and technological devices with the idea of making objects and functions simple to use by individuals with and without disabilities (Shapiro, 1993). Architects emphasise that the designs used to make buildings accessible to disabled individuals (e.g., ramps, lowered water fountains, levered door handles) benefit others such as the elderly, children, and individuals with temporary disabilities. This concept, termed universal design (Mace, 1988), is newly in fashion among architects and designers (Shapiro, 1993). Mace notes that universal design emerged from the desire to develop comprehensive plans that would be attractive to all the individuals who use the space. For example, an individual delivering heavy packages to a firm within the building may benefit from pressing the device that automatically opens the doors. The universal design concept may also be applied to post-secondary educational environments, which we have initiated and termed Universal Instructional Design



(UID). If this approach becomes part of the institution's instructional methodologies, students with disabilities in higher education will no longer need to rely heavily on support systems secondary to the primary instructional programs. In the typical service delivery program, modifications in an instructor's approaches or assessment procedures for students with disabilities require that students identify themselves as disabled, request specific accommodations, and wait for these specific adjustments to be implemented – a process that often takes weeks to complete. This traditional case-by-case instructional approach is quite conservative compared to UID, which places accessibility issues as an integral component of all instructional planning.

UID is a complement to the more flexible and innovative approaches to higher education instruction that are currently proffered. Such approaches as cooperative learning, computer-assisted instruction, and alternative measures are being explored by faculty in various disciplines (e.g., the arts, sciences, history). Also, accommodations with the universal appeal are related to the specific study strategies for a content area. For example, students with disabilities, especially students with learning disabilities, profit from guided instruction and strategies such as organising notes, specific text reading, test preparation, vocabulary review, identification of supplementary learning materials and appropriate technology, and reading for analysis. Most students can use these strategies to gain knowledge and skills related to the specific content areas.

The idea of accessibility transferred from architecture to education. Universal Design for Learning (UDL) is an approach to teaching and learning that gives all students equal opportunity to succeed. To understand what UDL is, it helps to understand what it is not. The word *universal* may throw you off. It may sound like UDL is about finding one way to teach all students. However, UDL actually takes the opposite approach. The goal of UDL is to use a variety of teaching methods to remove any barriers to learning. It is about building in flexibility that can be adjusted for every person's strengths and needs. That is why UDL benefits all learners. This approach to teaching or to workplace training does not specifically target people who learn and think differently. But it can be especially helpful for the 1 in 5 kids and adults with these challenges – including those who have not been formally diagnosed.



According to Amanda Morin (<https://www.understood.org/en/learning-thinking-differences/treatments-approaches/educational-strategies/universal-design-for-learning-what-it-is-and-how-it-works>), UDL is a framework for how to develop lesson plans and assessments. It's based on three main principles:

### 1. Engagement

Look for ways to motivate learners and sustain their interests. Here are some examples:

- let people make choices;
- give assignments that feel relevant to their lives;
- make skill-building feel like a game;
- create opportunities for learners to get up and move around.

### 2. Representation

Offer information in more than one format. For example, the instructor could provide a worksheet along with:

- audio, which could be as simple as saying the written directions out loud;
- video showing how to solve one of the problems;
- hands-on learning.

### 3. Action and expression

Give learners more than one way to interact with the material and to show what they know. For example, they might get to choose between:

- taking a pencil-and-paper test;
- giving an oral report;





- making a video or a comic strip;
- doing a group project.

On the website of a non-profit institution Understood, we can find a table comparing traditional teaching and UDL. the most important advantages of the UDL classroom are:

- The individualised focus on all students and what and how we teach them. There is no typical student.
- All students can benefit from different forms of knowledge transfer; we do not create divisions. It also removes stigma – a struggling student does not learn differently than the other students in the class, everyone has equal access to different forms of work.
- Pupils and teachers work together to set goals, find appropriate forms of work with the given material and choose which skills they want to develop first. It teaches independence, prioritising tasks and goals, and allows students to take responsibility for their own development.
- We work with space. The classroom should accommodate various needs, not create physical barriers, and provide opportunities to create different spaces for different types of work.
- The teacher allows for different evaluation forms, which allows students to develop and demonstrate their own skills. Teacher and student use feedback to improve performance, discover student strengths and weaknesses, work on developing selected skills.

What does this mean in practice?

1. Teachers alternate between different forms – lecture, video, podcast, board games, or discussion.



2. When the teacher introduces students to the text material, it should be accessible to all in a variety of forms: text-to-speech, Braille, digital text, and large print.
3. The teacher does not decide the form of the students' work. With the help of the teacher, each student should be given time to discover how they learn and, based on that recognition, set individual goals and how they work in the classroom.
4. We have access to a space that allows us to choose a form of work based on different types of assignments and student needs. We could choose from quiet individual work, small and large group work, and group learning. The teacher moves from space to space, helping students as they work.
5. The teacher enables the students to pass the subject – they can write an essay and record a speech or a video and prepare a mock-up or a mind map.

What conditions must be completed for this to succeed:

1. Defining appropriate goals. In systems education, the most important goal may be to find solutions that allow students to choose their own path forward while equipping them with the skills required for exams. Standardised objectives sometimes include the means to achieve the standard within the objective itself. When setting student goals, it is important that they be aligned to state standards while also being defined to allow students multiple ways to demonstrate that the goals have been met.
2. Assess the diverse needs of students. All students have strengths, weaknesses, and preferred areas of interest within the context of the learning environment. Teachers using a UDL lens can identify the strengths, needs, and interests of individual students and combine them into a UDL class/group profile. It is important to know the strengths, weaknesses, talents, and needs of our students.
3. Assessment of curriculum barriers. Most curricula are designed as if all students learn the same way. In reality, the idea of a “typical” student is a myth. Similarly,



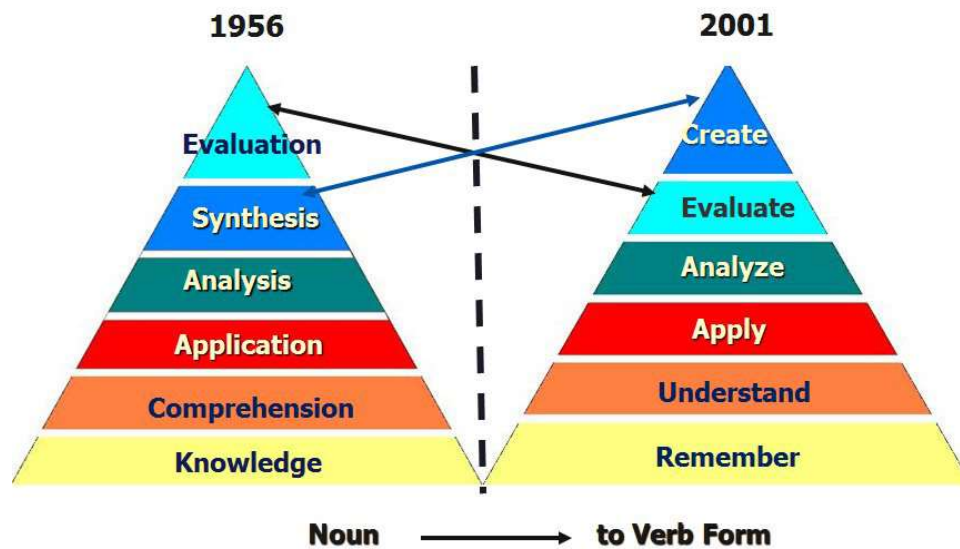
barriers to learning may not be present in students but rather at the intersection of students and curriculum. By analysing the characteristics outlined in the UDL class/group profile in light of the flexible methods and materials offered by the UDL approach, SLPs and other teachers can move beyond identifying individual learning disabilities and focus on and address barriers that exist in the curriculum. You must confront the myth of the typical student, and most tests are based on that myth. Standardised tests will not test the ability to apply knowledge to practice, will not allow you to choose the form of assessment, and will not create the conditions for giving full feedback.

## **Bloom's taxonomy**

Bloom's taxonomy delineates a hierarchy of cognitive-learning levels ranging from knowledge of specific facts and conventions to more advanced analysis, synthesis, and evaluation levels. Bloom's taxonomy is presented to help students attain more sophisticated understanding and abstraction levels in this course and their entire educational experience. It is worthwhile discussing the concepts of levels of learning, especially as students become more comfortable with dealing with the theories of human nature and the Experiential-Learning Model and are ready to begin to refine their work. Attention to higher-level processes, such as analysis and evaluation, certainly should be integrated into written comments on draft essays, and synthesis becomes very important in the development of some of the humanities papers.

The framework elaborated by Bloom and his collaborators consisted of six major categories: Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation. The categories after knowledge were presented as "skills and abilities," with the understanding that knowledge was the necessary precondition for putting these skills and abilities into practice. While each category contained subcategories, all lying along a continuum from simple to complex and concrete to abstract, the taxonomy is popularly remembered according to the six main categories. The main idea of the taxonomy is that what educators want students to know (encompassed in statements of educational objectives) can be arranged in a hierarchy from less to more complex. The levels are understood to be successive so that one level must be mastered

before the next level can be reached. the original levels by Bloom et al. (1956) were ordered as follows: Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation. It is worth reading both versions of Bloom’s taxonomy – the original one from 1956 and the revised version from 2001:



<https://thesecondprinciple.com/essential-teaching-skills/blooms-taxonomy-revised/>

This method is entirely different from Kolb’s cycle, where you can start with any of the process elements, as long as you go through all the stages: experience, reflections, theory, practice.

“Created in a post-war world marked by increasing specialisation and fragmentation, Bloom’s Taxonomy offered a way of thinking about knowing writ large. Though teachers might call themselves math teachers, English teachers, or history teachers, they were really all engaged in the same process: teaching students to think \ nd thinking, whatever particular disciplines it came in, could be organised and classified according to Bloom’s levels. The taxonomy, in short, promised to establish a scientific sense of order. Bloom was not alone in categorising human thought. However, the beauty of his taxonomy was simplicity. It was made up of six categories, not 60. Moreover, even when the original taxonomy was joined by its helpmate, the Taxonomy of Affective Educational Outcomes, it still remained lean and intuitive, easy to remember, easy



to use. Teachers could close their eyes and picture it. Entrepreneurial consultants could cover the basics in an hour-long workshop.“

Bloom’s taxonomy is a mature technique for analysing the cognitive depth of performing a given task. It is self-described as a “concise model for analysing educational outcomes in the cognitive area of remembering, thinking, and problem-solving.” (Bloom, 1956). It was specifically developed for use in educational contexts and has been used as a basis for several studies of IT education.

### History:

**1948** Convention of the American Psychological Association – Bloom began to work with a group of educators who eventually undertook the ambitious task of classifying educational goals and objectives. They intended to develop a classification method for thinking behaviours that were believed to be important in learning processes. Eventually, this framework became a taxonomy of three domains: the cognitive, the affective, the psychomotor.

**1956** work on the cognitive domain was completed, and a handbook commonly referred to as “Bloom’s Taxonomy” was published. This chapter focuses its attention on the cognitive domain.

While Bloom pushed for using the term “taxonomy,” others in the group resisted because of the unfamiliarity of the term within educational circles.

## **Mary Forehand**

At the heart of Bloom’s taxonomy framework is the ability to create achievable learning goals that teachers and students understand and build a definitive plan to meet them. Instructors are encouraged to view learning objectives in behavioural terms, such that they can see what students are capable of as a direct result of the instruction they have received at each level, without the need for class-wide generalisations.



Using the categorisation, educators can more effectively organise objectives and create lesson plans with appropriate content and instruction to lead students up the learning pyramid. Educators can also design valid assessment tools and strategies to ensure each category is met in turn, and that each part of the course material is in line with the level's objectives, whether it's basic knowledge at the beginning of a course (e.g. remembering and recalling basic concepts) or applying that knowledge towards the middle of a school year (e.g. using the learned information in specific settings by solving problems.) For students, Bloom's levels bridge the gap between what they know now and what they need to learn to attain a higher level of knowledge.

At the end of the learning process, the goal with Bloom's taxonomy is that a student has honed a new skill, level of knowledge, and/or developed a different attitude towards the subject. Furthermore, teachers can effectively assess this learning on an ongoing basis as the course moves through each stage of the framework.

Using Bloom's Taxonomy is useful in lesson planning and course design. Teachers can use the tools of Bloom's Taxonomy to precisely focus curricula throughout the year on specific parts of the structure, ensuring students have the appropriate cognitive skills for each assignment and exam before moving on to the next.

This way, students can have clear, concise, and measurable goals to achieve. They answer questions and complete tasks based on the goal they are currently focused on, using measurable verbs, such as those previously noted for each level, to elicit appropriate types of responses. For example, questions asking students to compare, discuss, and predict will help them with their basic understanding of the project, while the use of verbs such as "explore" and "relate" suggests that they have moved to the analysis stage.

Students can move from lower levels to higher Bloom Taxonomy with course materials, topics, lectures, assignments, and classroom activities that are finely tuned to help them succeed. Following the framework of Bloom's Taxonomy, classroom assignments and learning can be restructured to ensure they align with each successive level, so students have the essential tools to reach that most important deeper level of learning: the top of Bloom's Taxonomy Pyramid.



Teachers should consider developing lesson plans and curricula according to Bloom's Taxonomy. This way, students can build on their learning and progress through the levels throughout the semester. In modern classrooms, students do not always sit passively in front of a lecturer. Mobile devices and online course materials are the norms. It is a testament to the versatility of Bloom's Taxonomy, which fits perfectly into lesson planning for active learning.

In the "Remember" stage of Bloom's Taxonomy, instead of sitting back and absorbing information, you can ask students to challenge themselves to recall facts or make a list at the end of the class of the most important facts they learned that day. Moreover, during the analysis stage of Bloom's Taxonomy, you can spark class discussions by exploring problems, making comparisons, and examining how the subject matter can relate to students' everyday lives.

Making expectations explicit in class can also help point students in the right direction—a great use of metacognition within Bloom's Taxonomy. In this way, you can help students take responsibility for their learning. For example, in a marketing class, teachers can instruct students that by mid-semester, they should know the elements of a successful TV ad and why each element is important and how to work together holistically to achieve the goals of the company placing the ad.

Student assessment is not directly dependent on current or formative assessment, but it is a way for teachers to assess how well students are learning and climb up the hierarchy of Bloom's Taxonomy. Formative assessment is not a scale that determines student success or failure; instead, it is used as a teaching tool. Focus on what you want students to accomplish, using Bloom's Taxonomy as a guide instead of whether a specific activity will contribute to their overall grade. Develop specific learning objectives for each step and provide students with clear expectations. Determine what action the student should take on your assignment and to what level it applies. Then match the suggested assessment techniques and questions to the lecture and special activities that will encourage achievement. For example, at the Remember and Understand Bloom's Taxonomy stage in the primary classroom, multiple-choice or true-false questions make sense.



Once you reach the highest levels of Analyze, Evaluate, and Create in Bloom’s Taxonomy, whether it is an advanced class or at the end of the course, consider oral exams or written essays. Even if not tied to a grade, assignments can illustrate how much students have really learned so far, so teachers can adjust course materials or their approach. It will help better prepare students for success when it comes time for the summative assessment.

Bloom’s Taxonomy can be used to test and reinforce learning as the term progresses. Teachers can course-correct and refocus on areas of learning where students are struggling. Bloom’s taxonomy may also apply to assignments and exams that affect grades. Typically, midterm exams may cover material and learning that fits closer to the bottom of the pyramid regarding memorisation, comprehension, and application. However, when you get to the final exams, it may be useful to assess learning toward the top of the pyramid, including analysis, evaluation, and creation.

Bloom’s taxonomy can be seen as a powerful tool to help develop learning objectives because it explains the process of learning. It helps to organise the process, fit it into a specific framework, but it is related to the traditional perception of the role of the teacher and student:

- before you can understand a concept, you must memorise it;
- to apply a concept, you must first understand it;
- to evaluate a process, you must analyse it;
- to form an accurate conclusion, you must undergo a thorough evaluation.

For a course to meet Quality Matters standards, it must have measurable learning objectives. Using a verb chart like the one above will help you avoid verbs that cannot be quantified, such as understand, learn, appreciate, or enjoy. Quality Matters also requires that course assessments (activities, projects, and exams) align with learning objectives. For example, if your learning objective includes an application-level verb such as “present,” you cannot demonstrate that your students have mastered that learning objective simply by taking a multiple-choice quiz.





The difference between course and lecture objectives is vital. The most significant difference between course-level and lesson-level objectives is that we do not directly assess course-level objectives. Course-level objectives are simply too broad. Instead, we use several lesson-level objectives to demonstrate mastery of the one-course level objective. To create good course-level objectives, we must ask ourselves, “what do I want students to master at the end of the course?” Then, after finalising the course-level objectives, we need to ensure that mastery of all the lesson-level objectives below confirms that the student has mastered the course-level objective—in other words, if your students can demonstrate (through assessment) that they can complete each of the lesson-level objectives in this section. You, as the instructor, agree that they have mastered the course-level objective.

It is important to think about the objectives for the course and lecture/lesson. There is a difference between these two levels of teaching organisation:

- course level objectives should be broad; you may only have 3-5 course-level objectives; they would be difficult to measure directly because they go beyond the topics of the entire course;
- lesson-level objectives are used to demonstrate that the student has mastered the course-level objectives; we do this by building lesson-level objectives that work toward a course-level objective; for example, a student may need to demonstrate mastery of 8 lesson-level objectives to demonstrate mastery of one-course level objective;
- because the lesson-level objectives directly support the course-level objectives, they need to create a Bloom’s Taxonomy to help students achieve mastery of the course-level objectives; use Bloom’s Taxonomy to ensure that the verbs you choose for the lesson-level objectives match the verb level that is in the course-level objective; lesson-level verbs can be lower or equal to course-level verbs but **MUST NOT** have a higher level; for example, a course-level verb can be an application-level verb, “illustrate.”; your lesson-level verbs can come from any Bloom level that is equal to or lower than this level (applying, understanding, or memorising).



It is possible to separate certain stages in preparation for effective learning objectives.

They are listed below:

1. Make sure there is one measurable verb in each objective;
2. Each objective needs one verb. Either the student can master the objective, or he cannot master it. If an objective has two verbs (say, define and apply), what happens if the student can define but not apply? Are they demonstrating mastery?
3. Ensure that the verbs in the course-level objective are at least at the level of Bloom's top taxonomy as the top lesson-level objectives that support it. (Because we cannot verify that they can assess, our lessons only taught (and assessed) them to define.);
4. Try to make all learning objectives measurable, clear, and concise.

The benefits of Bloom's Taxonomy are evident. Bloom's Taxonomy is designed to help teachers identify the intellectual level at which individual students are capable (Rudnicki, 2018). It also assists students in further pursuing more specific questions and creating instruction to improve critical thinking as they pursue the top three levels of analysis, synthesis, and evaluation as students prepare to reach those levels.

Research indicates that teachers ask 300-400 questions per day. Consequently, teachers must have an arsenal in their toolboxes to engage students, encourage discussion, stimulate higher cognitive thinking, and assess student learning progress. It all makes Bloom's Taxonomy a potent tool that can be easily applied to the teaching profession. Higher cognitive thinking tends to encourage further understanding of other related content, such as problem-solving, making judgments, assessment, and reflection.

With Bloom's Taxonomy, difficult questions can be posed to students to establish their knowledge because the facts provided form the basis of their justification for the answer, and promote student ownership and a sense of power over their education because students can be motivated in a direction that encourages making judgments as well as engaging with an idea,



allowing them to reflect on a particular issue where the teacher presents the implications of the ideas. Essentially, Bloom's Taxonomy helps to encourage and teach students to make their own decisions just in the classroom, but it also helps to promote a life skill.

Sometimes creativity is not the goal, but a means that can be used effectively to further learning. You might ask students to create something in the first lesson, such as a false advertisement for a marketing class or a proposed solution to global warming. Teachers can deconstruct and compare the results with them and then use this creative project to present facts, concepts, and background knowledge about the topic. In this regard, although the structure elements are always the same, they are not necessarily arranged in a pyramid as in Bloom's original taxonomy. Bloom's taxonomy structure can morph into anything from a circle to a network, to a flower, and even a mandala (below) in design, showing each level of learning connecting and appearing at different points in the process. No matter how you divide (or organise) Bloom's Taxonomy, it always uses six key principles for deeper learning.

## Learning outcomes

What are learning outcomes? Multiple definitions exist, but all are relatively similar: 'Learning outcomes are statements of what a learner is expected to know, understand and be able to demonstrate at the end of a learning experience.' (Kennedy, D., Ryan, N. & Hyland, A. 2007)

Learning outcomes at all levels of education should fall into three categories: knowledge, practical application skills and social competences. By the effects of education, we mean the set of competences that a student has after completing a course, department or stage of education.

Elliot Eisner noted that in pedagogy, empirical research on educational goals is needed to examine the relationship between the way goals are formulated and their quality, the extent to which teachers set learning goals for themselves and their students, the impact of goals on curriculum planning and teaching, and the relevance of learning goals supporting the learning process. Educational goals can be divided into two sections: teaching goals, which emphasise the acquisition of general knowledge, and expression goals, which develop and modify existing



knowledge. It is important for the student to discover their passions and strengths on their own as part of the goals set. Expressive goals are aimed at looking for diversity and not at the unification of students' thought patterns.

In adopting the term 'outcomes' in place of objectives, Elliot Eisner differentiated between the latter, which imply a preformulated specific goal and the former, which are essentially what one ends up with, intended or not, after some form of engagement'. Outcomes, in Eisner's terms, are broad overarching consequences of learning which do not meet the stringent criteria which necessarily apply to behavioural objectives, where the latter are unambiguous, specific statements of expected behaviour which include the conditions under which the behaviour will occur and the standards of performance which are acceptable.

The process that led us to the present concept of learning outcomes can be traced at least from the rapid development of secondary and higher education in the mid-twentieth century. Significantly increased public spending has created a sense that teachers need to make their apprenticeships more responsible and that students have to complete the next stages of education with a range of adequately planned competences. In response to the question of who an educated person is, the general idea of development and education had to be translated into measurable and objective criteria. Which sometimes leads to the creation of dehumanised tables that do not correspond to the needs and expectations of the students. However, in order to objectify the teaching process, we must be able to define the observable outputs of educators' activities, i.e. learning outcomes. However, they should be considered more broadly than just in terms of the assessment and final results of the exams. Education should also lead to the development of the personality, equipping the student with a sense of responsibility for their own development, independence in making decisions and selecting scientific materials, and this, as a result, is sometimes immeasurable. Learning outcomes have become very fashionable among education theorists and are included in the guidelines of school inspectors. They are used to define precisely what the learner should know or understand and what skills or abilities they will have at the end of a certain period of study. They are usually used to define the minimum acceptable standard of performance, but it is worth remembering about prioritisation when designing them and introducing students to the following levels of



development. It paves the way for a distinction between general, specific, basic, transferable and non-transferable skills; different types of knowledge and understanding, etc., all identifiable as outcomes and, therefore to some extent, available for objective evaluation.

It is worth reversing the order, not only thinking about what goals the teacher wants to achieve but what the student expects from a given stage of work, what he would like to learn, what skills to develop. Equipping students with the right tools will allow them to choose appropriate solutions consciously.

Learning outcomes focus on what the learner has achieved rather than the teacher's intentions and what the learner can demonstrate at the end of a learning activity.

It is worth remembering these categories when designing the entire course and during individual classes or lectures. The purpose of a module or curriculum is a general statement of the teaching intent, indicating what the teacher intends to cover in the teaching block. Objectives are usually written from the teacher's point of view to indicate the overall content and direction of the module. The purpose of a module or program is usually to define the learning intentions in a specific way, i.e. it indicates one of the specific areas that the teacher intends to cover in the didactic block. One of the significant advantages of learning outcomes may be that they are clear statements of what is expected of the learner and how to demonstrate it – but it is worth remembering to leave a choice to propose a wide range of possibilities. From one perspective, learning outcomes can be seen as a kind of 'common currency' that helps modules and programs to become more transparent.

The learning outcomes approach is, first and foremost, a perspective and mindset to develop relevant programs. While an indispensable part of the implementation phase, writing learning outcomes is, of course, only the visible surface of this perspective or a consequence of its implementation. The work of Benjamin Bloom (1913-1999) was recognised by the staff at University College Cork in Ireland as a useful starting point for writing learning outcomes. Bloom believed that teachers should design lessons and assignments to help students achieve their own goals. Bloom identified three learning domains – cognitive, affective, and psychomotor – and found that there was an increasing order of complexity in each of them.



The taxonomy provides a framework within which to build on prior learning to develop more complex levels of understanding. Bloom's taxonomy was not just a classification – it tried to organise various thought processes into a hierarchy. Each level depends on the student's ability to operate at or levels below him in this hierarchy. For example, for a student to apply knowledge, he would need to have both the necessary information and an understanding of that information. Speaking of teaching, Bloom always recommended that when teaching and assessing students, it is important to remember that learning is a process and that the teacher should try to inspire students to move forward.

International trends in education indicate a shift away from the traditional “teacher-centred” approach to a more “student-centred” approach. Whereas traditionally, the focus was on what the teacher did, in recent years, the focus has shifted to what students have learned and can demonstrate at the end of a module or program. Among the key features of outcomes-based education listed by Harden (2002) are:

- development of clearly defined and published learning outcomes that must be achieved by the end of the program;
- developing curriculum, learning strategies, and learning opportunities to ensure achievement of the learning outcome;
- assessment process aligned to the learning outcomes and assessment of individual students to ensure they achieve the outcomes; the requirement to make the teaching and learning process more transparent and explicit is challenging for all involved in education; in the short term, this involves preparing for the immediate challenge of articulating modules and programmes in terms of learning outcomes; in the longer term, adopting a learning outcomes approach can help to adopt a more systematic approach to programme and module design.

If the emphasis is on what learners will be able to do, it distinguishes this learning outcomes approach from one that uses more elusive ideas about learning goals and tasks. There are important debates in the educational literature about the difference between goals/outcomes



and competences, but this introduction will not bother you with these little details. The keyword is DO, and the key need in developing learning outcomes is the use of active verbs. Notice how we used words such as to give, use, and view in the introduction.

Learning outcomes are statements of what is expected that a student will be able to DO due to a learning activity. For this new version of the Core Curriculum, the activity will be following your materials on WWW or listening to a lecture based on them, but it could also be a laboratory class, even an entire study programme. Note how we emphasise what students will be able to do. This distinguishes an approach based on learning outcomes, using more intangible ideas related to educational aims and objectives. There are important debates about the differences between objectives /outcomes and competencies in the educational literature, but this introduction will not bother you with these niceties. The keyword is DO, and the critical need in drafting learning outcomes is to use active verbs. Note how we used words such as to give, use and have a view in the introduction.

## **Students' knowledge and skills evaluation**

Appropriate evaluation is a process intertwined with all stages of course planning. The evaluation of the teaching results can be assessed from the position of a teacher or a student. It represents a form of feedback for the teacher to correct his next teaching activity in terms of student readiness to continue the process of acquiring knowledge and skills. The evaluation of teaching results for the student has an impression of motivation to achieve better performance, and deficiencies found represent development opportunities. There opens space for multi-criteria evaluation in modern education methods and thus eliminates deficiencies in the evaluation of one mark. The quality of university education is affected by the evaluation quality of teaching results. The evaluation of the teaching results finds and assesses the level of knowledge and skills obtained in relation to established standards. Standards are prepared on the basis of practical needs in terms of content in the field and the personal development of the student by the influence of the pedagogical process. The assessment of results of university education at the present stage of social development experienced the transition from quantitative to a qualitative evaluation of results. Quantitative



results are mainly the total number of students and number of successful graduates concerning the number accepted. The qualitative results can include the applicability of students in practice, transfer of know-how from renowned foreign universities, scientific research results with adequate participation of university students, successful study stays in foreign universities.

Assessment should relate to knowledge (Assesses mastery of discrete elements of knowledge, such as important history facts, spelling words, foreign language vocabulary, and parts of plans), reasoning (Assesses blocks of knowledge rather than pieces of detached information – such as causes of environmental disasters, the carbon cycle in the atmosphere, how one mathematical equation can be derived from another, or the concept of checks and balances in the government; helps identify whether a student has strong reasoning or problem-solving), skills (Determines whether a student can skillfully complete a task or perform in the desired manner, such as mixing chemicals correctly, engaging in skilled debate, holding a conversation in a foreign language, or making a decision in a legal case based on constitutional law), products (determines whether a student can create a quality product based on what they have learned. These might include a business presentation, a lab report, a health and fitness plan, a balanced chequebook register, a creative work of art, or even a news article or broadcast) and disposition (Gathers information about a student's dispositions and their ability to reason and allow you to probe more deeply; can take the form of interviews, student journals that you read and respond to, open questions during instruction, and oral exams).

The last key 'fundamental' of the teaching and learning process is evaluation and innovation: assessing what has been done and then looking at ways to improve on it.

### **Types of evaluation**

- according to form: oral, written, practical, electronic;
- according to time: entry continuous, final;
- according to student number: individual, group, frontal.





## Evaluation is important

It works mutually. We check whether students have mastered the material and can apply it in practice and whether we conduct classes effectively. New tools and new approaches to teaching are constantly coming available. They provide the opportunity to experiment a little to see if the results are better, and if we do that, we need to evaluate the impact of using a new tool or course design. It is what professionals do. But the main reason is that teaching is like golf: we strive for perfection but can never achieve it. It is always possible to improve, and one of the best ways of doing that is through a systematic analysis of past experience.

Simply put, we should evaluate three elements: knowledge, skills and social competences. It is best not to prepare a large test at the end of the classes but divide the assessment into several stages. We could use CATs. Classroom Assessment Techniques (CATs) are generally simple, non-graded, anonymous, in-class activities designed to give you and your students useful feedback on the teaching-learning process as it is happening.

Examples of CATs include the following.

- The *Background Knowledge Probe* is a short, simple questionnaire given to students at the start of a course or before introducing a new unit, lesson, or topic. It is designed to uncover students' pre-conceptions.
- The *Minute Paper* tests how students are gaining knowledge or not. the instructor ends class by asking students to write a brief response to the following questions:  
“What was the most important thing you learned during this class?” and “What important question remains unanswered?”
- The *Muddiest Point* is one of the simplest CATs to help assess where students are having difficulties. the technique consists of asking students to jot down a quick response to one question: “What was the muddiest point in [the lecture, discussion, homework assignment, film, etc.?” the term “muddiest” means “most unclear” or “most confusing.”



- The *What's the Principle?* CAT is useful in courses requiring problem-solving. After students figure out what type of problem they are dealing with, they often must decide what principle(s) to apply to solve the problem. This CAT provides students with a few problems and asks them to state the principle that best applies to each problem.
- *Defining Features Matrix*: Prepare a handout with a matrix of three columns and several rows. At the top of the first two columns, list two distinct concepts with potentially confusing similarities (e.g. hurricanes vs tornados, Picasso vs. Matisse). In the third column, list the important characteristics of both concepts in no particular order. Give your students the handout and have them use the matrix to identify which characteristics belong to each of the two concepts. Collect their responses, and you will quickly find out which characteristics give your students the most trouble.

All these tools will allow us to answer the following questions:

1. Were the learning outcomes or goals clear to students?
2. What learning outcomes did most students struggle with?
3. Was the teaching material clear and well structured?
4. Were the learning materials and tools students needed easily accessible and available 24 x 7?
5. What topics generated good discussion and what did not?
6. Did students draw appropriately on the course materials in their discussion forums or assignments?
7. Did students find their own appropriate sources and use them well in discussions, assignments and other student activities?
8. Which student activities worked well, and which badly? Why?



9. What of the supplied learning materials did students make most and least use of?
10. Did the assignments adequately assess the knowledge and skills the course was aiming to teach?
11. Were the students overloaded with work?
12. Was it too much work for me as an instructor?
13. If so, what could I do to better manage my workload (or the students') without losing quality?
14. How satisfied were the students with the course?
15. How satisfied am I with the course?

It is also essential to prepare students for self-assessment. Self-evaluation (or self-assessment) is a descriptive and evaluative act performed by a student concerning his own work and academic ability. It has many mechanisms and techniques by which students describe the characteristics and outcomes of their own learning processes. For self-assessment to be effective, students should be prepared and equipped with the ability to perceive their own actions and help them see progress and teach them to correct learning outcomes. We should take into account factors contributing to or inhibiting learning. There is a range of resources you can draw on to do this, much more in fact than for evaluating traditional face-to-face courses, because online learning leaves a traceable digital trail of evidence:

- student grades;
- individual student participation rates in online activities, such as self-assessment questions, discussion forums, podcasts;
- qualitative analysis of the discussion forums, for instance, the quality and range of comments, indicating the level or depth of engagement or thinking;



- student e-portfolios, assignments and exam answers;
- student questionnaires;
- focus groups.

However, before starting, it is useful to draw up a list of questions as in the previous section and then look at which sources are most likely to provide answers to those questions.

At the end of a course, we should look at the student grades and identify which students did well and which struggled. This depends, of course, on the number of students in a class. In a large class, I might sample by grades. If we use CATs, we will be able to monitor the learning process of students and check their progress throughout the semester. Students also have more control over their mastery of the material and their own development.

“Many institutions have a ‘standard’ student reporting system at the end of each course. These are often useless for evaluating courses with an online component. The questions asked need to be adapted to the mode of delivery. However, because such questionnaires are used for cross course comparisons, the people who manage such evaluation forms are often reluctant to have a different version for online teaching. Secondly, because students usually voluntarily complete these questionnaires after the course has ended, completion rates are often notoriously low (less than 20 per cent). Low response rates are usually worthless or, at best, highly misleading. Students who have dropped out of the course will not even look at the questionnaire in most cases. Low response rates tend to be heavily biased towards successful students. It is the students who struggled or dropped out that you need to hear from.”

### **The purpose of assessment (according to Bates)**

There are many different reasons for assessing learners. It is essential to be clear about the purpose of the assessment because it is unlikely that one single assessment instrument will meet all assessment needs. Here are some reasons (you can probably think of many more):

- to improve and extend students learning;



- to assess students knowledge and competence in terms of desired learning goals or outcomes;
- to provide the teacher/instructor with feedback on the effectiveness of their teaching and how it might be improved;
- to provide information for employers about what the student knows and/or can do;
- to filter students for further study, jobs or professional advancement;
- for institutional accountability and/or financial purposes.

### **Methods of assessment (according to Bates)**

The form the assessment takes and the purpose will be influenced by the instructors' or examiners' underlying epistemology: what they believe constitutes knowledge, and therefore how students need to demonstrate their knowledge. The assessment form should also be influenced by the knowledge and skills that students need in a digital age, which means focusing as much on assessing skills like knowledge of content. Thus continuous or formative assessment will be as crucial as summative or end-of-course assessment. There is a wide range of possible assessment methods. I have selected just a few to illustrate how technology can change the way we assess learners in ways that are relevant to the digital age:

- **No assessment**

A question to be considered is whether there is a *need* to assess learning in the first place. There may be contexts, such as a community of practice, where learning is informal, and the learners themselves decide what they wish to learn and whether they are satisfied with what they have learned. In other cases, learners may not want or need to be formally evaluated or graded but do want or need feedback on how they are doing with their learning. 'Do I really understand this?' or 'How am I doing compared to other learners?'



- **Computer-based multiple-choice tests**

This method is good for testing ‘objective’ knowledge of facts, ideas, principles, laws, and quantitative procedures in mathematics, science and engineering etc., and are cost-effective for these purposes. This form of testing though tends to be limited for assessing high-level intellectual skills, such as complex problem-solving, creativity, and evaluation, and therefore less likely to be helpful in developing or assessing many of the skills needed in a digital age.

If we remember the principle “if the answer can be googled, it is not an appropriate evaluation”, it is worth giving up tests and using, for example – open book exams. This type of exam checks whether the student has understood a given part of the material and can apply it in practice and solve a problem with it.

- **Written essays or short answers**

This method is good for assessing comprehension and some of the more advanced intellectual skills, such as critical thinking, but it is labour intensive, open to subjectivity, and not good for assessing practical skills. Experiments are taking place with automated essay marking, using developments in artificial intelligence, but so far, automated essay marking still struggles to identify valid semantic meaning. It is worth remembering that this tool is suitable for all scientific disciplines, not just humans.

- **Project work**

Project work encourages the development of authentic skills that require an understanding of content, knowledge management, problem-solving, collaborative learning, evaluation, creativity and practical outcomes. Designing good and practical project work needs a high level of skill and imagination from the instructor.



- **e-Portfolios (an online compendium of student work)**

E-portfolios enable self-assessment through reflection, knowledge management, recording and evaluation of learning activities, such as teaching or nursing practice, and recording of an individual's contribution to project work; e-portfolios are usually self-managed by the learner but can be made available or adapted for formal assessment purposes or job interviews.

It is worth adding to Bates list a learning diary, kept throughout the semester, preferably in the digital version, in which the student writes down his notes from self-read materials, sets his own priorities, analyses the progress together with the teacher.

- **Simulations, educational games (usually online) and virtual worlds**

These facilitate the practice of skills, such as:

- complex and real-time decision-making;
- operation of (simulated or remote) complex equipment;
- the development of safety procedures and awareness;
- risk-taking and decision-making in a safe environment, activities that require a combination of manual and cognitive skills.

These methods are currently expensive to develop but cost-effective with multiple-use, where they replace the use of costly equipment, where operational activities cannot be halted for training purposes or were available as open educational resources.

It can be seen that some of these assessment methods are both formative in helping students to develop and increase their competence and knowledge, as well as summative in assessing knowledge and skill levels at the end of a course or program. In a digital age, assessment and teaching tend to become even more closely integrated and contiguous.



## Conclusion

“Nothing is likely to drive student learning more than the method of assessment. At the same time, assessment methods are rapidly changing and are likely to continue to change. Assessment in terms of skills development needs to be both ongoing and continuous as well as summative. There is an increasing range of digitally based tools that can enrich the quality and range of student assessment. Therefore the choice of assessment methods, and their relevance to other components, are vital elements of any effective learning environment.”

The question of how and when we will test the knowledge and skills of our students is worth asking before starting the course. You should also agree with the students on the evaluation principles at the beginning of the course and work with methods that will later help them develop their competences. Evaluation works both ways and should not prove to students that they do not understand something but to check their development and provide information on whether we conduct classes effectively.





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## 2. Methodology's teaching methods: flipped classroom, gamification

### Flipped classroom

This figurative name, this "flipped classroom", refers to two aspects that are the pillars of this model. The first is a role reversal in education – the teacher removes himself from the centre of attention, and the students take his place. In practice, the teacher limits the use of the lecture method (direct transmission method) and tries to create conditions conducive to student learning. The second aspect relates to the reversal of the process of substantive preparation – students, before they proceed to the assimilation of specific material, look for references to their subject knowledge, independently use external sources (primarily materials provided by the teacher), process the acquired knowledge, so that only at the end, during the class, make a synthesis and under the active guidance of the teacher, fill in the gaps.

We can define a "flipped classroom" in the following words:

Students' first exposure to new material in the course, and their steps in basic learning of that material, will take place outside of synchronous meetings (wherever and however they are conducted) and will be individual because students can take advantage of unstructured time to interact with the material at their own pace, and because basic cognitive tasks do not require as much intensive expert assistance as higher-level tasks. Having moved the first-person experience out of the classroom (real or virtual), the entire course encounter is now open to higher-level questions and tasks-the kinds of complex, challenging work that students must do in a group space to assimilate the information they have seen and that will benefit the most from social interaction with peers and close guidance from an expert.

For the "flipped classroom" to exist in academic practice, four elements are necessary:



- a channel of communication with students where the academic teacher will be able to share materials (for example, MS Teams platform, padlet.com, Moodle platform);
- appropriate factual materials (created by the teacher or ready-made, available on the Internet) or engaging, short issues, research problems to be explored by students and questions to be answered;
- knowledge of group work methods possible in blended learning;
- regular examination of the learning outcomes during the semester, which makes up the final grade.

Group work methods are an integral part of the "flipped classroom" model. Among them can be used:

- liberating structures;  
Liberating Structures are easy-to-learn microstructures that enhance relational coordination and trust. They quickly foster lively participation in groups of any size, making it possible to truly include and unleash everyone.
- critical thinking routines;  
A thinking routine is a set of questions or a short sequence of steps used to scaffold and support student thinking.
- activating methods;  
There are many methods of group work. It is essential that these methods are based on structures that liberate rather than constrain; that trigger self-esteem, engagement, responsibility. Therefore, it is worth taking care of the working groups' configuration, how they interact and how they present the results of their work.
- methods for examining learning outcomes (acquired information, skills and competences), allowing for ongoing evaluation;

When using different methods of examining the learning outcomes, it is worth remembering that planning moments during the semester when the students summarize their knowledge, find out what they know and what still needs to be developed is very important. It allows a student to see where he/she stands in the process. It also allows the teacher to adjust the planned teaching process to serve the students best.



The creators of this method: Salman Khan (Khan Academy), Joe Bergman and Aaron Sams (2012) have shown that students absorb material more effectively if they acquire knowledge independently. Before each class, the teacher points out to students concisely the thematic issues and provides learning materials such as videos, book excerpts, articles, infographics, etc. According to their own pace of learning, students assimilate basic information (e.g. basic concepts and theoretical issues). Students do not listen to the teacher's lecture during the classes, but they undertake practical activities, exercises, and discussions. Polish specialists from the Adam Mickiewicz University, led by Professor Stanislaw Dylak and the Polish National Foundation for Computer Education, developed an extended version of the flipped classroom – the strategy of anticipatory education. This approach corresponds to the "flipped classroom" but is characterized by, among other things, greater student independence in the process of acquiring knowledge.

Anticipatory learning contains four stages:

## 1. Activation

Students activate their shared knowledge of subjects, phenomena, and problems within the discipline at this stage. The new material will be meaningful to the student only when it is possible to relate its content to the cognitive structure that is the product of his/her prior learning. The teacher acts here as a guide – supports students in the process of creative thinking about a given problem, inspires and mobilizes them to individual searches for information, encourages them to share their thoughts and judgments, colloquial opinions, and to reach for popular and scientific sources.

In practice:

- the teacher brings in an issue and posts it on the digital platform of his/her choice where he/she works with students (e.g. in Teams on the Teams platform, on the general channel). Students share their thoughts in the comments, discuss, cite sources, try to find answers, thus learning from each other (peer learning);
- the teacher divides the students into smaller groups; each group chooses a topic from the pool of topics suggested by the teacher. Each group has the task to create an e-



portfolio around the chosen topic. An e-portfolio is an electronic documentation of the total experience gained by the student during the independent or group learning, inspired by the teacher's tasks. At the activation stage, the e-portfolio should include texts read, sometimes loosely related to the topic, reflections on them, initial notes, photos.

## 2. Processing

The second stage of the anticipatory learning strategy ("flipped classroom") takes place in a digital environment on a platform (in a distance learning environment). Students use instructed or teacher-prepared materials on given topics, learn new facts and concepts and develop new skills. Students use intellectual processes such as analysis, synthesis, generalization, comparison, definition, and the processes of justification of statements at the processing stage – checking, proving, explaining, inferring, thanks to which they construct their knowledge.

In practice, in the processing stage, students complete individually or in groups a specific task proposed by the teacher based on previously collected materials. The processing stage takes place outside of class, and its results should be visible on the digital platform chosen for collaborative communication. The processing can occur when the student or group answers questions prepared by the teacher on a specific topic. It is valuable for the answers to be found, for example, on the previously prepared e-portfolio and to discuss this stage – among the students themselves and between the students and the teacher. The key to success in this stage is for the teacher to prepare an exciting task and to pose intriguing questions. At the end of the processing stage, there may be a test. Not a test to assess student knowledge, but one that will show the teacher what the students do not know, what they did not understand during processing, and what they are remarkably talented. It will help the teacher prepare for the next step – systemizing.

## 3. Systematization

Systematization is a stage carried out in class in the presence of the teacher. It consists of completing the knowledge structures already internalized by the students. At this stage, students organize the knowledge acquired during the activities at the processing stage. At the same time,





they also build their own cognitive schemas and locate them in the system of already mastered concepts, operations, statements and beliefs, according to specific categories of educational goals selected by the teacher. The role of the teacher at the systematization stage is crucial. He or she no longer acts as a transmitter of knowledge but as an architect of the students' knowledge – he or she sees the gaps, towers, and collapses, and with his or her questions and arguments can equalize and make coherent.

In practice:

- the teacher can invite group work, during which students share their acquired knowledge among themselves and complement each other;
- the teacher may ask for a presentation of the results of individual or group work – the presentation does not have to be done with the help of PowerPoint. It can be done with the help of a poster, showing the e-portfolio, creating a story, generating new questions, etc.
- the teacher does not lecture in this lesson but complements, interprets, systematizes, explains and answers questions. After class, students make corrections to their notes or e-portfolio.

#### **4. Evaluation and assessment**

After processing and systematizing the acquired knowledge, students may be evaluated. The teacher makes the assessment – it is to be based on measurable indicators and expressed in measurable values, according to criteria developed in consultation with the students. Only after the grade/point has been given does the evaluation take place – the final fourth stage of the strategy. Grading is the assignment of specific values to student achievement. On the other hand, evaluation is a somewhat inverted process: it involves valuing, assigning something to the specific values for which the action was initiated. Anticipatory education should be more attuned to the individual intellectual needs of students to create conditions for their independent, critical construction of knowledge.

On the other hand, in the evaluation process, students may note, for example, that they did not have many opportunities for independence, that the tasks were not inspiring for them, or that



they did not do what they should have done. Such responses should inspire teachers to rethink their actions in this strategy. In the evaluation phase, students deal with their knowledge from the outside as critics and reviewers. In the process of evaluation, students summarize their work and their achievements themselves. They wonder what could be added or what sources they forgot; whether and how they could organize their work better; which tasks they find most interesting and helpful, and which ones too difficult or even unnecessary; what has changed in their knowledge since they worked on the given topic – e.g. "did I know what I know now?" or "how do I understand now what I thought I already understood before?" This stage shows students the path they have taken around the topic and strengthens them through it; it is also triggered criticism of one's performance and the belief that answers to questions always raise new questions. Evaluation can occur on a digital platform and is the final stage in mastering a topic. Here, the teacher can suggest or offer a ready-made evaluation tool.



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## Gamification

### Introduction

One of many possible techniques that could be used in the flipped classroom seems to be gamification. By using gamification rules, students can more effectively develop their own knowledge and skills as well as more deeply interact with others.

According to Karl Kapp (2012), gamification is a process in which some elements and rules of games are used. The aim of these elements and rules is to enhance the level of motivation and engagement of people, motivate action, promote learning, and solve problems in non-game situations.

Precisely the same goals can be achieved by using gamification in education. The main problems of contemporary education are connected with students' lack of engagement and motivation to participate actively in the learning process. The incorporation of game elements and rules into an educational environment results in an increased students' level of motivation and engagement. Thanks to the gamification of the entire course or selected classes, we can, among many others, engage more students, optimise the learning process, introduce objectives that bring a purpose to learning, support behaviour changes, socialise or increase interactive cooperation.

Comparing the gamified and non-gamified classes, it can be definitely said that in the first option, students have the opportunity to gain more profound, more detailed, and practical knowledge that they have gained at their own pace, based on their own decisions and choices, according to their skills, aptitudes and previous experiences. It is the student who is supposed to want to study and who becomes responsible for her/his own learning.



As Gabriela Kiryakova, Nadezhda Angelova, and Lina Yordanova (2014) emphasise, several ideas or terms are closely connected with gamification or game-based learning and should be clearly distinguished if we want to avoid misunderstandings:

1. Game inspired design: using the playful design without adding game elements;
2. Serious games: games designed for a specific purpose rather than for fun;
3. Simulation: similar to serious games, but their purpose is user training in circumstances resembling real life;
4. Games: include all the features mentioned above but designed for entertainment.

### **Gamification / rules**

Some distinctive elements should be taken into consideration in the context of gamification of learning. Appropriately designed mechanics, dynamics, and aesthetics of the game/gamified class can guarantee a state of flow by gamers/students and thus maximise their engagement level.

The game mechanics consist of differentiation of tools such as points, levels, rankings, challenges and tasks, badges. Then, the elements that influence the quality of playing and motivate to constitute the game's dynamics. These are autonomy, voluntariness, a sense of purpose, cooperativity. Finally, the game's aesthetics determines how mechanics and dynamics are visualised, how cues are represented, and how feedback is displayed. In other words, the game's aesthetics has an impact on the emotional state of the gamers/students. Of course, aesthetics seems to be the crucial element in games; however, in the case of game-based learning, it is an essential activating factor.

In the context of gamified learning, it is worth knowing different forms of gaming. Roger Caillois (2001) names and defines four types:

1. *agôn* (competition on an artificially playing field; a gamer plays for the satisfaction of own winning and an opponent's losing; e.g., chess or sports games),



2. *alea* (games of chance; all gamers are accompanied by a sense of uncertainty about the final result of the game; there is no “winner – loser” relation – a gamer plays against herself/himself or fate; e.g., roulette or one-armed bandit),
3. *mimesis* or *mimicry* (role-playing games; players have avatars using which they enter the game world; ultimate immersion games; e.g., “The Witcher” or “Divinity: Original Sin”),
4. *ilings* or *vertigo* (disorientating oneself, thrill-seeking or risk-taking games; players have strong sensory experiences and must challenge their own weaknesses, overcoming which is the victory in the game; e.g., bungee jumping or roller coaster riding).

Of course, the boundaries between the types mentioned above often are fluid ones. In this context, a teacher can use already existing games (board games, arcade games, “tic-tac-toe”, “taboo”, “puns”, etc.) or create their own original game.

### Motivation of gamers

One of the key issues for gamification seems to be the motivation of gamers/students. Nick Yee (2006) identifies ten motivating components, which has been classified into three groups of motivations:

1. Achievement: advancement (the desire to gain power, progress rapidly, and accumulate in-game symbols), competition (the need to challenge and compete with others), mechanics (feeling an interest in analysing the underlying rules and system);
2. Social: socialising (having an interest in helping and chatting with other players), relationships (the desire to form long-term, meaningful relationships with others), teamwork (deriving satisfaction from being part of a group effort);
3. Immersion: discovery (finding and knowing things that most other players do not know about), role-playing (creating a persona with a background story and interacting with other players to create an improvised story), customisation (having an interest in customising the appearance of their character), escapism (using the online environment to avoid thinking about real-life problems).



Another classification has been proposed by Rajat Paharia (2003), who points out five key intrinsic motivators that seem to be crucial in the frame of gamification:

1. Autonomy: urge to direct our own lives (to control);
2. Mastery: desire to get better (to improve);
3. Purpose: the yearning to be a part of something larger than ourselves (to mean, to make a difference);
4. Progress: desire to see results (to achieve);
5. Social Interaction: need to belong and interact (to connect).

## Typology of gamers

Richard Allan Bartle, writer and game researcher, divided virtual world players into four types:

### *1. Achiever*

For this type of player, the most important things are points, achievements and gaining levels. It is important to win, but also to be able to compare oneself with other players (for example, by means of a scoreboard).

### *2. Explorer*

For this type of player, the most important thing is to be able to use the game resources, gain new information, discover secrets. This type of player likes surprises. The greatest reward is not the points earned but the discovery of new areas of the game.

### *3. Socialiser*

This type of player must contact other players with whom they interact, make new friends, and enjoy playing together. This type of player is not focused on winning but on working together. A Socialiser realises that together they can do more. According to Bartle, this is the largest group of players (80%).



#### 4. Killer

For this type of player, the most important thing is domination, fighting, winning. In these characteristics, he is similar to an Achiever. The difference is that he wants to defeat his opponent first and foremost. Satisfaction comes from the number of defeated players, not just the number of points scored. For a Killer, the points he has won are important, but even more important are the points his opponent has lost.

When gamifying an activity, these four types may appear simultaneously or only a selection of them. It is a good idea to conduct a survey among students (pupils) before starting the game in order to determine what types of players they are. The results, however, should not determine the entire process of gamification of classes because the attitude to gamified areas may change.

It is a good idea to run a test with a group of students to see what types of players we are dealing with.

The test can be done at the beginning of the session or twice, at the beginning and the end of the session, giving interesting results about how the types of players may change during the session.

The test is available online at the link: <https://matthewbarr.co.uk/bartle/>

### **Gamification in education**

Games, as well as gamification in education in their fundamental principles, are present since forever. Education through play is a basic model of learning typical of human beings. At the higher levels of education, due to the creation of a certain ethos of seriousness and authority of the university, the element of play has been deliberately excluded. However, the ongoing changes in education are creating space for the re-inclusion of these forms of learning.

There have been, and continue to be, disputes over which teaching methods can be considered the most effective. Some researchers have concluded that games are not competitive with typical teaching tools or will not work for all learners. However, the current body of literature and research suggests that the potential inherent in games and gamification should be exploited.



Gamification can be used at any level of education. Thanks to participation in gamified activities, students can acquire knowledge and develop specific skills, shape desired attitudes and behaviours. Gamification may be a method of influencing students' motivation and decision-making processes, which may affect the number of people completing a given course, the results achieved, and ultimately – obtaining a diploma.

Gamified classes can, of course, take place online as well as in the traditional form of lectures, presentations or exercises. In both cases, the functioning of the assessment system changes, i.e. the way grades are collected, and finally, the way credit is obtained. Students' actions and achievements are converted into points, which in turn are converted into rewards or levels, which in time will translate into final grades and ultimately a passing grade for the semester. Additionally, students can be offered challenges in the form of additional tasks, special assignments, and there are many possibilities. However, regardless of the form, the key is voluntariness; it is related to building motivation and student involvement in the process. It gives them an opportunity to choose what and when they learn, and on the other hand, it rewards them on an ongoing basis for the knowledge they gain and points out deficiencies (the role of feedback). The student knows what is required precisely of him and can adapt the game to his own style of play. If he/she performs well in the future, this will result in less work, e.g. in the form of homework or exemption from exams. At the same time, we are dealing only with positive reinforcement. Lack of action or incorrect performance does not result in a punishment. By introducing gamification, it is also possible to create an appropriate storyline, which will consolidate the entire process at the level of history and will give it an appropriate character (dark, adventure, scientific, social). Thanks to “dressing” the classes in such a storyline, they will become a way of experiencing an adventure whose main goal is to gain established and proven knowledge. It seems that it is not always necessary to include elements of the game without the storyline, but it may significantly increase the attractiveness of the process. However, it will largely depend on the specifics of the group. It seems that an important factor in using games and gamification in education is the instructor's experience with games (he or she actively plays digital and analogue games, sees the advantages and positive sides of games) and conviction that working with this method is justified.



Table 1. Game-design elements and motives (by Blohm, I., Leimeister, J.M., (2013) Gamification: Design of IT-based enhancing services for motivational support and behavioural change. *Bus. Inf. Syst. Eng.* 5, 275–278. doi:10.1007/s12599-013-0273-5) Retrieved June 18, 2021 from [https://doc.rero.ch/record/311550/files/12599\\_2013\\_Article\\_273.pdf](https://doc.rero.ch/record/311550/files/12599_2013_Article_273.pdf)

| Game-design elements                   |                          | Motives                |
|--|--------------------------|------------------------|
| Game mechanics                         | Game dynamics            |                        |
| Documentation of behavior              | Exploration              | Intellectual curiosity |
| Scoring systems, badges, trophies      | Collection               | Achievement            |
| Rankings                               | Competition              | Social recognition     |
| Ranks, levels, reputation points       | Aquisition of status     |                        |
| Groups tasks                           | Collaboration            | Social exchange        |
| Time preassure, tasks, quests          | Challenge                | Cognitive stimulation  |
| Avatars, virtual worlds, virtual trade | Development/organisation | Self-determiantion     |

### Advantages of gamification

- potentially increases student engagement;
- creates enthusiasm;
- provides instant feedback;
- improves social connections and skills;
- self-confidence building;
- improves knowledge/skills acquisition and retention process;
- applies and practices learning within a meaningful and authentic context;
- places students within systems where they can safely manipulate and explore functions;
- learning to plan, act consistently and take responsibility for decisions.

Potential constraints, barriers and challenges related to gamification in education have been developed in the chapter **Methodology’s limitations and weaknesses (p. 210)**



1. Practitioners suggest that implementation of gamification should be done in small steps, starting with selected activities or classes and only then moving on to entire courses. It is pointed out that regardless of the scale of gamification, its implementation should proceed as follows:
  1. Identify the behaviours that one wants to change or the competences that one wants to develop in students;
  2. Identify the goal to be achieved, define it as testable and measurable;
  3. Consider who the students are, what is important to them, what motivates them, what kind of players they are;
  4. Consider the form of the activity, what elements of the games and what they will be used for;
  5. Coming up with a story, defining the fun element, and making most students want to join in?
  6. Define the so-called “game map” (Plan the tasks and the scoring system around which the game should revolve.

Three examples of gamification of courses at the university level are described below.

### **Gamification at the University of Gdansk**

The University of Gdańsk is one of the universities in Poland that leads the way in gamification experience. Especially famous are the courses created and taught by Ms Joanna Mytnik and Mr Wojciech Glac at the Faculty of Biology, University of Gdańsk. On the website <https://eduplus.com.pl/>, it is possible to have a look at the courses prepared so far. In the course “Neurobiology of addiction,” students have the opportunity to develop mechanisms and behaviours that protect them from developing an addiction to risky behaviours such as “failing the exam”. The way to develop them is to create a kind of psychological/behavioural “resistance” resulting from the accumulated points. The points are obtained by participating in and performing the prepared “tasks” (Fig. 1). These are characterised by level, time availability. Access to Level 2 tasks is restricted to those attending lectures. The tasks fall into categories

such as Questions for a drug addict (a question about the neurobiology of addiction to which students are supposed to prepare answers), drug dictionary (building an encyclopedia of basic terms in the field of neurobiology of addiction, the task of the course participant is to describe one entry), drug addict's outbursts (preparation of a short essay on a given topic), drug quiz, drug string (a multi-step task, where the correct answer to the task is a pass to the next one), drug-surprise egg (a bonus task, disclosure after opening).

| Zadanie                  | Poziom | Tydzień zajęć * |   |   |   |   |   |   |   |   |    |    |    |    |    |    | Punkty oporności | Czas na wyk. zad. | Liczba zadań |
|--------------------------|--------|-----------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|------------------|-------------------|--------------|
|                          |        | 1               | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |                  |                   |              |
| Pytania do narkomana     | 1      |                 | → | → |   |   | → |   |   | → |    |    | →  |    |    |    | 10               | 30 min.           | 5            |
| Narkosłownik             | 2      |                 |   | → |   |   | → |   |   | → |    |    | →  |    |    | →  | 10               | 1 tydz.           | 5            |
| Wynurzenia narkomana     | 1      | →               | → |   |   | → | → |   |   | → | →  |    |    | →  | →  |    | 20               | 2 tyg.            | 4            |
| Quiz narkowiedzy         | 2      |                 |   | → |   |   | → |   |   | → |    |    | →  |    |    | →  | 10               | 30 min.           | 5            |
| Ciąg narkotykowy         | 2      |                 |   |   |   |   |   |   |   |   |    |    | →  | →  | →  | →  | 35               | 4 tyg.            | 1            |
| Jajko narkoniespodzianka | 1      | ?               | ? | ? | ? | ? | ? | ? | ? | ? | ?  | ?  | ?  | ?  | ?  | ?  | ?                | ?                 | ?            |

czas, którym zadanie jest dostępne (kolorowy kwadrat)  
→ zadanie (kropka) i maksymalny czas na jego wykonanie (strzałka)  
 \* każdy kolejny tydzień zajęć rozpoczyna się wykładem i kończy z chwilą rozpoczęcia kolejnego wykładu

Figure 1. Example of the course gamification: activity plan with points and duration time. Neurobiology of addiction. Glac, 2014, *Neurobiologia uzależnień – księgaręgul.* Retrieved June 18, 2021, from [http://eduplus.com.pl/pliki/neurobiologia\\_uzalezniem\\_2014.pdf](http://eduplus.com.pl/pliki/neurobiologia_uzalezniem_2014.pdf) )

Depending on the number of points earned, students may be given a facilitated exam as determined by the instructor. These are the minimum exam grades that a person may earn regardless of the exam score and the option not to answer a selected number of test questions, which significantly increases the chances of raising the minimum grade.

The number of gamified courses and Mr Glac's testimonials clearly indicate the positive reception of the methods used by students and their effectiveness in the author's opinion.

## Gamification at Kazimierz Wielki University in Bydgoszcz

The staff of Kazimierz Wielki University in Bydgoszcz, Aleksandra Mochocka, Michał Mochocki and Mikołaj Sobociński, at the Department of English Philology, decided to gamify all their classes. The experiment lasted throughout the winter semester. The gamified



classes aimed to draw students into the world of science, academic considerations that would allow them to understand the information presented, increase their engagement, write interesting bachelor's and master's theses, and, most importantly, make students eager to learn throughout their lives. The basic principle that guided the teaching staff in the creation of gamified classes was the assumption that it is the student who should make decisions, actions, choices dictated by his/her own motivation. The student should want to study and should be responsible for his/her own learning. As in the game, each student's effort was rewarded and, importantly, one cannot "fail" the game. If you fail a level, you have to think about what to change, what skills to gain to start the game again next year. The game rules were as follows: students received an appropriate number of points for attendance at exercises, laboratories and lectures. For activity during classes, which was scored after each meeting. For preparing homework, credit assignments, essays, presentations. Of course, there were also points for tests. To facilitate the flow of information between teachers and students about tasks and points, Google Apps were used. Students also had three "lives"; they lost them when they did not fulfil their basic obligations, for not handing in their work on time, not taking tests, for absences, etc. Students who lost all their lives could not take the final exam – "zombies do not pass".

### **Gamification at the Jagiellonian University**

Lecturers at the Jagiellonian University in Kraków have decided to use gamification to create classes that students perceive as unique. Piotr Prokopowicz and Grzegorz Żmuda, prepared a modified course, "Personnel Psychology", for this purpose. At the first stage, students were able to choose avatars as their in-game personification for the rest of the course. Students accumulated points instead of traditional grades: experience – for class participation, knowledge – for literature tests, and charisma – for individual and group projects. To pass the course, students had to earn at least one bronze (60 points), one silver (75 points), and one gold (90 points) badge in selected aspects of character development.

Additionally, students received badges for remarkable achievements (e.g., being the first to volunteer for an individual project). Students could monitor their character development and thus their progress in the game on the course website. According to the instructors, the students liked this form of classes very much.



Below are other examples of gamified courses at universities, introduced as an educational innovation (tested capabilities, effectiveness, observed changes in student behaviour):

- “Operation Couch” – a gamified Psychotherapy course, by Anna Rogala from the University of Gdansk (Rogala, 2014);
- “The EU and the outside world” – a gamified course on the External Policy of the European Union, by Tomasz Kaminski, from the University of Lodz (Kaminski, 2014);
- "Data mining" – a gamified course by Mikołaj Morzy, from the Po- Poznan University of Technology (Morzy, 2011);

To sum up, implementing effective and efficient gamification is a demanding and complex process. It requires a high level of motivation and involvement from the teacher and is also time-consuming both at the preparation stage and conducting classes. On the other hand, it requires basic but solid digital competences connected with the extensive digital/online aspect of this method. At the same time, through the suggested freedom of students’ participation and the multiplicity of tasks, it becomes possible for students to function in those areas/activities in which they feel confident, and their skills allow them to do so. It provides opportunities for specific personalisation of the course and meeting the diverse needs of students. Gamification is a method that develops independence, initiative and social competences.

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## 3. Methodology's on-line tools: catalogue of tools and platforms available

### Introduction

The catalogue of tools and platforms suitable for use in applying the flipped classroom method has been developed according to the following description scheme:

#### 1. Tool description format:

- a) Print screen (screenshot) of the tool;
- b) Link to start page of the tool;
- c) General tool characteristics;
- d) Possibility of using the tool in teaching (suggestions);
- e) Supplemental materials;
- f) Search categories:
  - type of materials search;
  - accessibility;
  - type according to Bloom's taxonomy.

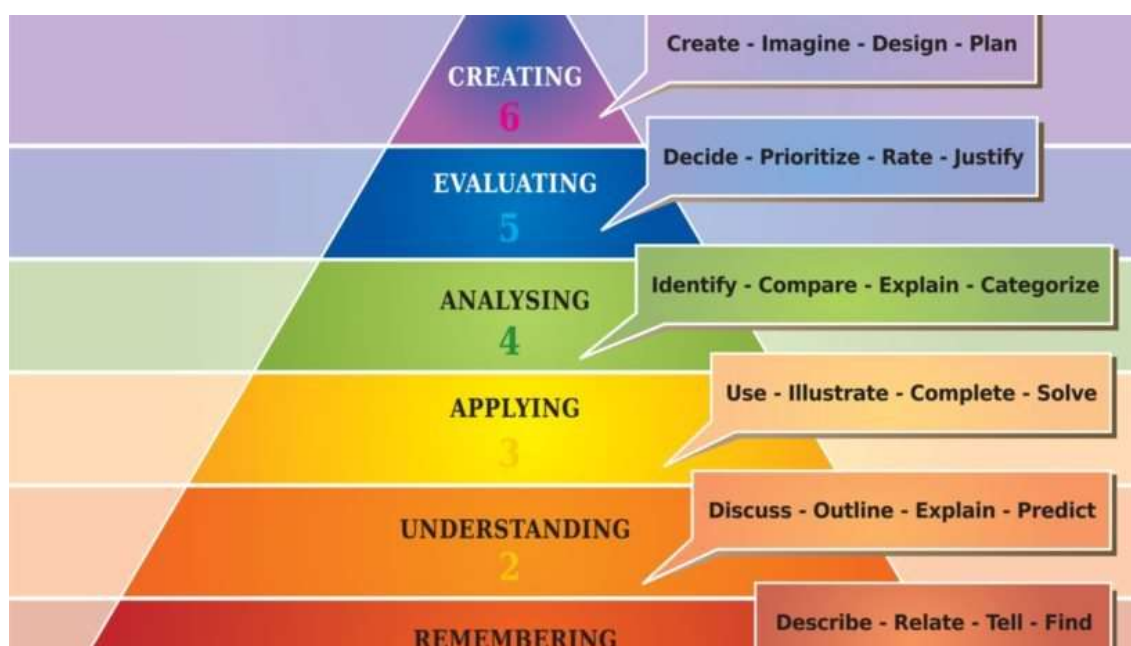
Type of materials search includes such items as a word cloud, virtual whiteboard, mind map, blog, website, schedule, brochure, presentation, poster, infographic, agenda, quiz, poll, film, photo, collage, poster, comic, newsletter, educational game, book cover, ebook, all possible types of materials, etc.

Accessibility comprises free access, paid access and special access for educational purposes.

Benjamin Bloom's taxonomy is used in determining the level of skills acquired and knowledge attained by students. The determination of the taxonomy level in the description of the tools



allows for their proper selection so that the development of the desired students' skills is guaranteed. It is necessary to remember that the taxonomy has been developed with the learning objectives and, therefore, with the students' point of view and the skills they should acquire in the teaching and learning process. The arrangement of skills in the form of a pyramid implies that if a tool implements, for instance, Creating, it means that it also covers all skills below this level, thus: Remembering, Understanding, Applying, Analysing, Evaluating, as follows:



Deanna Flanagan: Using Bloom's Taxonomy To Build A Solid Foundation For Business Learning. [Article]. In: eLearning Industry platform. May 17, 2019. <https://elearningindustry.com/blooms-taxonomy-for-business-learning-build-solid-foundation> [access: 23.07.21].

The tools and platforms' specifics determine the differences in the description of the tools – the description of single-purpose tools is short and straightforward, while the description of multifunctional tools is much more extensive.

The catalogue includes tools and platforms that offer a wide range of possibilities for educational solutions, as well as those most commonly used by teachers in their work.



The forty-three tools' descriptions have been arranged **in alphabetical order**. Regardless, the tools and platforms have been grouped in a substantive arrangement according to how they could be used for teaching. Due to the multiple functions of most tools, the particular tool might belong to multiple groups, which are:

1. Open Educational Resources;
2. Quick montage and editing tools;
3. Tools for communication, collaboration and sharing;
4. Tools for student assessment (Evaluation).

The bibliography is supplemental, **as all tool descriptions have been written from the autopsy.**

## Groups of tools and platforms according to their use

### **Open Educational Resources**

Tools that offer ready-made educational materials freely available for teachers to use, adapt and distribute.

### **Quick montage and editing tools**

Tools for quick assembling all possible types of materials.

### **Tools for communication, collaboration and sharing**

Tools that enable collaboration and innovative developments, creating collective documents, games, solving tasks, joint project activities. These tools offer contact for discussion, sharing materials, opinions, knowledge and skills.

### **Tools for student assessment (Evaluation)**

Tools that collect information about students' skills, including checking and testing them.



| Open Educational Resources  | Quick montage and editing tools  | Tools for communication, collaboration and sharing   | Tools for student assessment (Evaluation)  |
|---|--|--|--|
| Canva<br>Coggle<br>Khan Academy<br>Kizoa<br>Nearpod<br>Pixton<br>Storybird<br>TED<br>LearningApps | Clarisketch<br>Comixify<br>FilmoraGo<br>Kizoa<br>Lumen5<br>Pixton<br>PosterMyWall<br>Thinglink | ActionBound<br>AnswerGarden<br>Blogger<br>Canva<br>Coggle<br>EdWordle<br>Emaze<br>Genially<br>Google Classroom<br>Google Drive<br>Khan Academy<br>Lino<br>Mentimeter<br>MindMup<br>MonkeyLearn<br>Moodle<br>MSTEams<br>LearningApps<br>Nearpod<br>OneDrive<br>Padlet<br>Prezi<br>Sway<br>Tagxedo<br>TED<br>Trello<br>Tricider<br>Wakelet<br>WordArt<br>WordItOut<br>Wordsift | ActionBound<br>Coggle<br>Genially<br>Google Classroom<br>Kahoot<br>Khan Academy<br>LearningApps<br>MindMup<br>Moodle<br>MSTEams<br>Nearpod<br>Padlet<br>Quizizz<br>Socrative |



## Tools' descriptions in alphabetical order

### AnswerGarden

**What is AnswerGarden**  
AnswerGarden is a new minimalistic feedback tool. Use it for real time audience participation, online brainstorming and classroom feedback.

**Who uses AnswerGarden**  
AnswerGarden has many different users: classroom, conference and corporate audiences, creative teams, online crowds, mindmappers, and more!

**Benefits of AnswerGarden**  
AnswerGarden fits educational, professional and creative purposes, is standalone and embeddable, and shows thousands of answers in a glance!

<https://answergarden.ch/>

#### 1. Tool characteristics:

AnswerGarden is a website that provides instant answers to teacher questions. The website does not require a login, and mobile devices can be used to interact. Students can enter their own answers or choose from available options. The final version of the word cloud table can be uploaded in available formats and shared with students. An answer that has been appeared many times will be enlarged on the screen. The program allows moderating students' answers if they are wrong, frivolous or offensive.

#### 2. Possibility of using the tool in teaching (suggestions):

- moderated discussion;
- brainstorming;
- debates.



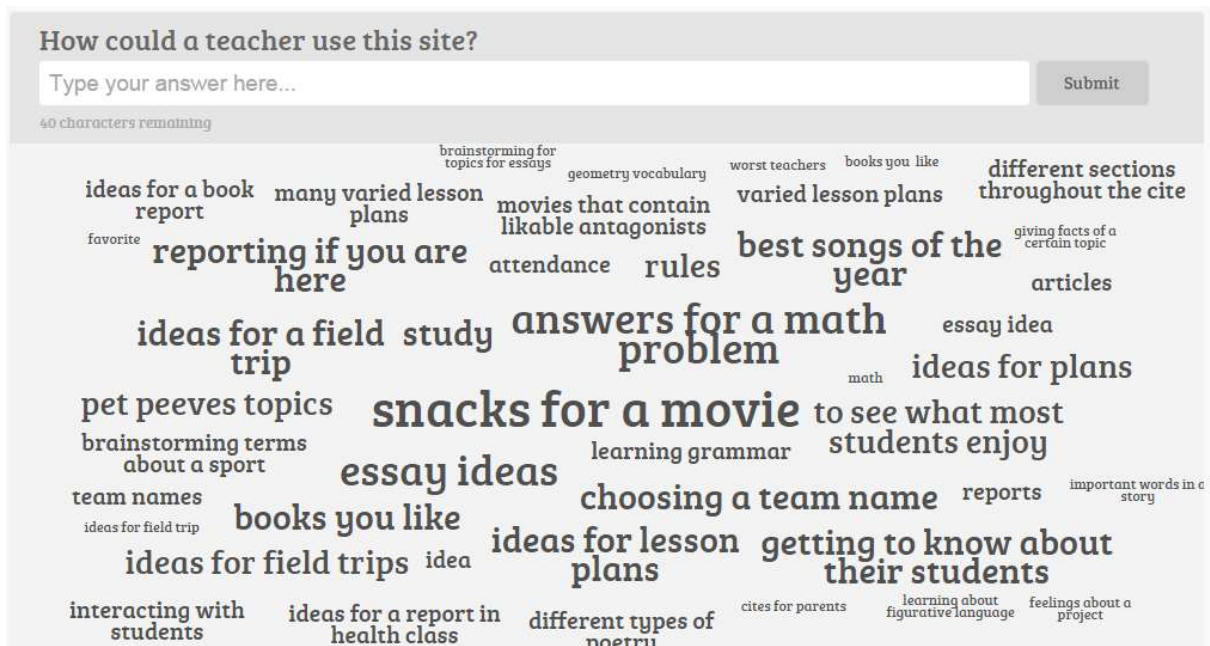
3. Supplemental materials:

- tutorials:

Answer Garden Tutorial. [Film]. In: YouTube. November 28, 2016.

<https://www.youtube.com/watch?v=12XKqbMngKc> [access: 29.06.2021].

- additional materials:



<http://techttoolsforassessment.pbworks.com/w/page/93453284/AnswerGarden>

[access: 29.06.2021].

4. Search categories:

- type of materials search: word cloud;
- availability: free account;
- Bloom's taxonomy: understanding.



## Actionbound



<https://en.actionbound.com/>

### 1. Tool characteristics:

Actionbound is a tool used to create educational and outdoor games. The games can be developed in public spaces (e.g. museums, parks, libraries) and on campus. Thanks to the game, students can apply knowledge in practice, learn to cooperate in a group. Participation in the game requires the installation of an application on a mobile device (e.g. phone, tablet) and access to the Internet. Tasks that can be prepared include: knowledge test, taking photos, recording videos.

Several functions can be used:

INFORMATION – allows recording instructions for the game participants;

STAGE – allows using the map of the area where the game is being played;

FIND SPOT – the task will be credited if the participant's phone logs in at the specified location;

QUIZ – allows asking groups a scored question. You can attach any pictures, films and round files to the questions. When creating a question, we decide, among other things, the number of points possible to obtain and the time limit for answering;

MISSION – allows entering answers, make a video and attach a photo. The author of the game will see the answers on their profile in the Actionbound application;

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SCAN CODE – students have to find QR codes hidden in a specific place and then scan them;  
SURVEY – allows conducting a short poll/vote among the players on any topic;  
TOURNAMENT – allows creating challenges for group members, e.g. who can do the longest jump.

2. Possibility of using the tool in teaching (suggestions):

- an educational game prepared by the teacher, checking the level of mastery of knowledge and skills at the end of the semester;
- an educational game prepared by a group of students for other groups.

3. Supplemental materials:

- tutorials:

Actionbound Tutorial – Stages (English version). [Film]. In: YouTube. May 28, 2019.  
<https://www.youtube.com/watch?v=kXVcRs88zYo> [access:15.06.2021].

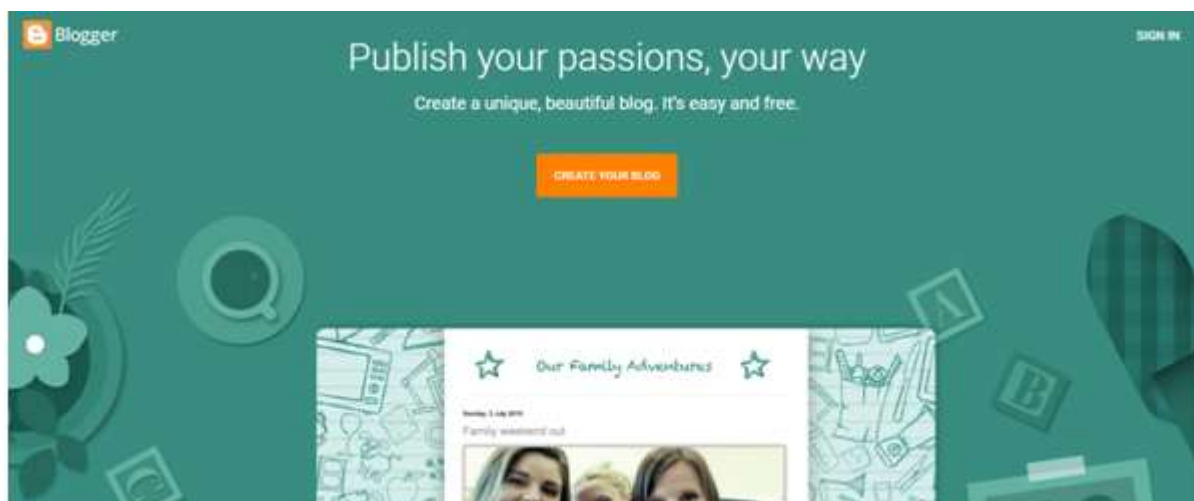
Actionbound Tutorial – Switches. [Film]. In: YouTube. January 13, 2020.  
<https://www.youtube.com/watch?v=aSLraQbwOJO> [access: 15.06.2021].

4. Search categories:

- type of materials search: game; educational game, repetition, test, live engagement tool;
- accessibility: free account – basic version, paid account – additional options; free educational account;
- Bloom's taxonomy: applying.



## Blogger



<https://www.blogger.com/about/?bpli=1>

### 1. Tool characteristics:

Blogger is a tool used to create blogs and websites. Setting up a blog and using the Blogger platform is intuitive and straightforward. It works well with the WebQuest method. It enables the creation of subpages, which constitute independent wholes. The user can use ready-made templates or design their own. Thanks to analytical functions, it is possible to check e.g. the popularity of blog posts.

### 2. Possibility of using the tool in teaching (suggestions):

- the teacher prepares assignments for students using the WebQuest method;
- students comment on blog entries, applying their knowledge and skills after the lesson;
- students collect links to texts on a shared blog and a short description of the texts and verify the information contained in these texts.

### 3. Supplemental materials:

- tutorials:





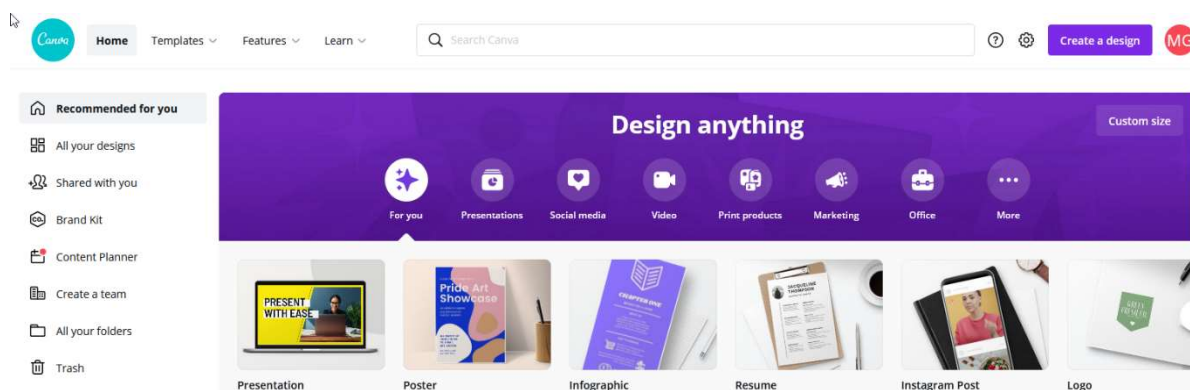
David Utke: Blogger Tutorial: Start a blog with Google's FREE Blogging Platform. [Film]. In: Youtube. April 13, 2021. <https://www.youtube.com/watch?v=XmcTXhwphU> [access: 24.06.2021].

How to set up a classroom blog with Blogger. [Film]. In: YouTube. June 14, 2020. <https://www.youtube.com/watch?v=yL45OFhEUs4> [access: 24.06.2021].

#### 4. Search categories:

- type of materials search: blog, website;
- accessibility: free access;
- Bloom's taxonomy: creating.

## Canva



<https://www.canva.com/>

### 1. Tool characteristics

Canva is software that allows creating any graphics using ready-made templates. The prepared project can be shared as a link or downloaded for printing or posting on the web in a selected format PDF, PNG, JPG. Each project can be modified in any way – change font type, size, colour, background, spaces, interlining, introduce additional elements such as photos sent from the web or user’s device, add animations, movies, background music, etc. Attractive and professional-looking graphics can be created without advanced design expertise. Canva is integrated with all major educational tools such as Google Classroom and Microsoft Teams.

### 2. Possibility of using the tool in teaching (suggestions):

- within a free educational account (Canva for Education), the program allows to create of a group for collaborative work, similar to MS Teams or Google Classroom platforms;
- specific tasks can be assigned (with feedback and comments or a grade), and the created learning materials can be shared;
- students have the opportunity to work on the project together, recording changes on the desktop in real-time with the use of mobile version (application for smartphones);
- creating a graphic design according to specific rules as a substitute for a standard evaluation test.



### 3. Supplemental materials:

- tutorials:

Canva for Education Tutorial for Teachers. Film]. In: YouTube. March 29, 2021. <https://www.youtube.com/watch?v=9iuWcf67pgM> [access: 20.06.2021].

Canva for Education. Set up your virtual classroom with Canva for Education. Film]. In: YouTube. 2021. <https://designschool.canva.com/tutorials/education/> [access: 20.06.2021].

Canva 2.0 Tutorial – free and easy graphic design. Film]. In: YouTube. March 19, 2019. <https://www.youtube.com/watch?v=Qfx0o24n3CE> [access: 20.06.2021].

- additional educational possibilities:

Canva for Education <https://www.canva.com/education/> [access: 20.06.2021].

### 4. Search categories:

- type of materials search: presentation, multimedia presentation, infographics, graphics and animation for social media (YouTube, Facebook, Instagram, LinkedIn, Pinterest etc.), poster, CV, logo, certificate, diploma, invitation, business card, book/e-book cover, magazine cover, photo collage, brochure, agenda, planner, chart, banner, flyer, label, offer, advertisement;
- accessibility: free account – basic version, paid account – additional options, free educational account;
- Bloom’s taxonomy: creating.



## Clarisketch



<https://www.clarisketch.com/>

### 1. Tool characteristics

Clarisketch is an application for mobile devices that allows to quickly create a short multimedia note in the form of a video, consisting of a photo, drawing and voice commentary. Saved notes can be viewed in any web browser, and message recipients do not need to install the Clarisketch app. The small media file format allows for instant interaction with others from a smartphone or tablet.

### 2. Possibility of using the tool in teaching (suggestions):

- with the help of a note, it is possible to explain a selected educational issue in a simple and clear way;
- prepared notes, outlines, instructions can be immediately shared with students or other teachers working in a team;
- the application saves time and improves the quality of the message using a combination of photographs and annotated commentary in educational processes.



### 3. Supplemental materials:

- tutorials:

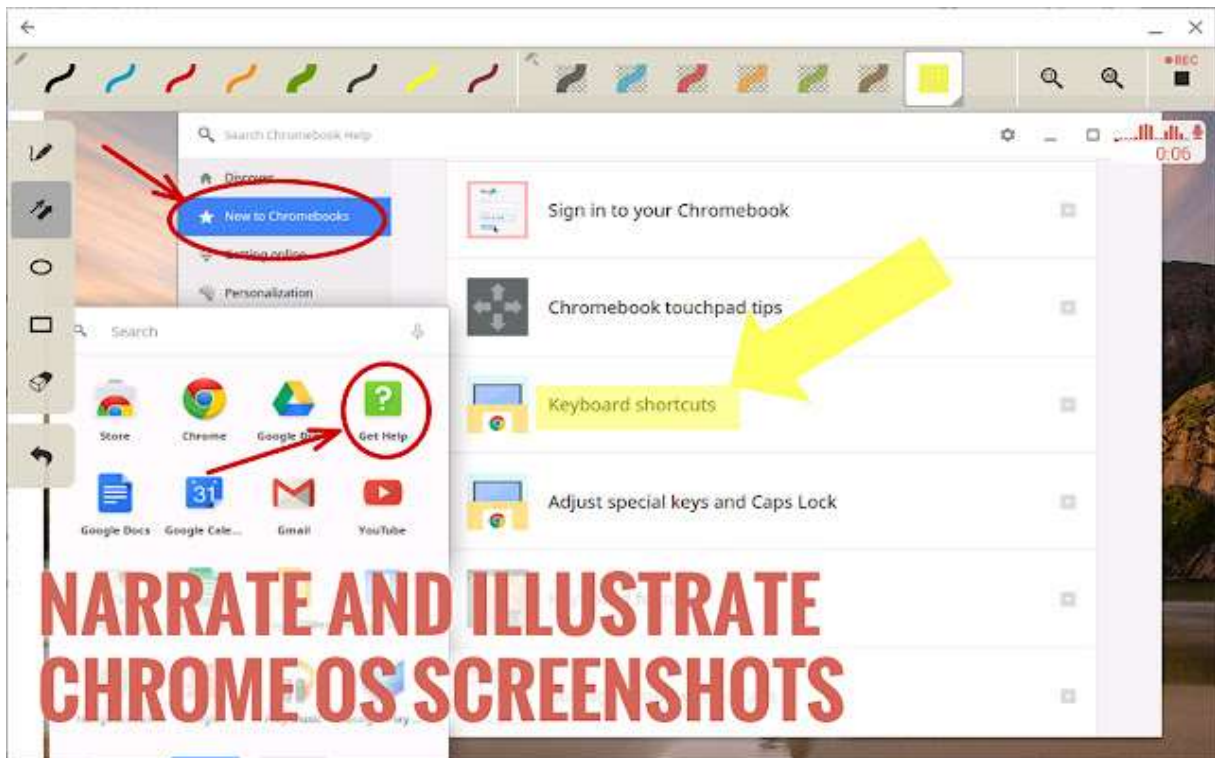
Clarisketch: Narrate & Annotate Pictures for Teaching or Collaboration. [Film]. In: YouTube. September 28, 2014. <https://www.youtube.com/watch?v=njKSAu2iIDY> [access: 26.06.2021].

Clarisketch SWOT Analysis. [Film]. In: YouTube. June 18, 2020. <https://www.youtube.com/watch?v=USWellUtbjw> [access: 26.06.2021].

- additional materials:

Hastuti, U. (2018). The role of Clarisketch apps in enhancing the activeness of students in learning English. In: CALL & MALL to enhance the thinking process; Innovative, Practical Solutions, Enhanced Sustainability. 13-14 March 2018 in Universitas Sebelas Maret, Solo, Indonesia. Retrieved June 26, 2021 from <https://itell.or.id/conference/index.php/itell/itell2018/paper/view/52>







Clarisketch: Narrate & Annotate Pictures for Teaching or Collaboration. [Film]. In: YouTube. September 28, 2014. <https://www.youtube.com/watch?v=njKSAu2ilDY> [access: 26.06.2021].

#### 4. Search categories:

- type of materials search: multimedia note, instruction, map, diagram, drawing, instructional video;
- availability: free account;
- Bloom's taxonomy: applying.



## Coggle



<https://coggle.it>

### 1. Tool characteristics:

Coggle is a tool used to create a spatial record of information. It visualises a topic using key words, symbols, and images linked together by lines or arrows. The topic is presented according to the principle “from general to specific”. The main word – the key is placed in the central part, lines or arrows spread from it.

A mind map allows you to develop a topic or strategy creatively, stimulating thinking and engaging the group in brainstorming teamwork. A mind map allows you to organise your knowledge; it also makes it easier to remember by associating keywords or graphics, or drawings.

### 2. Possibility of using the tool in teaching (suggestions):

- notetaking;





- a presentation plan prepared by the teacher or student;
- working on a problem using the “brainstorming” method;
- planning;
- developing strategies;
- developing scenarios to solve the problem.

### 3. Supplemental materials:

- tutorials:

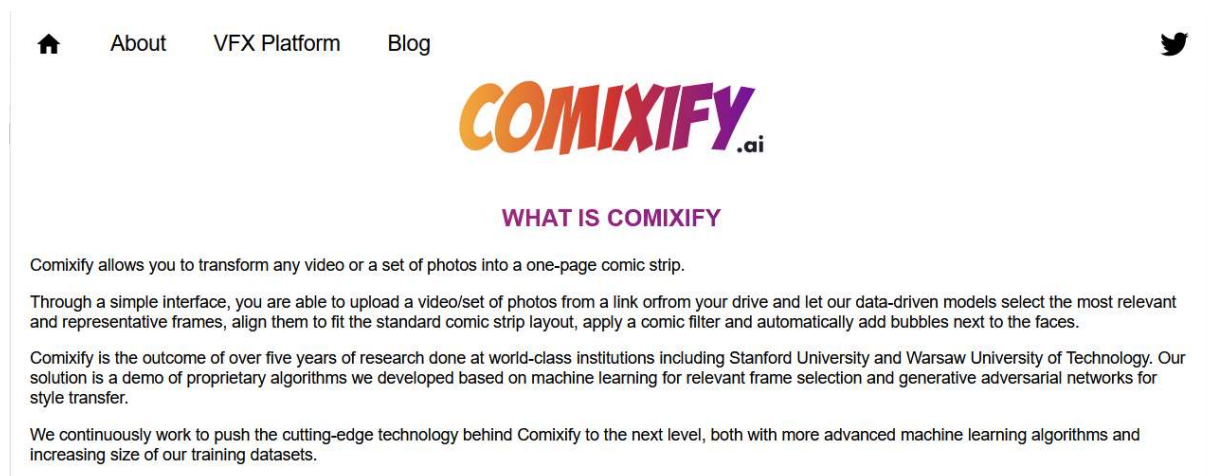
Coggle Introducion (English version). [Film]. In: YouTube. May 25, 2016  
<https://www.youtube.com/watch?v=iL40u0uNYa8> [access: 22.05.2021].

### 4. Search categories:

- type of materials search: mind map;
- accessibility: free account – basic version, paid account – additional options;
- Bloom’s taxonomy: analysing.



## Comixify



<https://comixify.ai/>

### 1. Tool characteristics:

A website that allows generating an educational comic book using pre-recorded video or photos taken. Transforming videos with a maximum length of 25 minutes into a comic book does not require special artistic or digital skills.

### 2. Possibility of using the tool in teaching (suggestions):

- using storytelling in the classroom;
- teaching skills in working with digital tools;
- assigning and completing homework using the application.

### 3. Supplemental materials:

- tutorials:

Comixify: Turning videos into comics – Adam Svystun, Maciej Pęśko, Tomasz Trzcinski. [Film]. In: YouTube. March 5, 2019. <https://www.youtube.com/watch?v=m7e-SqXQOV0> [access: 28.06.2021].



#### 4. Search categories:

- type of materials search: comic, film, photo;
- availability: free account;
- Bloom's taxonomy: creating.



## EdWordle

EdWordle Home Create FAQ Reference Shape Wordle

### EdWordle

EdWordle is a tool for editing "word clouds" based on the [Wordle](#). The initial word cloud can be generated from the input text or read from an existing one. You can re-font, re-colore, resize, move, rotate, add and delete words to create custom visualizations.

EdWordle's main benefit is that it allows a neighborhood-preserving editing process, which keeps words at predictable and close locations during and after the editing process. Like Wordle, the images you create with Wordle are yours to use however you like. You can save them to your own desktop to use as you wish.

[Create Now »](#)

Some examples created by others and you can further edit them:

[Edit it!](#)

[Edit it!](#)

[Edit it!](#)

[Edit it!](#)

© 2017 Yunhai Wang [How to Use](#)

[www.edwordle.net](http://www.edwordle.net)

### 1. Tool characteristics:

A word cloud is a collection of keywords presented using graphics. It is a tool for getting students active in class and avoiding one-way presentations. Word cloud work can be integrated into any stage of the lesson. The tool can be used at the beginning of a class, before introducing new material, as a test of students' knowledge of specific topics. It can be used as a brainstorming activity at the beginning of a unit or as a debriefing activity at the end of a unit. The tool can also be used for taking notes. The word cloud can be presented in any shape you choose (depending on the shape models offered by the word cloud generator). The shape can be chosen according to the topic, e.g. when working on the topic of Africa, students can be asked to create a word cloud in the shape of the African continent. Word cloud generators also offer different fonts, colours and directions of words writing, which not only have a graphic

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effect but also help in remembering key concepts. Ready word clouds can be downloaded in the form offered by a given generator (PDF, PNG, JPG).

## 2. Possibility of using the tool in teaching (suggestions):

- brainstorming before introducing a new topic – students write all the associations with the given topic;
- the teacher prepares a word cloud with key terms, which are then discussed during the class;
- summarising the lecture or classes by collecting the students' keywords related to particular topics, entering them during the lecture into the generator, displaying the created "cloud", and finally, if possible, sharing it with the students via the platform or tool that we use at the university to communicate with the group;
- the word cloud as a homework assignment for students;
- the word cloud as a class note.

## 3. Supplemental materials:

- tutorials:

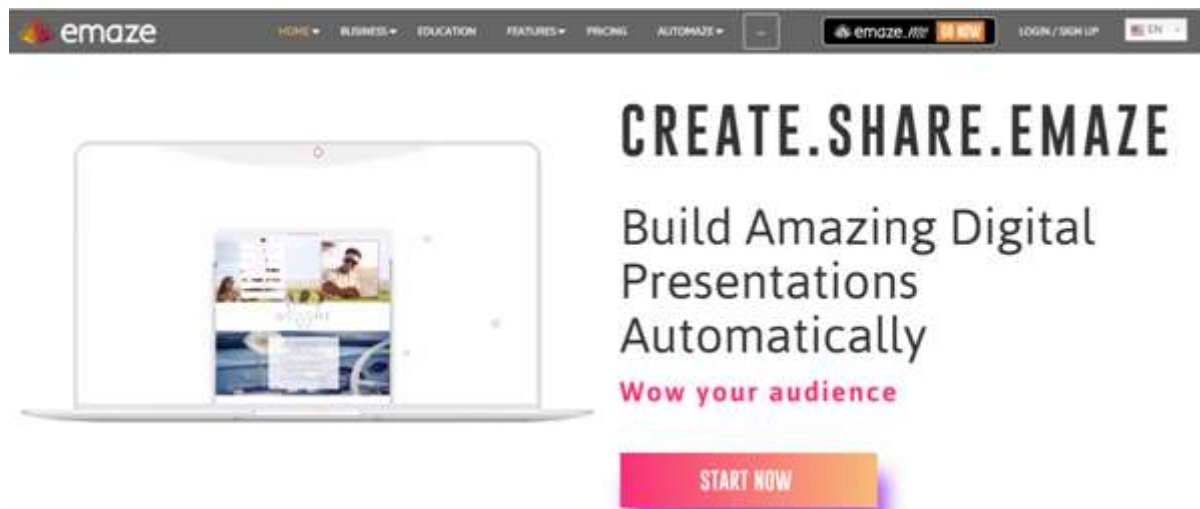
How to use EdWordle tutorial. [Film]. In: YouTube. May 2, 2021  
<https://www.youtube.com/watch?v=0WXX9cy5HdQ> [access: 27.05.2021].

## 4. Search categories:

- type of materials search: word cloud, tag cloud;
- accessibility: free account;
- Bloom's taxonomy: understanding.



## Emaze



<https://www.emaze.com/>

### 1. Tool characteristics:

Emaze is a tool for creating primarily dynamic and eye-catching online multimedia presentations with the possibility of adding videos (including from YouTube) and a soundtrack. The tool suggests using stimulating effects (e.g. animations, themes, fonts). Allows to make presentations using voice commands (next, prev, stop, play). It gives the possibility to import and modify presentations e.g. from PowerPoint to Emaze. Various techniques are used to present a slideshow, such as zoom or 3D movements.

### 2. Possibility of using the tool in teaching (suggestions):

- the teacher prepares presentations for the lecture;
- students jointly maintain a website where they post interesting news that complements the lecture topics.

### 3. Supplemental materials:

- tutorials:



Khan Shaina: How to attach an Emaze presentation link in Google Classroom. [Film]. In; YouTube. August 25, 2020. <https://www.youtube.com/watch?v=RLp8fpTMPW8> [access: 24.06.2021].

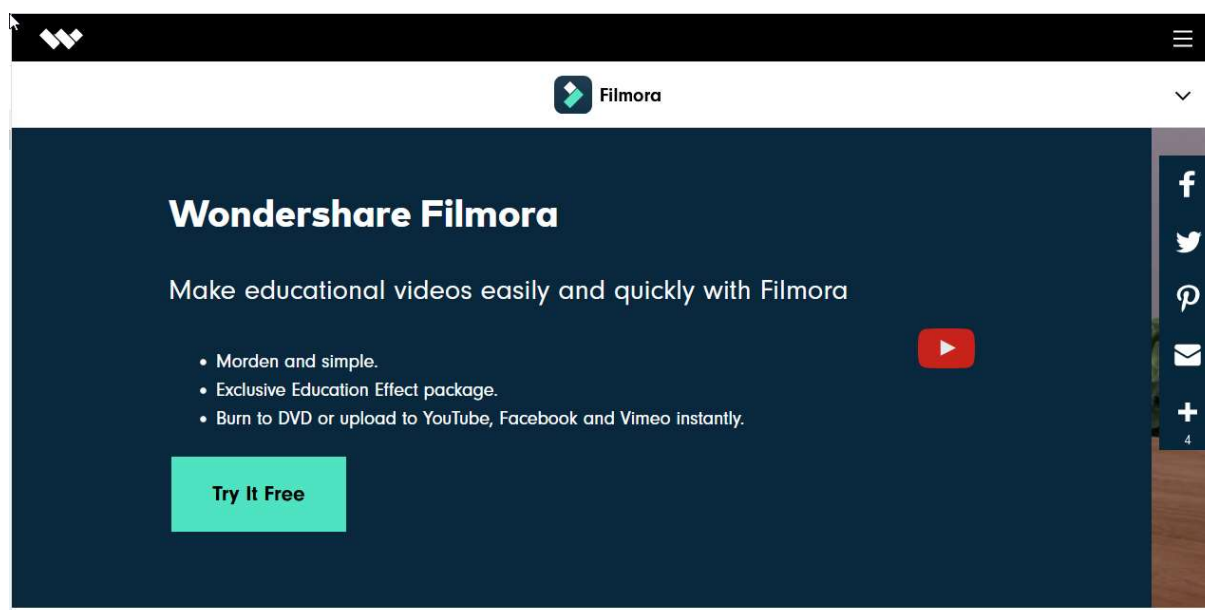
Welcome to Emaze. [Film]. In: YouTube. January 14, 2021. <https://www.youtube.com/watch?v=e9LV2tsAaHE> [access: 24.06.2021].

#### 4. Search categories:

- type of materials search: presentation, online multimedia presentation, 3D presentation, blog, website, graphic material, animation;
- accessibility: free access; paid access – additional options;
- Bloom's taxonomy: understanding.



## FilmoraGo



<https://filmora.wondershare.com/video-editing-tips/video-sites-guide-for-educators.html>

### 1. Tool characteristics:

FilmoraGo is an application used to edit videos, photos and movies recorded with a mobile device. You can add music, special effects, and choose the recording style from a wealth of application resources. The application enables a teacher to record a commentary to each of the posted videos, photos or photographs. The finished material can be shared on the web, e.g. on social media.

### 2. Possibility of using the tool in teaching (suggestions):

- simple and fast editing of audio and video files for novice teachers and students;
- assigning and completing homework using the application;
- the teacher can prepare and record a lesson discussing the given material, which the student can play back at any time and place, which means that it is particularly suited to implementing materials designed for flipped classrooms.





### 3. Supplemental materials:

- tutorials:

Wondershare Filmora – QUICK START Video Editing Tutorial! Film]. In: YouTube. October 13, 2019. <https://www.youtube.com/watch?v=c1bm-pSVLMY> [access: 26.06.2021].

- additional materials:

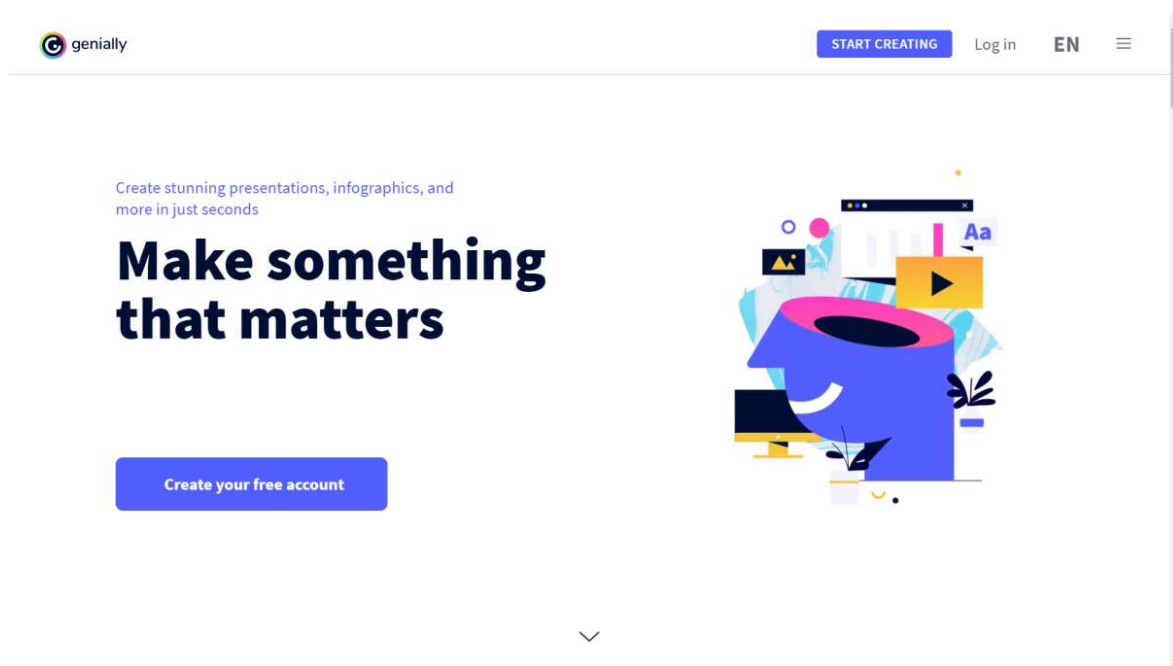
Hasanudin, C., Fitrianiingsih, A. & Saddhono, K. (2019). The Use of Wondershare Filmora Version 7.8.9 Media Apps in Flipped Classroom Teaching. *Review of Computer Engineering Studies*, 6 (3), 51-55. Retrieved June 26, 2021 from [https://www.researchgate.net/profile/Cahyo-Hasanudin/publication/338573995\\_The\\_Use\\_of\\_Wondershare\\_Filmora\\_Version\\_789\\_Media\\_Apps\\_in\\_Flipped\\_Classroom\\_Teaching/links/605a621592851cd8ce61ab0a/The-Use-of-Wondershare-Filmora-Version-789-Media-Apps-in-Flipped-Classroom-Teaching.pdf](https://www.researchgate.net/profile/Cahyo-Hasanudin/publication/338573995_The_Use_of_Wondershare_Filmora_Version_789_Media_Apps_in_Flipped_Classroom_Teaching/links/605a621592851cd8ce61ab0a/The-Use-of-Wondershare-Filmora-Version-789-Media-Apps-in-Flipped-Classroom-Teaching.pdf)

### 4. Search categories:

- type of materials search: film, video, photo, photography;
- availability: free account;
- Bloom's taxonomy: creating.



## Genially



<https://www.genial.ly>

### 1. Tool characteristics:

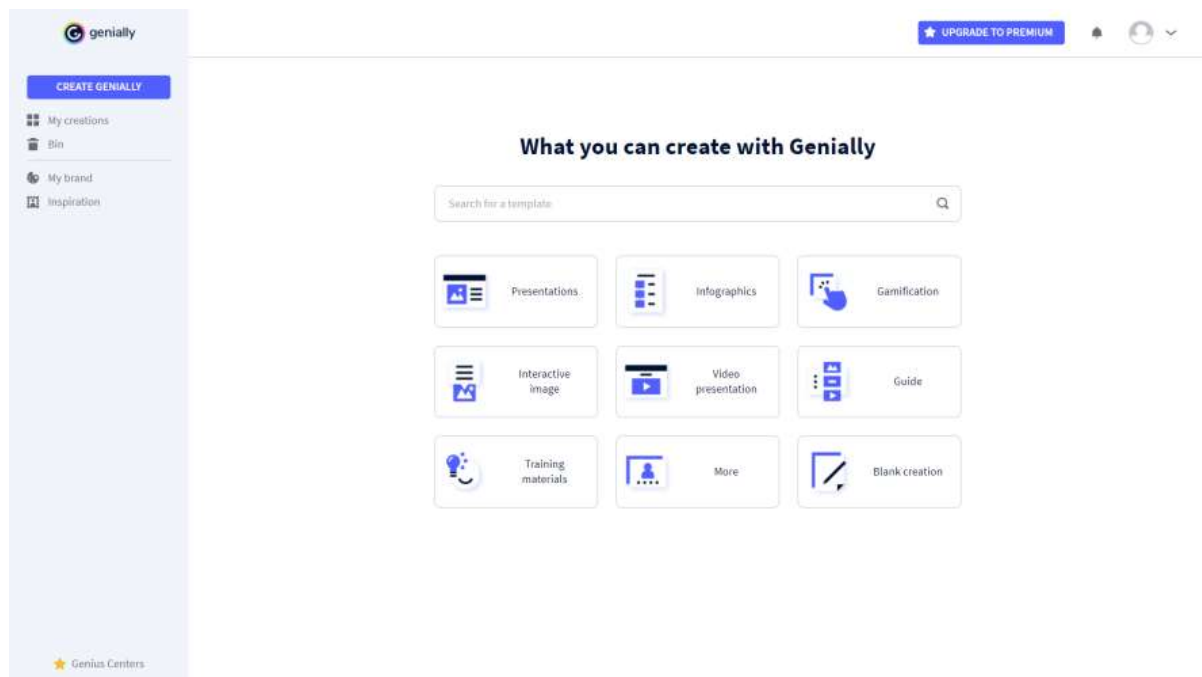
Genial.ly is a powerful online tool for creating interactive materials. The application allows designing: interactive posters, presentations, games, escape rooms, infographics, video presentations, interactive CV or portfolio, graphics used in social media.

You can create content from scratch or use ready-made templates (genial.ly offers a package of templates for free accounts and an extended package for paid accounts). Using ready-made templates, you can write your own content. The creation of materials from scratch (<https://app.genial.ly/templates/custom>) enables the combination of resources available on the website or the use of ready-made materials (<https://app.genial.ly/inspiration>). Genial.ly allows to include animations in materials and to place links to websites or films (e.g. available on YouTube). In presentations created in Genial.ly, you can also include links to games and tasks created in LearningApps. The tool also enables direct access to a free photo database (Unsplash and Pixabay). Genial.ly enables conducting classes with the use of gamification elements. The application requires logging in only of the persons who create the tasks, whereas students can

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solve the tasks after clicking on a link generated by the teacher, without the need to log in. Materials prepared in genial.ly can also be sent directly from the application to the given e-mail address(es) and can also be posted on social networking sites (Facebook, LinkedIn, Twitter, Pinterest) or sent to Google Classroom or MSTeams).



### [Panel - Genial.ly](#)

#### 2. Possibility of using the tool in teaching (suggestions):

- conducting the game;
- at the beginning of the lecture to check the initial level of knowledge;
- conducting a game at the beginning of a lecture to verify the degree of mastery; of the content, which students had to prepare for classes;
- conducting a game at the end of the lecture as a summary/verification of the degree of mastery and understanding of the material covered;
- preparing a presentation with the use of interactive elements;
- gamification of the whole class or a block of classes;



- creating interactive presentations and video presentations;
- creating interactive pictures with hidden tasks, quizzes and videos;
- creating quizzes and escape rooms as elements making the classes more attractive.

### 3. Supplemental materials:

- tutorials:

What is Genially, and how do you use it? – Tutorial and first steps for beginners (English version). [Film]. In: YouTube. November 24, 2020 <https://www.youtube.com/watch?v=pYijc9SXQ40> [access: 19.05.2021].

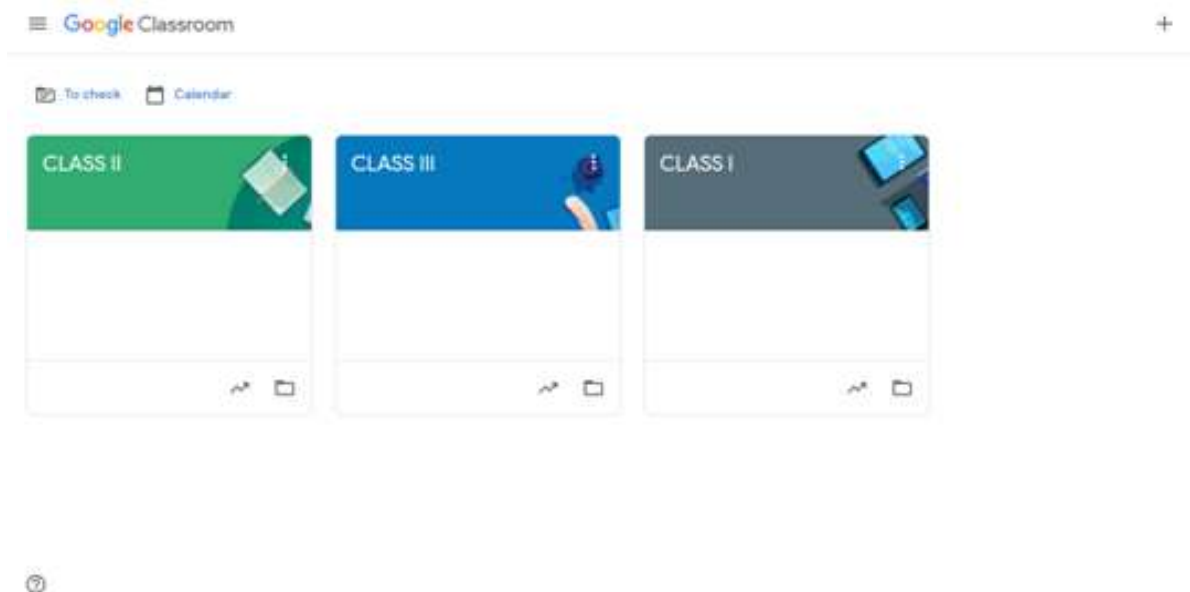
Tutorials in 5: Creating Interactive Presentations with Genially (English version). [Film]. In: YouTube. February 12, 2021 <https://www.youtube.com/watch?v=FUjofpIRzXw> [access: 19.05.2021].

### 4. Search categories:

- type of materials search: educational game, quiz, presentation;
- accessibility: free account – basic version, paid account – additional options;
- Bloom's taxonomy: applying.



## Google classroom



Source: Author's own resources

### 1. Tool characteristics:

Google Classroom is a platform that enables the creation of virtual teams and teaches online. Although it offers fewer features than other large learning platforms, it is easy to use. It is integrated with other Google services, such as forms and documents. It makes it possible to communicate with students, upload materials (e.g. texts, films, graphics) and tasks (including tests) for students and evaluate their performance. The package of tools and services of Google Workspace for Education is adjusted to the school's needs. In the Fundamentals version, it is available free of charge for educational institutions that meet specific requirements. Google Workspace for Education Standard, Education Plus and Teaching and Learning Upgrade are paid subscriptions. Conducting synchronous online classes is enabled by Google Meet. Bookmarks can be used in Google Classroom:

STREAM – for communication with students;

CLASSWORK – for submitting and grading essays, tests;

PEOPLE – a list of teacher and student names;



MARKS– a list of grades for assignments.

2. Possibility of using the tool in teaching (suggestions):

- creating virtual classrooms; students can join to team from sent email or by using the code;
- preparing tasks for students to complete by a specific date using the CLASSWORK tab;
- creating quizzes;
- communication between teacher and students using the STREAM tab;
- inserting in the CLASSWORK tab information related to the classes (e.g. videos published on YouTube, quizzes, links to articles);
- engaging students in question-based discussions.

3. Supplemental materials:

- tutorials:

Betcher Chris: Understanding Google Classroom and Google Meet Integration. [Film]. In: YouTube. April 10, 2020. <https://www.youtube.com/watch?v=Gohp27KbO6g> [access: 24.06.2021].

Blakemore Thomas: Google Classroom Tutorial For Teacher. [Film]. In: YouTube. January 4, 2021. <https://www.youtube.com/watch?v=ErDGEa9SpZo> [access: 24.06.2021].

Duran Diana: Google Meet for Substitute Teachers. [Fil]. In: YouTube. November 2, 2020. <https://www.youtube.com/watch?v=kj9m-0X5xjE> [access: 24.06.2021].

Hill Dominic: Google Classroom Advanced. [Film]. In: YouTube. February 27, 2020. <https://www.youtube.com/watch?v=xuh3NVbkQRA> [access:24.06.2021].

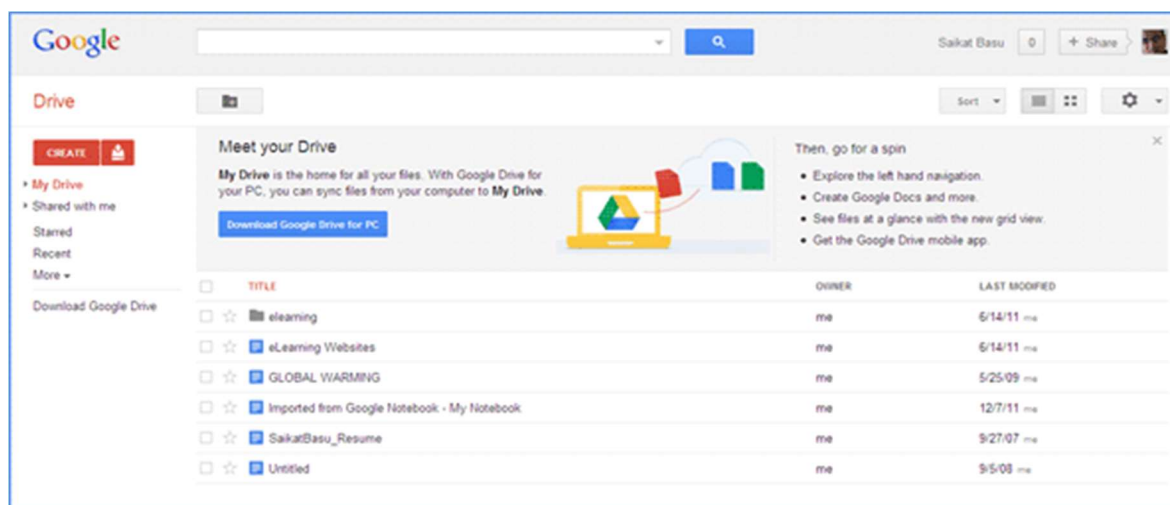
10 Tips on How to Implement Google Workspace for Education. [Film]. In: YouTube. April 30, 2021. <https://www.youtube.com/watch?v=tJ2FmUYOMcc> [access: 24.06.2021].

4. Search categories:



- type of materials search: all possible types of materials;
- accessibility: free account, free educational account, paid educational account;
- Bloom's taxonomy: evaluating.

## Google Drive



<https://drive.google.com>

### 1. Tool characteristics

Google Drive is a cloud owned by Google where we can store any files we want, whether created in other Google services or uploaded from personal devices. Internet cloud is a virtual drive that allows storing, sharing and collaboration of many people on shared files. It allows access to resources from any device and anywhere in the world where there is Internet access.

### 2. Possibility of using the tool in teaching (suggestions):

- organisation and storage of files in the cloud;
- backup copies of shared, educational materials;
- sharing and collaborating on files – everyone can see the changes in real-time;
- the ability to access materials regardless of the currently used device;
- ability to easily search for needed files by keywords;
- sharing materials with participants during a meeting on a platform that does not have a file sharing option (Zoom type);
- files from all Google's tools (including Google Docs, Google Sheets, Google Slides, Google Sites, Google Forms, and Google Jamboard) are stored there.





### 3. Supplemental materials:

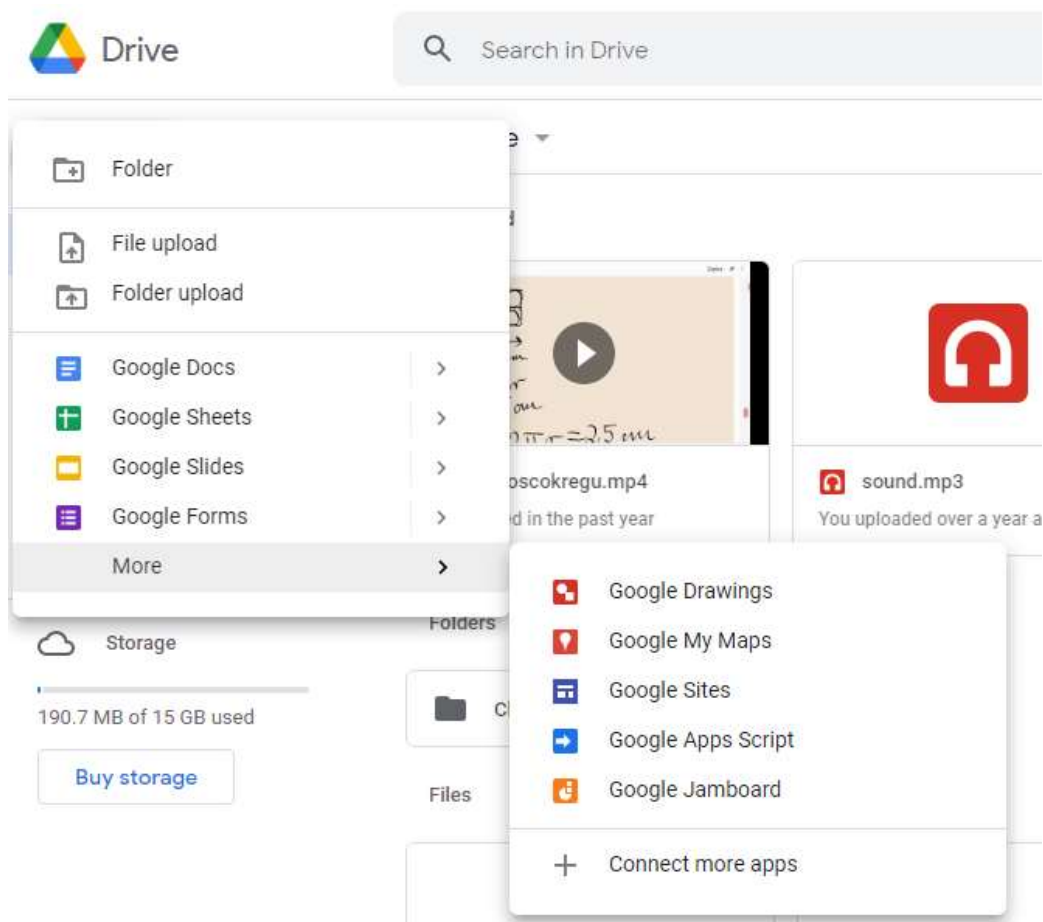
- tutorials:

How to use Google Drive – Tutorial for Beginners. Film]. In: YouTube. December 2, 2020. <https://www.youtube.com/watch?v=gdrxAoqfvbA> [access: 24.06.2021].

- additional educational possibilities:

Google Workspace for Education <https://edu.google.com/products/workspace-for-education/> [access: 24.06.2021].

- other Google services compatible with Drive:



<https://drive.google.com> [access: 26.06.2021].

### 4. Search categories:

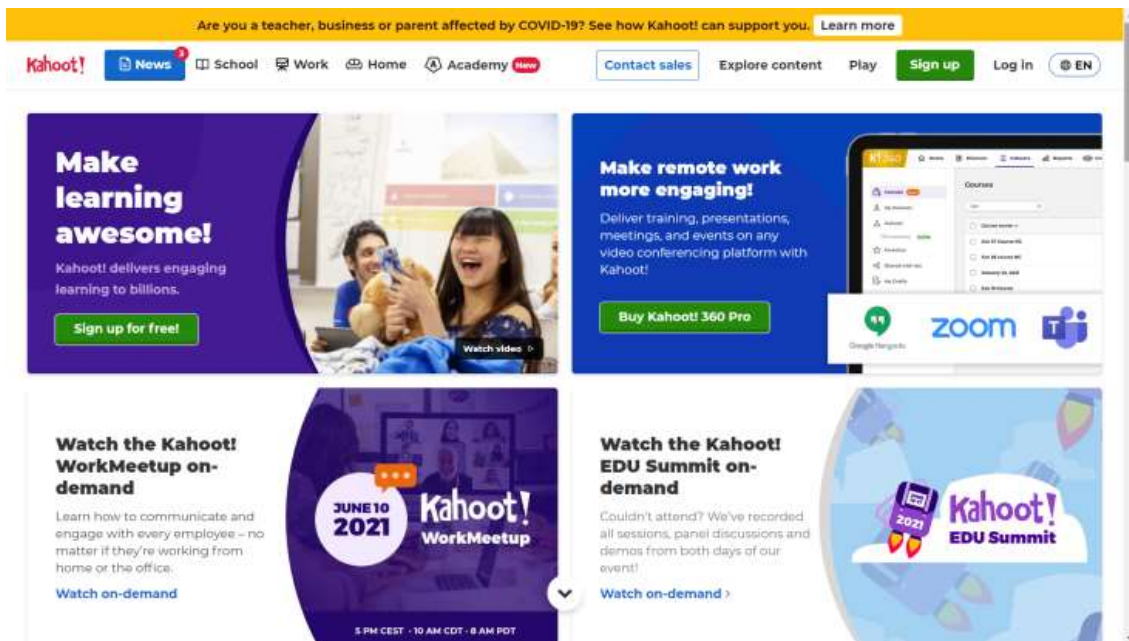
- type of materials search: all possible types of documents;



- availability: free account – basic version, paid account – additional options, free educational account;
- Bloom’s taxonomy: remembering.



## Kahoot



<https://kahoot.com/>

### 1. Tool characteristics:

Kahoot is a free tool for creating quizzes and surveys. The tool allows you to create your own quizzes or use materials that already exist in the resources. Questions can be enriched with multimedia files, photos and videos. The tool can be used as an introduction to the topic, summary of the discussed issue, verification of student knowledge. The quiz can also be scheduled as a homework assignment for students. The tool allows the user to set a time limit for completing the task according to the level of difficulty and students' advancement. The teacher can see students' progress, correct and incorrect answers. After completing the quiz, the results are given as percentages, making it easy to assess the task.

### 2. Possibility of using the tool in teaching (suggestions):

- creating quizzes or surveys to test or summarise student knowledge during class or as a homework assignment;



- using resources developed by other users to prepare tests by the lecturer;
- use of resources developed by other users for the preparation of tests by the lecturer; use of found resources for the repetition of the issue by students;
- using the tool for student teamwork as a competitive element.

3. Supplemental materials:

- tutorials:

Kahoot: How to use Kahoot? 2020 Tutorial (English version). [Film]. In: YouTube. December 24, 2019 <https://www.youtube.com/watch?v=zBkVp8-CDeo> [access: 22.05.2021].

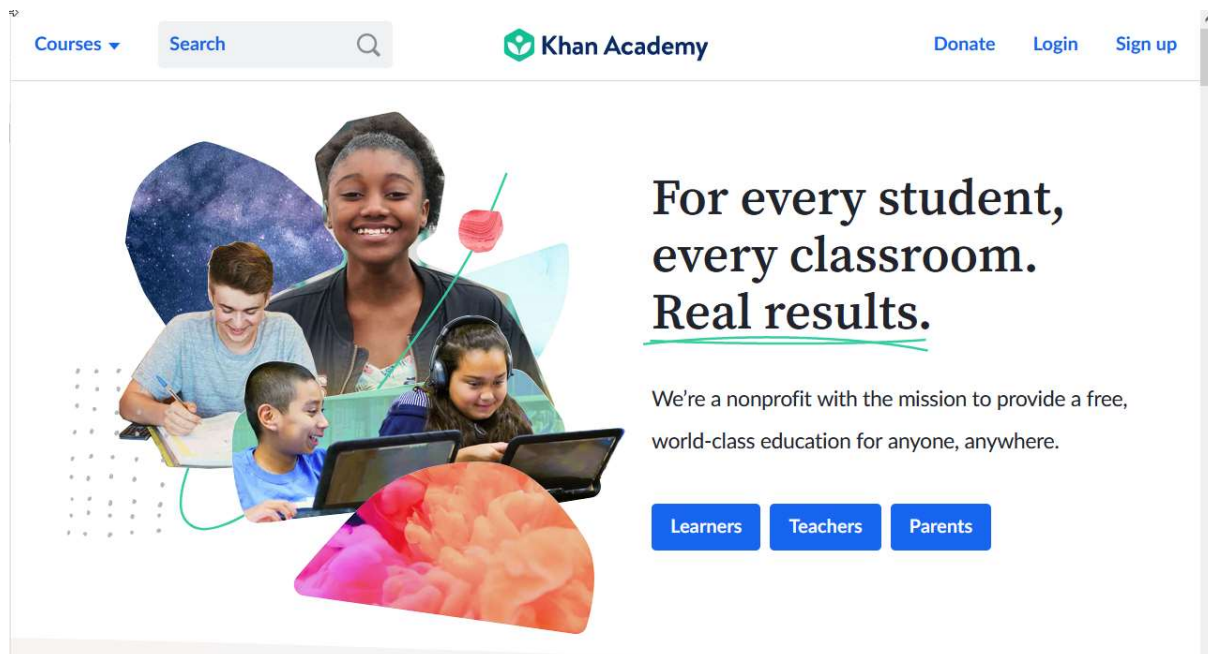
Kahoot: How to use the Kahoot app for Microsoft Teams (English version). [Film]. In: YouTube. May 27, 2020 <https://www.youtube.com/watch?v=NLftTEekITU> [access: 22.05.2021].

4. Search categories:

- type of materials search: quiz, poll;
- accessibility: free account;
- Bloom's taxonomy: evaluating.



## Khan Academy



<https://www.khanacademy.org/>

### 1. Tool characteristics:

Khan Academy is an entirely free educational platform founded by a nonprofit organisation that provides a vast multi-domain library of videos, short lessons, instructional tools, and exercises for students. The goal of Khan Academy is to assist and provide resources so that the student can master selected topics at their individual pace and their convenience.

### 2. Possibility of using the tool in teaching (suggestions):

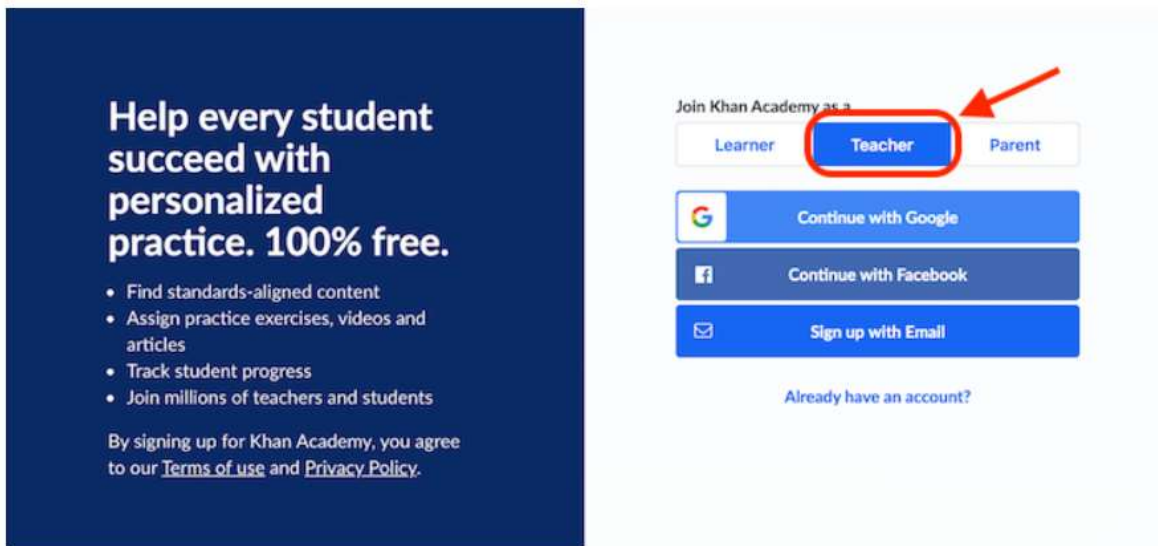
- within a free educational account, the program allows to create of a group for collaborative work, similar to Canva, Pixton, MS Teams or Google Classroom platforms;
- specific tasks can be assigned (with feedback and comments or a grade), and the learning materials can be shared;
- analysing and solving practical and theoretical problems;



- evaluation in a creative way;
  - an ideal tool for the implementation of the flipped classroom;
3. Supplemental materials:
- tutorials:




How to use Khan Academy for teachers. Film]. In: YouTube. November 6, 2015.  
<https://www.youtube.com/watch?v=HVh3u3HPXvg> [access: 29.06.2021].

Teachers — here's how to use Khan Academy for remote learning. [Film]. In: YouTube. March 13, 2020. <https://www.youtube.com/watch?v=9xg0picYJ3o> [access: 29.06.2021].





### How would you like to add your students?

|   |   |   |
|---|---|---|
|  <p><b>Invite your Google Classroom</b></p> <p>The fastest, easiest way to invite your students.</p> |  <p><b>Students join with a class link</b></p> <p>Email or share a link, or have your students use a class code.</p> |  <p><b>Create your students' accounts</b></p> <p>Enter student names and we'll make passwords you can customize.</p> |
|---|---|---|

<https://pl.khanacademy.org/khan-for-educators/resources/teacher-essentials/getting-started-on-khan-academy/a/teacher-quick-start-checklist> [access: 29.06.2021].

- additional educational possibilities:

Parslow, G.R. (2012). Commentary: The Khan Academy and the day-dight flipped classroom. *Biochemistry and Molecular Biology Education*, 40 (5), 337-338. Retrieved July 5, 2021 from <https://www.learntechlib.org/p/91754/>

#### 4. Search categories:

- type of materials search: all possible material types;
- availability: free account;
- Bloom's taxonomy: creating.



## Kizoa



<https://www.kizoa.com/>

### 1. Tool characteristics:

Kizoa is a tool used primarily to create collages, photo slideshows, video montages to which you can attach text, animation and music, among other things. A selection of these can be found in the extensive library. Works can be uploaded to websites or social networks.

### 2. Possibility of using the tool in teaching (suggestions):

- students create a slide show that relates to the topic of the lecture;
- the teacher creates a slideshow that illustrates the content of the lecture.

### 3. Supplemental materials:

- tutorials:

Caruso, Shirley J.: How to Use Kizoa. [Film]. In: YouTube. November 10, 2017.  
[https://www.youtube.com/watch?v=8qfM\\_nO2Oig&t=163s](https://www.youtube.com/watch?v=8qfM_nO2Oig&t=163s) [access: 24.06.2021].

### 4. Search categories:

- type of materials search: film, photo collage, photo show, poster, social media animation;
- accessibility: free account – basic version, paid account – additional options;
- Bloom's taxonomy: creating.





## Learningapps



<https://learningapps.org>

### 1. Tool characteristics:

LearningApps is a free tool for preparing online learning tasks and games. Thanks to the game and play formula, the application supports learning and remembering the material. Within LearningApps, we can use 21 different applications to create tasks and games, such as crossword, crossword puzzles, millionaires, horse race, hangman, estimation, find pairs, where is it? grouping, number axis, audio/video annotation and others. The teacher can create their own games and activities or use existing ones. Exercises can be saved in directories appropriately titled by the teacher. It is also possible to create virtual classes to which students can be assigned and then tasks can be assigned to them. Only the creators of the assignments



need to be logged in, while the students can complete the assignments by clicking on a link generated by the teacher without having to log in. Assignments can also be shared using QR codes or by embedding them (e.g. in Genial.ly).

2. Possibility of using the tool in teaching (suggestions):

- creating quizzes, tests or games to check or summarise students' knowledge during class or as homework;
- checking the level of understanding of the discussed topic during the class;
- using resources developed by other users to prepare tests by the lecture.

3. Supplemental materials:

- tutorials:

How-To: Learningapps.org – Introduction (English version). [Film]. In: YouTube. March 28, 2016 [https://www.youtube.com/watch?v=q9NXid8ru\\_8&t=16s](https://www.youtube.com/watch?v=q9NXid8ru_8&t=16s) [access: 19.05.2021].

4. Search categories:

- type of materials search: educational game, quiz;
- accessibility: free account;
- Bloom's taxonomy: evaluating.



## Lino



<https://en.linoit.com/>

### 1. Tool characteristics:

Lino (virtual whiteboard) is a tool for collecting, organising and sharing information (e.g. notes, tasks, ideas, photos, information, websites, files, videos) and collaboration. The tool is suitable for project work as all team members can put the results of their work on the board. Lino can also be used for brainstorming. As a teacher, the virtual whiteboard can help to organise the workspace.

### 2. Possibility of using the tool in teaching (suggestions):

- running a whiteboard which is used for communication between the teacher and the students;
- running a discussion forum - the teacher asks questions, and students answer them;
- the teacher and students create a blog where they share ideas and electronic resources, post links to articles;
- it is a place for group work - teams are given different topics and write their findings on the pad;
- during the lecture, students can add notes or ask questions.



### 3. Supplemental materials:

- tutorials:

Linoit – Tech Tool to Create Virtual Collaborative Boards. [Film]. In: YouTube. March 14, 2020. <https://www.youtube.com/watch?v=GP34QvdKUqA> [access:24.06.2021].

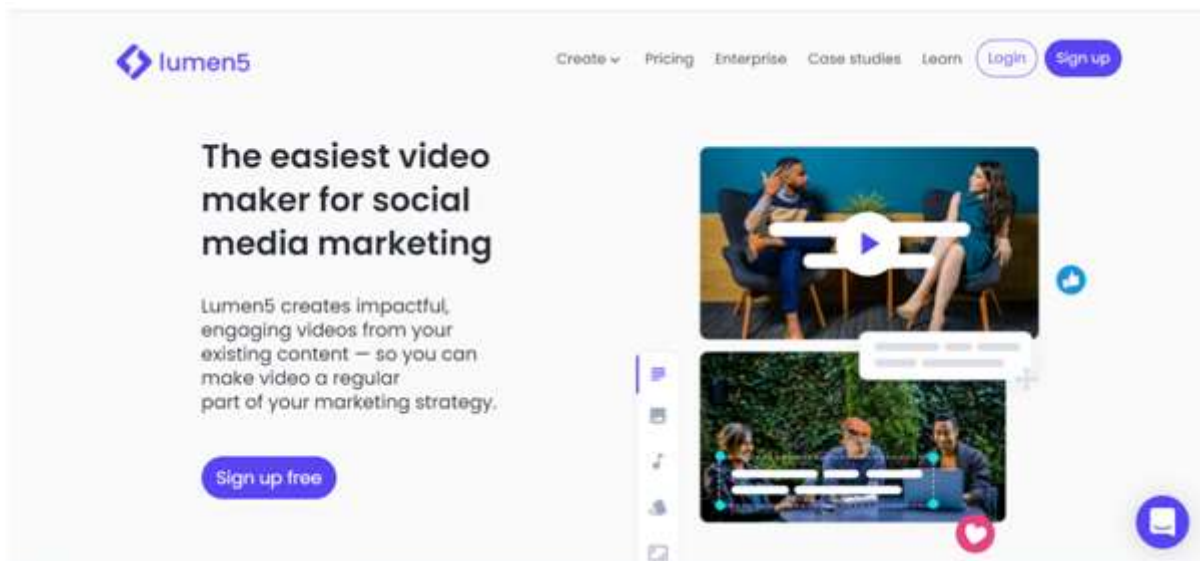
Review of Lino – Online Sticky Note App. [Film]. In: YouTube. March 18, 2020. <https://www.youtube.com/watch?v=tixSjcgEpUU> [access: 24.06.2021].

### 4. Search categories:

- type of materials search: virtual whiteboard, discussion forum, blog, survey, live engagement tool;
- accessibility: free access;
- Bloom's taxonomy: remembering.



## Lumen5



<https://lumen5.com/>

### 1. Tool characteristics:

Lumen5 is an intuitive tool that uses artificial intelligence to create videos quickly. The user enters a link to an article (e.g. shared on a blog), and Lumen5 presents the text as a video file, which can be supplemented with music, additional images and formatting. The video can be saved on a computer or posted online (e.g. on social media: Facebook, YouTube, Instagram, etc.).

### 2. Possibility of using the tool in teaching (suggestions):

- the teacher prepares a presentation for a lecture in Lumen5 instead of, e.g., PowerPoint;
- students create a video based on articles on a particular topic;
- students create a video using blog posts;
- students create a video as a summary of the topic.

### 3. Supplemental materials:



- tutorials:

How to use Lumen5. [Film]. In: YouTube. May 15, 2020. <https://www.youtube.com/watch?v=VE44UcfwbHw> [access: 24.06.2021].

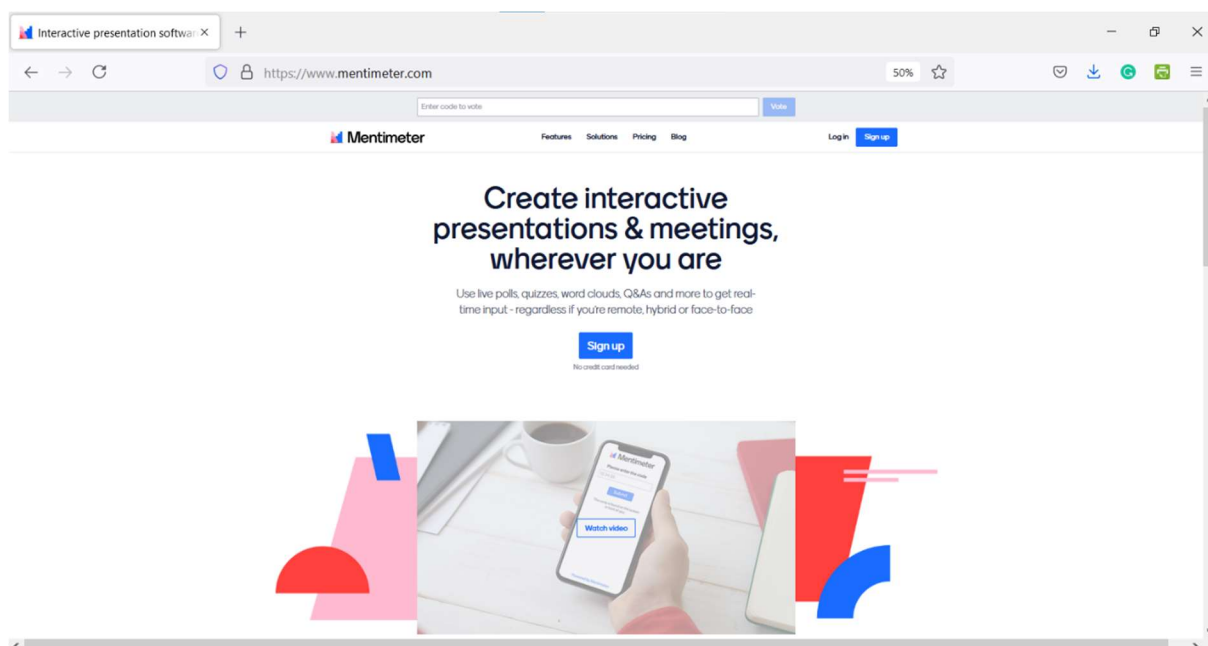
Lumen5. [Film]. In: YouTube. July 6, 2019. <https://www.youtube.com/watch?v=ULzWTLI-p4I> [access: 24.06.2021].

#### 4. Search categories:

- type of materials search: film, animation for social media;
- accessibility: free account – basic version, paid account – additional options;
- Bloom's taxonomy: creating.



## Mentimeter



<https://www.mentimeter.com/>

### 1. Tool characteristics:

Mentimeter is software for remote, hybrid, and face-to-face work through interactive, real-time presentations that engage participants by asking questions and visualising the answers graphically. Listeners connect to the presentation using their smartphones. Once completed, the real-time presentation can be shared and results exported for further analysis, and data can be compared over time to measure student progress. Among the slides available for use are:

**Popular question types** diagrams for creative slides that allow interaction and real-world collaboration, asking questions and immediately collecting student responses on the desktop:

MULTIPLE CHOICE – students make choices of options;

WORD CLOUD – students create word clouds from their answers;

OPEN ENDED – students create a set of longer answers;

SCALES – students rate the material discussed on a scale;

RANKING – students rank the given answers;

IMAGE CHOICE – students make a choice using an image;

Q&A – students ask questions the teacher can display and provide answers to (questions to the instructor); the option allows for modification and modelling of the activities, adapting to the needs of the students.

**Quiz competition** diagrams for test-taking slides allow formulating quiz questions to test students' knowledge on a specific topic. The quiz can consist of closed (SELECT ANSWER) or open (TYPE ANSWER) questions.

**Content slides** for traditional slides similar to other traditional tools for presenting content like PowerPoint and others, including audiovisual material.

## 2. Possibility of using the tool in teaching (suggestions):

- preparing classes with the use of **Content slides**, presenting new material, combined with interactive, **Popular question types** and **Quiz competition** testing students' knowledge or opinions;
- arranging discussions and debates in real-time (round table discussion, moderated discussion, analysis and problem solving);
- brainstorming (all creative slides);
- evaluation tool (answering different types of questions in real-time).

## 3. Supplemental materials:

- tutorials:

Mentimeter Tutorial - Create your first Mentimeter presentation. Film]. In: YouTube. October 1, 2019. <https://www.youtube.com/watch?v=Sd0fAenuAnw> [access: 22.06.2021].

Mentimeter Tutorial. Film]. In: YouTube. March 18, 2020. <https://www.youtube.com/watch?v=rT90-aklzPQ> [access: 22.06.2021].

Mentimeter: Using Mentimeter in the classroom. [Film]. In: YouTube. March 22, 2019. <https://sites.marjon.ac.uk/elearninghelp/2019/03/22/mentimeter-using-mentimeter-in-the-classroom/> [access: 22.06.2021].

Mentimeter Tutorial - Multiple Choice Questions. Film]. In: YouTube. September 26, 2019. [https://www.youtube.com/watch?v=gNelXjgA\\_4w](https://www.youtube.com/watch?v=gNelXjgA_4w) [access: 22.06.2021]. Mentimeter — Open





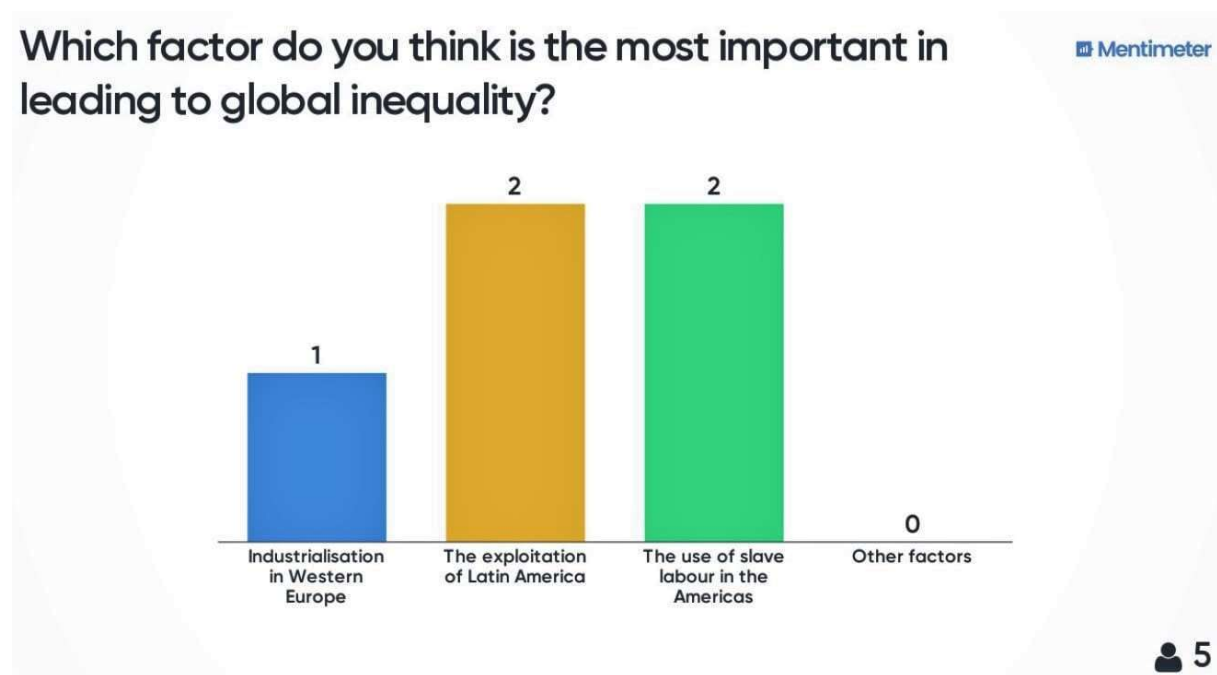
Ended Question. Film]. In: YouTube. February 18, 2018.  
<https://www.youtube.com/watch?v=cmm0SsihU9Y> [access: 22.06.2021].

5 Ways to use the Scales question-type. [Presentation]. In: Mentimeter. April 23, 2019.  
<https://www.mentimeter.com/blog/awesome-presentations/5-ways-to-use-the-scales-question-type> [access: 22.06.2021].

9 ways to use Mentimeter Image Choice questions. [Presentation]. In: Mentimeter. July 8, 2019.  
<https://www.mentimeter.com/blog/audience-energizers/9-ways-to-use-mentimeter-image-choice-questions> [access: 22.06.2021].

- examples of graphical data visualisation (by creative slide types):

#### MULTIPLE CHOICE Questions





## WORD CLOUD

Voting is closed Open voting

Enter 3 separate words that come to mind when you think of online learning. Mentimeter

personal creative **engaging** changing self-paced learning curve **future** fresh limitless efficient devices computers opportunities Tools **technology** **awesome** fun what next new accessible engagement evolving impersonal work anytime anywhere

⚙️ 12

## OPEN ENDED

Why is this hard to achieve personalization, agency, authentic audience, connectivity & creativity in a traditional classroom? Mentimeter

|   |  |   |
|---|--|---|
| There is a lot of focus on teaching from required texts in the classroom which makes it a bit difficult to be creative thus connecting with students is difficult because they do not relate to the material. | School curricula is heavily based on standardized testing, almost forcing students to learn how to answer a test at the end of the year, rather than learn meaningful content. | I feel like in a traditional classroom, most teachers "teach to the test" in order for students to perform well on state-testing, which does not necessarily include these characteristics. |
| In a traditional classroom setting, the teacher is the purveyor of knowledge and information is poured into the students. Students  | I think the main problem is having the time to create these things when teachers have a large number of students and a limited amount of time.                                 | Teachers are focused on test scores and getting their "school" numbers up rather than making learning meaningful and engaging for the students  |

Pause scroll



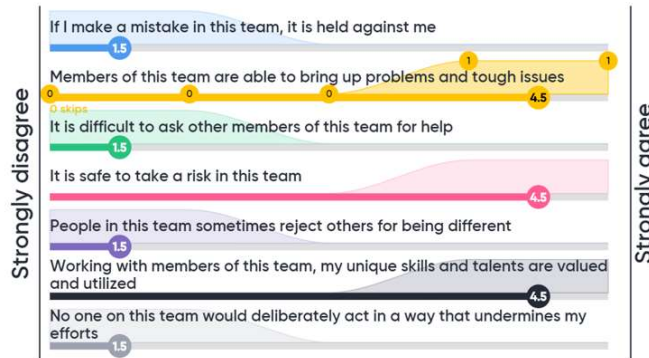
## SCALES

Go to [www.menti.com](http://www.menti.com) and use the code



### Scales

Mentimeter



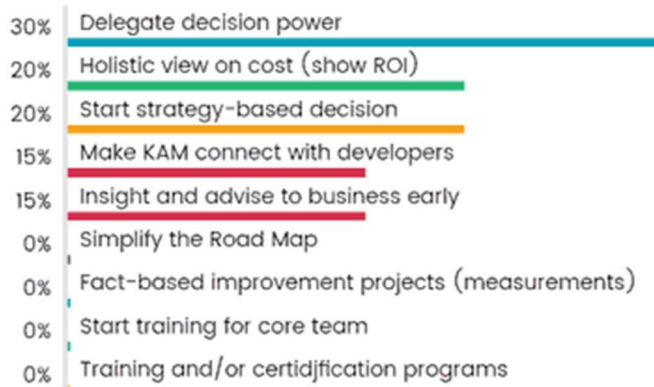
2

## RANKING

Go to [www.menti.com](http://www.menti.com) and use the code 49 54 59

### What is most important for us to start doing?

Mentimeter



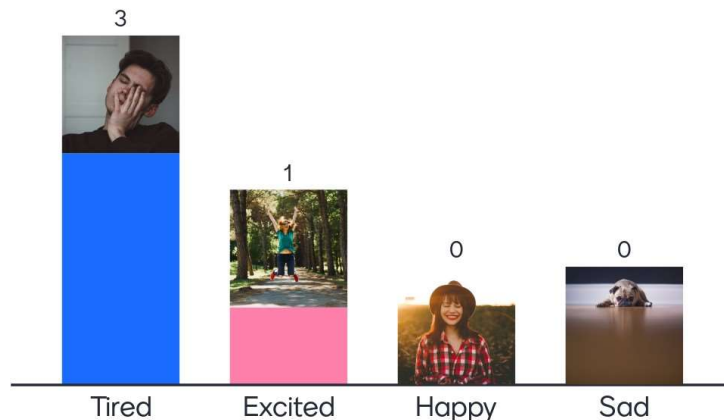
Votes: 3



## IMAGE CHOICE

# How are you feeling today?

Mentimeter



<https://www.mentimeter.com/> [access: 22.06.2021].

- additional educational possibilities:

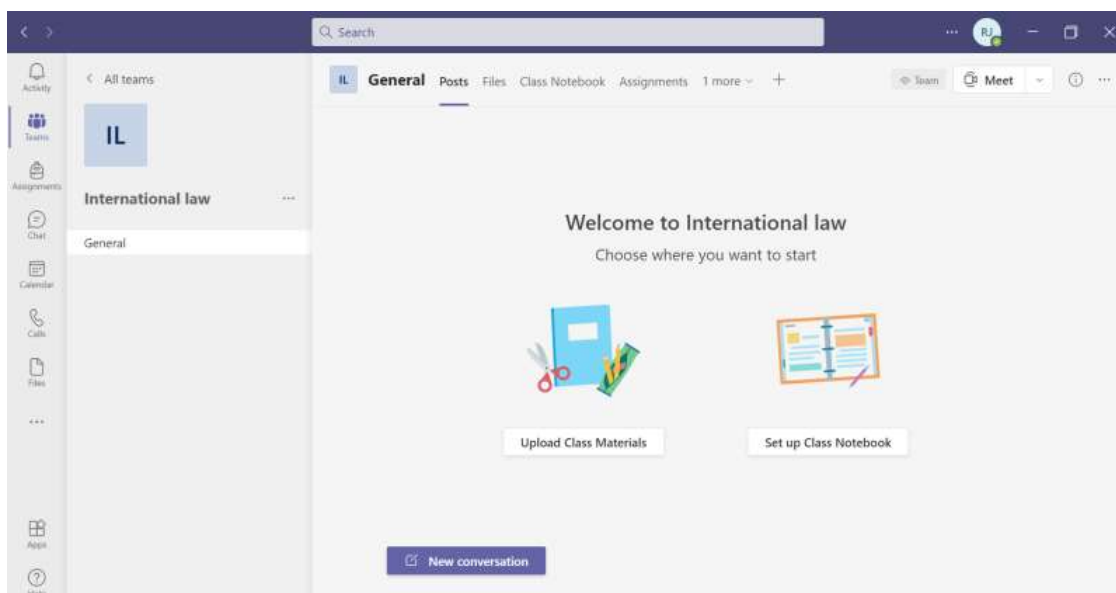
Mentimeter for Education, Schools and Universities

<https://www.mentimeter.com/solutions/education> [access: 22.06.2021].

#### 4. Search categories:

- type of materials search: poll, quiz, test, presentation, multimedia presentation, interactive presentation, word cloud;
- accessibility: free account – basic version, paid account – additional options, free educational account;
- Bloom's taxonomy: understanding.

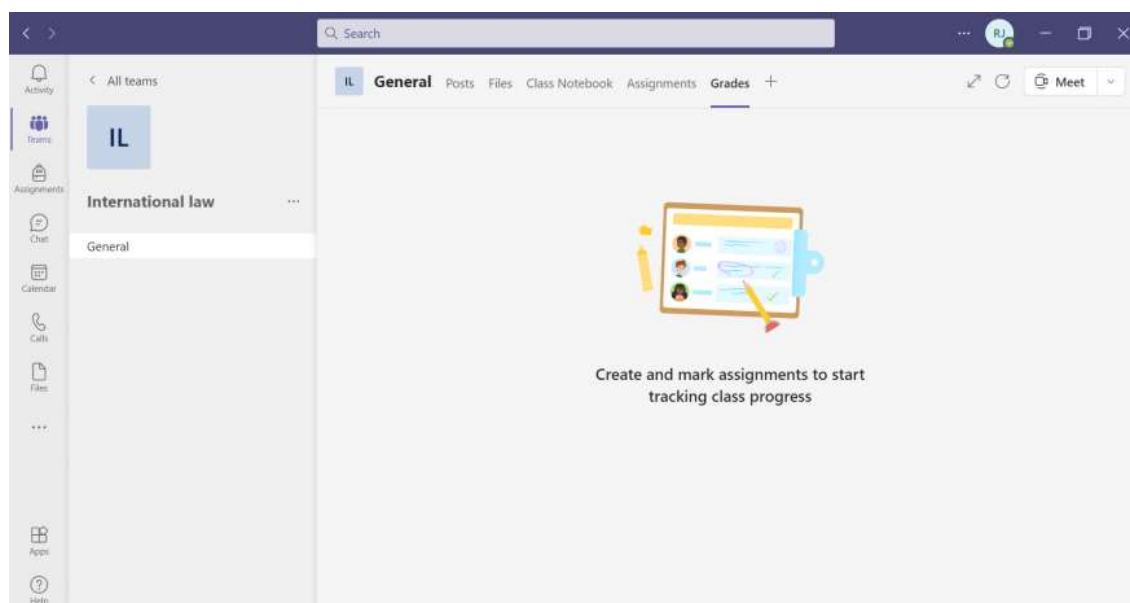
## Microsoft Teams



Source: Author's own resources

### 1. Tool characteristics:

MS Teams is a powerful communication platform that works as a desktop application that can be run in a web browser and mobile device. MS Teams is part of Office 365; in order to use the platform, it is necessary to create an Office 365 account. The platform has many functionalities. It is primarily used as a communication and team collaboration tool. MS Teams is used in remote education, among others, due to its functionality. The tool allows creating teams to which we assign students attending to the chosen subject (to the team, we can assign a group of students, pupils or department of the company because MSTeams is also commonly used in business). Each team has a general channel, and we can also add new channels which we use, for example, to divide students into task groups. There are applications and tools pinned to each team.



Source: Author's own resources

For each team, he can add documents (Files), and create a notebook for notes, which at the same time can be a space for collaboration. Another important tab in Teams is the Tasks function, which allows you to create tests (in Forms) or assign tasks. The Assignments feature allows teachers to create and assign assignments. Students can submit completed assignments directly in the application; while the teacher has the option to provide feedback in the form of comments and assignment grades when scheduling assignments or tests, the teacher can edit the start and end date and time of the assignment. While working in the team, we can also use other applications directly available in MSTeams or other applications with which MS Teams are connected (currently, 381 applications). Tools that facilitate active participation in classes or meetings is the ability to share the screen. Another important feature is the ability to divide a group into rooms, which enables working in smaller task groups. The calendar for planning is a tool that facilitates the organisation of meetings. Team members for whom the meeting is organised can see the invitation in the calendar. It is also possible to invite people who don't belong to the team and people from outside the organisation such as the university.



2. Possibility of using the tool in teaching (suggestions):

- communicating with students via chat and video conferencing;
- conducting lectures, training, oral exams;
- verification of student knowledge through tests in Forms;
- teamwork in task groups (room dividing function);
- organising meetings, conferences, seminars outside teams.

3. Supplemental materials:

- tutorials:

Microsoft Teams Tutorial (English version). [Film]. In: YouTube. September 20, 2019  
<https://www.youtube.com/watch?v=2zB2jiCxxuQ> [access: 22.05.2021].

4. Search categories:

- type of materials search: all possible types of materials;
- accessibility: free account – basic version, paid account – additional options, special educational account;
- Bloom's taxonomy: evaluating.



## MindMup



<https://www.mindmup.com>

### 1. Tool characteristics:

A mind map is a tool used to create a spatial record of information. It visualises a topic using key words, symbols, and images linked together by lines or arrows. The topic is presented according to the principle “from general to specific”. The main word – the key is placed in the central part, lines or arrows spread from it.

A mind map allows you to develop a topic or strategy creatively, stimulating thinking and engaging the group in brainstorming teamwork. A mind map allows you to organise your knowledge; it also makes it easier to remember by associating keywords or graphics, or drawings.

### 2. Possibility of using the tool in teaching (suggestions):

- notetaking;
- a presentation plan prepared by the teacher or student;





- working on a problem using the “brainstorming” method;
- planning;
- developing strategies;
- developing scenarios to solve the problem.

3. Supplemental materials:

- tutorials:

MindMup Tutorial (English version). [Film]. In: YouTube. November 19, 2019

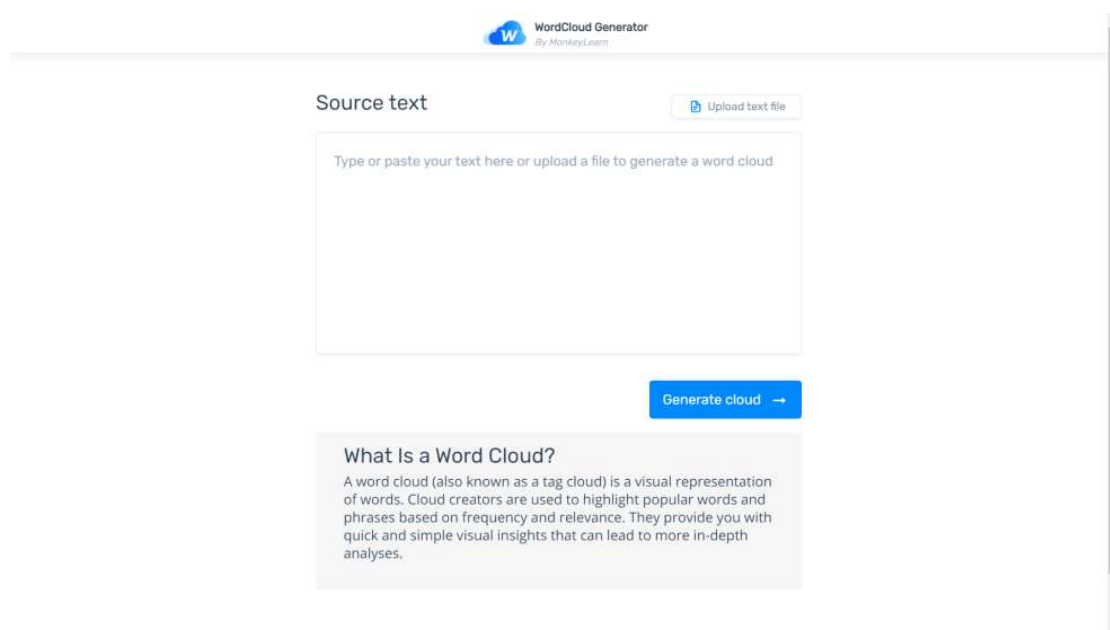
<https://www.youtube.com/watch?v=AvRAD1YP2K4> [access: 22.05.2021].

4. Search categories:

- type of materials search: mind map;
- accessibility: free account – basic version, paid account – additional options;
- Bloom’s taxonomy: analysing.



## MonkeyLearn



<https://monkeylearn.com/word-cloud/>

### 1. Tool characteristics:

A word cloud is a collection of keywords presented using graphics. It is a tool for getting students active in class and avoiding one-way presentations. Word cloud work can be integrated into any stage of the lesson. The tool can be used at the beginning of a class, before introducing new material, as a test of students' knowledge of specific topics. It can be used as a brainstorming activity at the beginning of a unit or as a debriefing activity at the end of a unit. The tool can also be used for taking notes. The word cloud can be presented in any shape you choose (depending on the shape models offered by the word cloud generator). The shape can be chosen according to the topic, e.g. when working on the topic of Africa, students can be asked to create a word cloud in the shape of the African continent. Word cloud generators also offer different fonts, colours and directions of words writing, which not only have a graphic effect but also help in remembering key concepts. Ready word clouds can be downloaded in the form offered by a given generator (PDF, PNG, JPG).



2. Possibility of using the tool in teaching (suggestions):

- brainstorming before introducing a new topic – students write all the associations with the given topic;
- the teacher prepares a word cloud with key terms, which are then discussed during the class;
- summarising the lecture or classes by collecting the students' keywords related to particular topics, entering them during the lecture into the generator, displaying the created "cloud", and finally, if possible, sharing it with the students via the platform or tool that we use at the university to communicate with the group;
- the word cloud as a homework assignment for students;
- the word cloud as a class note.

3. Supplemental materials:

- tutorials:

Free AI-Powered Word Cloud Tool – MonkeyLearn (English version). [Film]. In: YouTube. March 12, 2020 <https://www.youtube.com/watch?v=QjPwnsw3714> [access: 22.05.2021].

4. Search categories:

- type of materials search: word cloud, tag cloud;
- accessibility: free account;
- Bloom's taxonomy: understanding.



## Moodle

Getting started is easy  
Moodle is the world's most popular learning management system. Start creating your online learning site in minutes!

GET STARTED TODAY

Get started today

Robust open-source learning platform

Powering learning environments worldwide

Moodle stories from around the world

Community driven, globally supported.

COMMUNITY FORUMS

Help us make a difference with open and quality education for all

DONATE

Announcements

Congratulations to our Learn Moodle 3.11 Basics MOOC participants  
Wednesday, 14 July 2021

Latest news

Moodle Workplace 3.11.1: enhancing multi-tenancy for your LMS  
Thursday, 22 July 2021

<https://moodle.org/?lang=en>

### 1. Tool characteristics:

Moodle is a platform for creating professional e-learning courses. The system offers specific functionalities, such as the ability to separate individual modules and these, in turn - the corresponding submodules. For example, it is possible to create a specialised module, then a submodule course, then specific teaching materials, and so on. Each course has participants with different roles (access rights), e.g. student or teacher. Each course publishes materials (mainly for educational purposes) and forums, chat, blogs, instant messaging, and can create and run tests, surveys, assignments, and more. It has been designed to support both teaching and learning. Moodle provides the most flexible set of tools to support both blended learning and 100% online courses.



2. Possibility of using the tool in teaching (suggestions):

- teaching any course within the university curriculum using all types of materials;
- communicating with students via chat, blog, forum etc.;
- conducting surveys, lectures, training, exams;
- verification of student knowledge through tests.

3. Supplemental materials:

- tutorials:

Moodle 3.8 Complete Tutorial for Teachers and Creating Online Courses. [Film]. In: YouTube. January 2, 2020. <https://www.youtube.com/watch?v=hl74T-31tKI> [access: 22.07.2021].

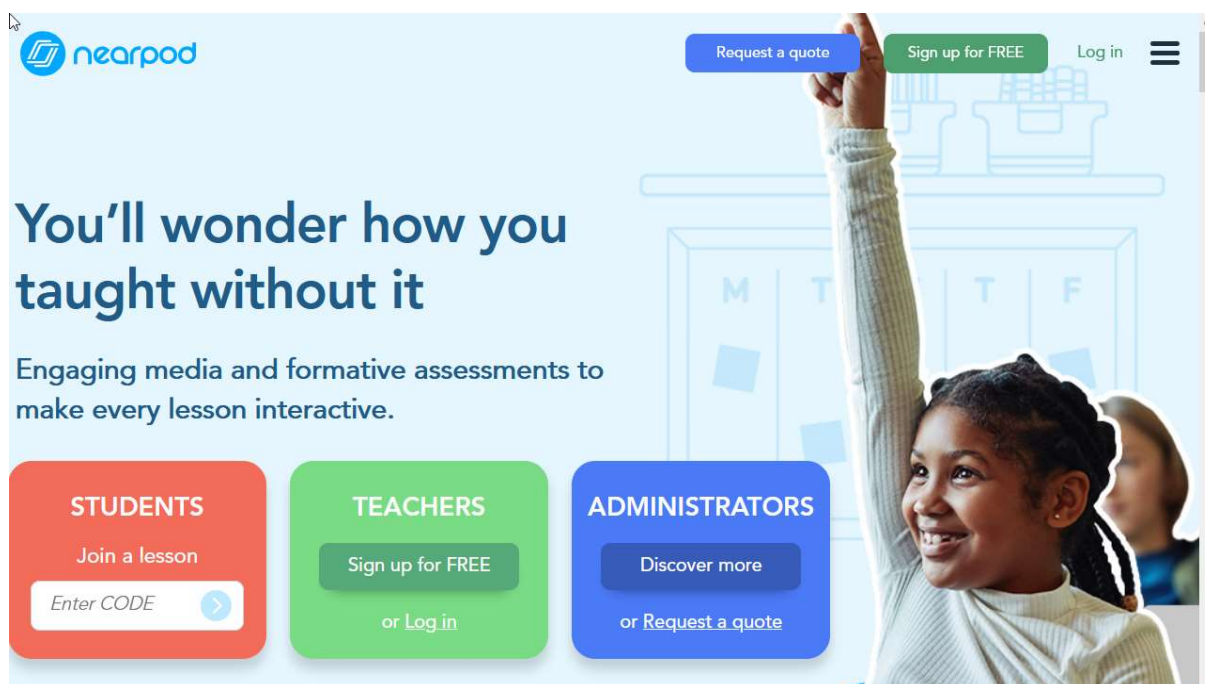
Moodle for Beginners: An introduction to the free Moodle cloud. [Film]. In: YouTube. September 14, 2018. <https://www.youtube.com/watch?v=oJ3qwBaQsOk> [access: 22.07.2021].

4. Search categories:

- type of materials search: all possible types of materials;
- accessibility: free account;
- Bloom's taxonomy: evaluating.



## Nearpod



<https://nearpod.com/>

### 1. Tool characteristics:

Nearpod is a comprehensive platform for creating interactive lessons where teachers can create and deliver lessons using their own materials or materials from the extensive Nearpod library. The teacher can modify existing presentations as they see fit (delete, add slides, change content, etc.) and combine entire presentations. Within the application, it is also possible to create new presentations, videos, interactive tasks, etc., displayed on multiple devices and see in real-time the students' work on the task. The inventory of content slides includes:

**Web content** to add content from the web;

**Nearpod 3D** to add 3D movies from the Nearpod library;

**Simulation** to add ready-made simulations useful for math, physics, or chemistry classes;

**VR field trip** to add ready-made videos in virtual reality technology;

**BBC video** to add videos produced by the BBC;

**Sway** to add an existing presentation prepared in Microsoft Sway;

**Slideshow** to add an existing presentation;

**Audio** to add audio;



**PDF viewer** to add a PDF document.

2. Possibility of using the tool in teaching (suggestions):

- the teacher can control the students' actions and display the result of their work on the interactive whiteboard in real-time, but can also delegate the task at home;
- to implement a fully interactive classroom in remote or hybrid teaching;
- students can work individually or in pairs at their own pace, and the results of their work go to the teacher's account; an ideal tool in the implementation of the flipped classroom;
- as an evaluation tool for student achievement and completed work.

3. Supplemental materials:

- tutorials:

Nearpod Tutorial for Teachers 2020. [Film]. In: YouTube. May 19, 2020. <https://www.youtube.com/watch?v=ISIZX8RxoOQ> [access: 29.06.2021].

How to create a lesson using the Nearpod add-on in Google Slides. [Film]. In: YouTube. March 13, 2020. <https://www.youtube.com/watch?v=RF2lhn3OLCA> [access: 29.06.2021].

- additional educational materials:

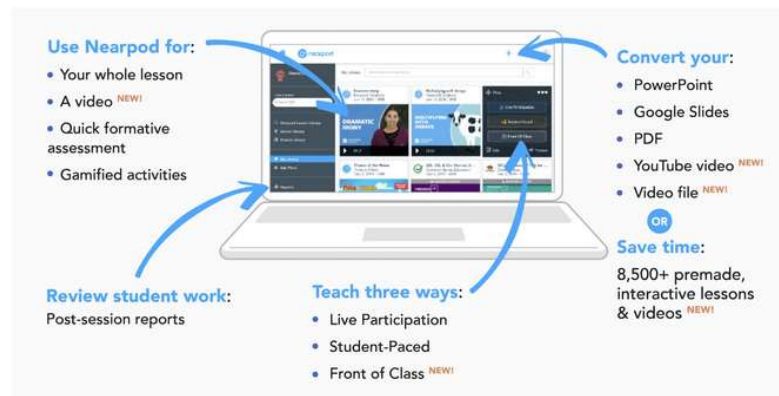
Mattei, M., D., Ennis, E. (2014). Continuous, real-time assessment of every student's progress in the flipped higher education classroom using Nearpod. *Journal of Learning in Higher Education*, 10 (1), 1-7. Retrieved June 29, 2021 from <https://eric.ed.gov/?id=EJ1143320>

Hakami, M. (2020). Using Nearpod as a tool to promote active learning in higher education in a BYOD learning environment. *Journal of Education and Learning*, 9 (1), 119-126. Retrieved June 29, 2021 from <https://eric.ed.gov/?id=EJ1241026>



## Nearpod: combines engaging media and formative assessments to make every lesson interactive

Flex between classroom, distance learning, or hybrid



<https://www.etchkshop.com/products/nearpod-for-education-school-license>

[access: 9.06.2021].



<https://kendrawollert.wordpress.com/2017/03/02/week-7-what-is-the-appropriateness-of-nearpod-to-your-students-classroom-and-your-unit/>

[access: 29.06.2021].



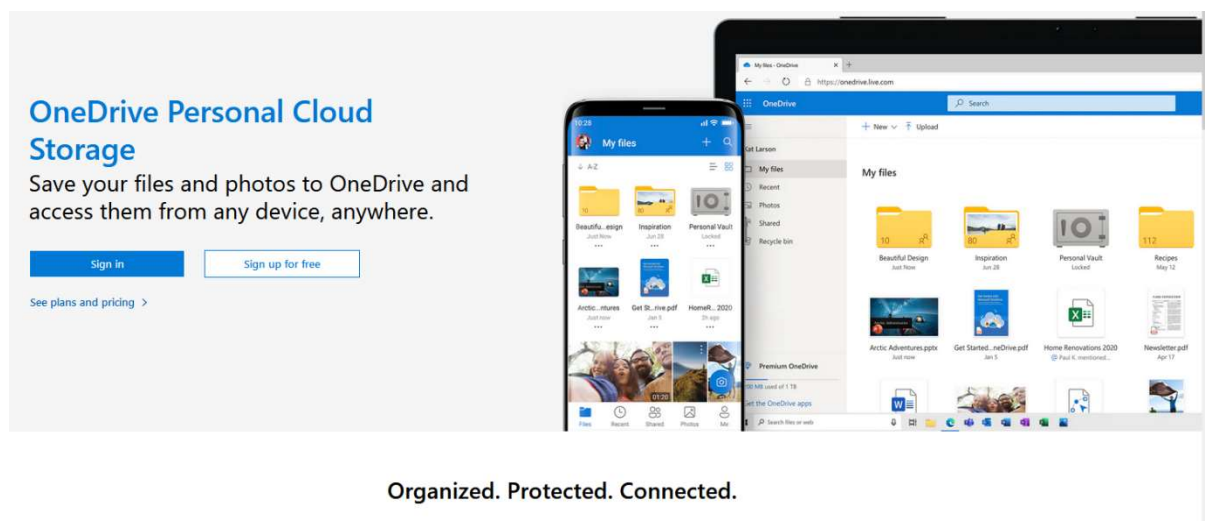


4. Search categories:

- type of materials search: presentation, film, video, quiz, form, test, poll, interactive whiteboard, educational game;
- availability: free account – basic version, paid account – full options, special educational account;
- Bloom's taxonomy: creating.



## OneDrive



<https://www.microsoft.com/en-us/microsoft-365/onedrive/online-cloud-storage>

### 1. Tool characteristics

OneDrive is a cloud owned by Microsoft where we can store any files we want, whether created in other Microsoft services or uploaded from personal devices. Internet cloud is a virtual drive that allows storing, sharing and collaboration of many people on shared files. It allows access to resources from any device and anywhere in the world where there is Internet access.

### 2. Possibility of using the tool in teaching (suggestions):

- organisation and storage of files in the cloud;
- backup copies of shared, educational materials;
- sharing and collaborating on files – everyone can see the changes in real-time;
- the ability to access materials regardless of the currently used device;
- ability to easily search for needed files by keywords;
- sharing materials with participants during a meeting on a platform that does not have a file sharing option (Zoom type);
- files from all Microsoft's tools are stored there.



### 3. Supplemental materials:

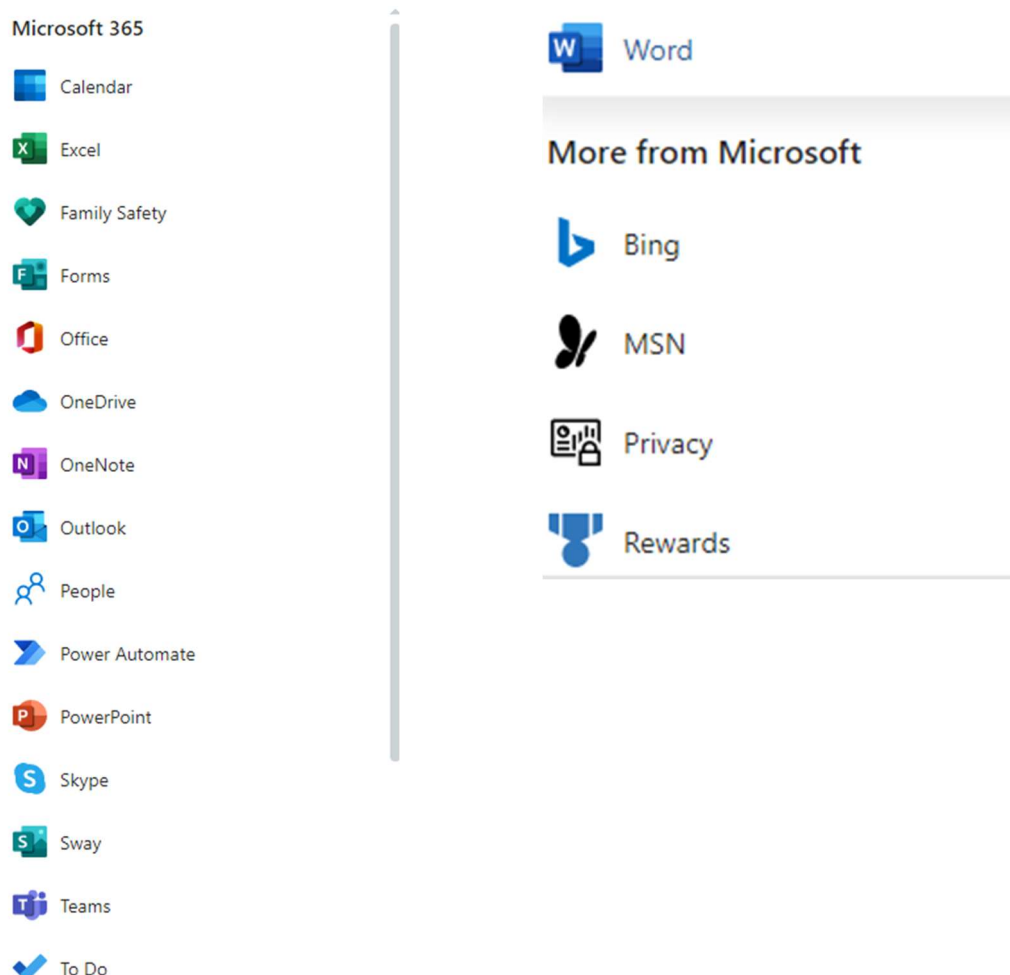
- tutorials:

How to use Microsoft OneDrive. [Film]. In: YouTube. August 13, 2020. <https://www.youtube.com/watch?v=Xa-lx5bLF5o> [access: 29.06.2021].

- additional educational possibilities:

OneDrive for teachers and students: Easily transfer between phone and PC and backup your work. [Film]. In: YouTube. May 11, 2020. <https://www.youtube.com/watch?v=YU2igKL7SYk> [access: 29.06.2021].

- other Microsoft services compatible with OneDrive:



<https://onedrive.live.com/> [access: 29.06.2021].

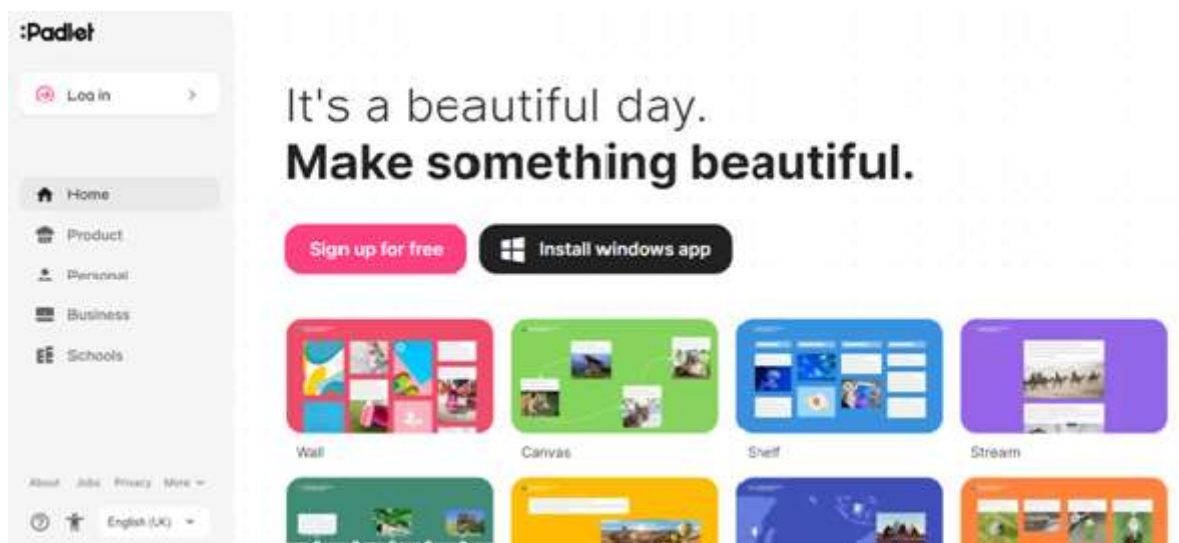


4. Search categories:

- type of materials search: all possible types of documents;
- availability: free account – basic version, paid account – additional options, special educational account;
- Bloom's taxonomy: remembering.



## Padlet



<https://en.padlet.com/>

### 1. Tool characteristics:

Padlet (virtual whiteboard) is a simple tool mainly used to collect and share digital content. It can accommodate various types of data (e.g. texts, photos, notes, documents, links, music, films) and information (e.g. organisational) addressed to students. The materials can be classified problematically (thematically) or chronologically (for specific activities). The teacher may invite students to co-create the whiteboard.

### 2. Possibility of using the tool in teaching (suggestions):

- running a whiteboard which is used for communication between the teacher and the students;
- running a discussion forum – the teacher asks questions, and students answer them;
- the teacher and students create a blog where they share ideas and electronic resources, post links to articles;
- it is a place for group work - teams are given different topics and write their findings on the pad;
- during the lecture, students can add notes or ask questions.



3. Supplemental materials:

- tutorials:

Learn how to use Padlet – 2020 tutorial. [Film]. In: YouTube. July 20, 2020.

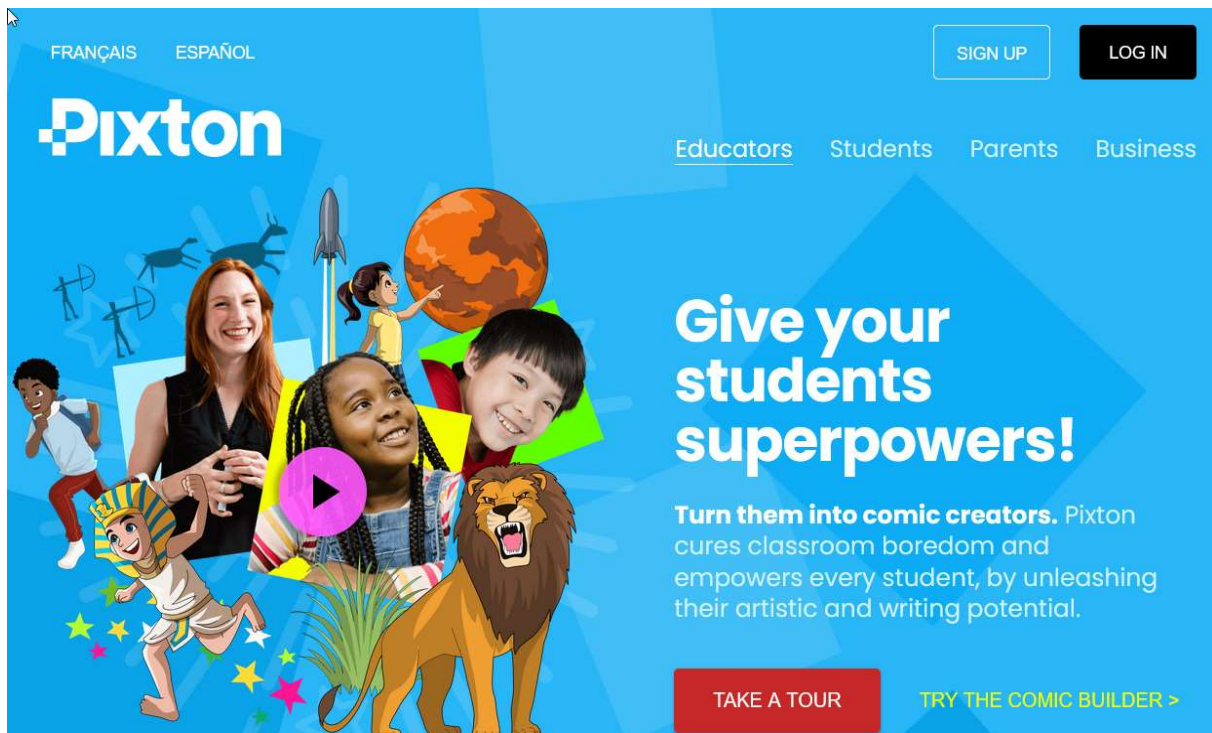
<https://www.youtube.com/watch?v=qtoJCe3WNnc> [access: 15.06.2021].

4. Search categories:

- type of materials search: virtual whiteboard, discussion forum, blog, survey, live engagement tool;
- accessibility: free access – basic version (for three padlets), paid option – additional options (unlimited number of padlets);
- Bloom's taxonomy: remembering.



## Pixton



<https://www.pixton.com/>

### 1. Tool characteristics:

A powerful tool for creating and sharing educational comics, providing access to ready-made comic templates and enabling their creation. The development of educational materials is simple and does not require artistic talents.

### 2. Possibility of using the tool in teaching (suggestions):

- within a free educational account, the program allows to create of a group for collaborative work, similar to Canva, MS Teams or Google Classroom platforms;
- specific tasks can be assigned (with feedback and comments or a grade), and the created learning materials can be shared;



- the teacher and students have the opportunity to work on the project together, recording changes on the desktop in real-time with the use of mobile version (free application for smartphones);
- using storytelling in the classroom.

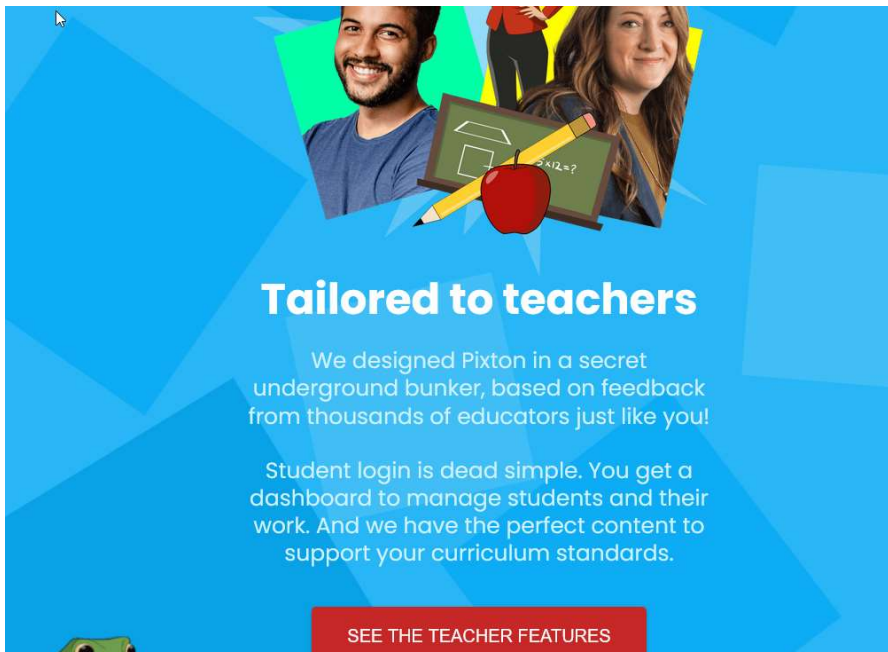
### 3. Supplemental materials:

- tutorials:

Make Comics for School with Pixton Edu. Film]. In: YouTube. June 5, 2020. <https://www.youtube.com/watch?v=gTCi0H87x84> [access: 27.06.2021].

- additional educational possibilities:

Pixton Comic & Storyboard Builder for Education. <https://www.pixton.com/> [access: 27.06.2021].



**Tailored to teachers**

We designed Pixton in a secret underground bunker, based on feedback from thousands of educators just like you!

Student login is dead simple. You get a dashboard to manage students and their work. And we have the perfect content to support your curriculum standards.

[SEE THE TEACHER FEATURES](#)





The banner is set against a blue background with colorful geometric shapes. It features three columns of text, each with a corresponding image and a call-to-action button. The first column shows a character creator interface and a woman with curly hair. The second column shows a Google Classroom logo and a girl running. The third column shows a circular diagram of arrows.

| Avatars as diverse as you  | No-brainer access for students   | Explore new dimensions of literacy  |
|--|--|---|
| When kids put themselves and their classmates at the center of their comic adventures, they discover a personal connection with the topic at hand. | Choose the login method that's right for your class. Just give them their join link and they're in. Pixton plays nice with Google Classroom, unlike Oil Woman and Dr. Water. | Peruse our Idea Library and challenge your students to create a comic, <u>storyboard</u> , or graphic novel to show what they know. |
| START THE ADVENTURE  | LET'S PLAY   | OPEN THE PORTAL   |

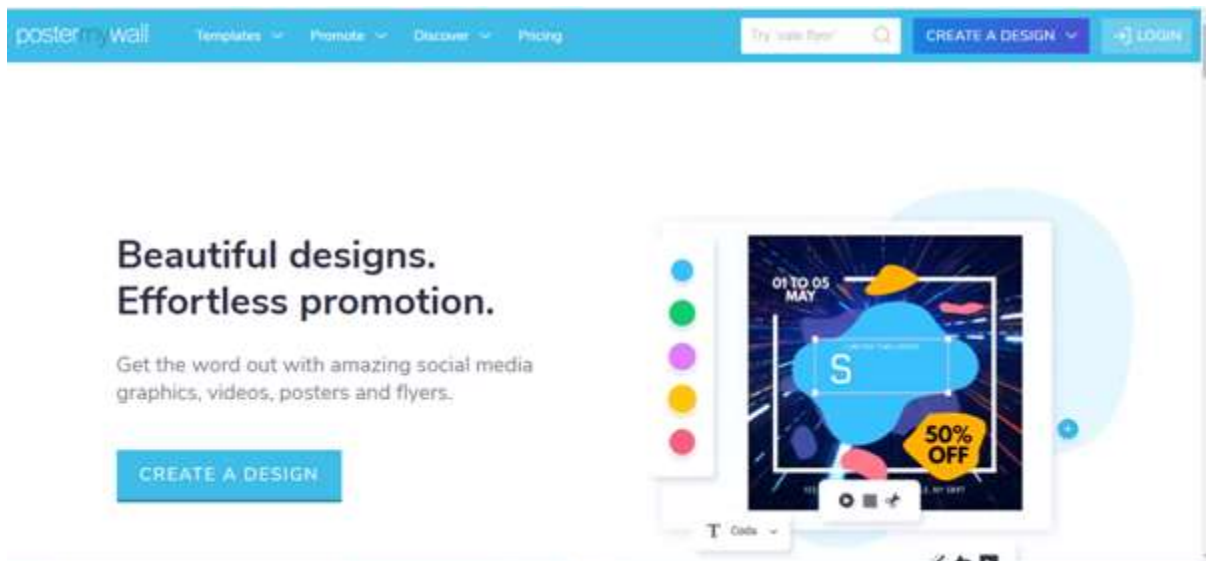
<https://www.pixton.com/> [access: 27.06.2021].

#### 4. Search categories:

- type of materials search: comic, storyboard, graphic novel;
- availability: free account – basic version, paid account – additional options, free educational account;
- Bloom's taxonomy: applying.



## PosterMyWall



[www.postermywall.com](http://www.postermywall.com)

### 1. Tool characteristics:

PosterMyWall is a tool related to graphic design. Thanks to PosterMyWall, you can quickly create posters, leaflets, advertisements, business cards (in a traditional version or multimedia effects for posting on the Internet). You can use ready-made templates or create your material which can be placed, for example, on a website. The templates are grouped by type (e.g. flyer, poster) and subject (e.g. educational). The tool offers many features, e.g. selection of fonts, clipart and images. Teachers can create free “lesson accounts” to organise student work.

### 2. Possibility of using the tool in teaching (suggestions):

- the teacher prepares a poster to summarise the lecture;
- students prepare a summary of the class in the form of a poster.

### 3. Supplemental materials:

- tutorials:

PosterMyWall Live Class: Shortcuts for Power Users. [Film]. In: YouTube. January 14, 2021.

<https://www.youtube.com/watch?v=1SmVVFxwmxA> [access: 24.06.2021].



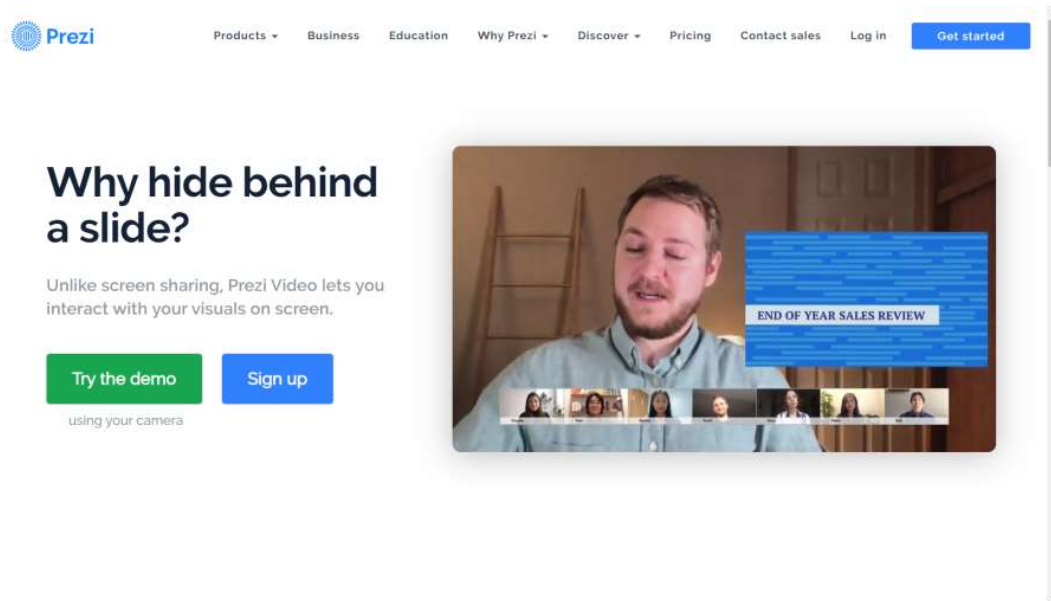
Afthonidou Klimentini: How to make a poster with PosterMyWall. [Film]. In: YouTube. September 4, 2020. [https://www.youtube.com/watch?v=vGlz-hRih\\_c](https://www.youtube.com/watch?v=vGlz-hRih_c) [access: 24.06.2021].

4. Search categories:

- type of materials searched: flyer, poster, graphics for social media, Zoom background, book cover, teaching aid, schedule, magazine cover, brochure, social media posts, infographic;
- accessibility: free account – basic version (no collaborative working, for example), paid account – additional options; free educational account;
- Bloom’s taxonomy: creating.



## Prezi



<https://prezi.com>

### 1. Tool characteristics:

Prezi is an alternative to PowerPoint – a slide-based presentation. Prezi is a tool for creating presentations on a so-called virtual canvas of unlimited area with non-linear navigation. The presentation is created in the form of a storyboard with the possibility and reduce selected elements (points). The presentation can be created using a ready-made template from Prezi resources or choose a blank presentation (Blank). You can attach to the presentation such elements as movies, images, PDF files or audio files. You can also edit your presentation with invited people, both in real-time and asynchronous mode. Prezi comes in a free and a paid option. With the free license, presentations are automatically set to the Public option and become available to all users. In this version, you can only use the web application. The paid license allows you to save the presentation in the Private option, which is visible only to the author and the people who have shared the presentation.



2. Possibility of using the tool in teaching (suggestions):

- preparation of presentations;
- students work on a topic given by the instructor as group work (by preparing a presentation together).

3. Supplemental materials:

- tutorials:

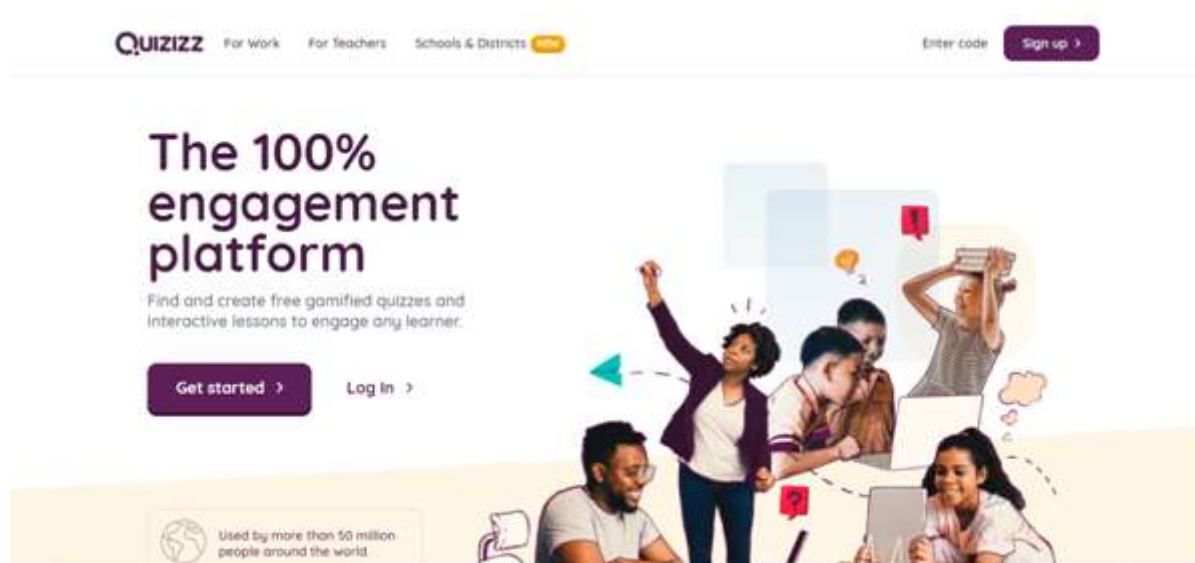
How to Create Engaging Presentation – Prezi Tutorial. (English version). [Film]. In: YouTube. March 8, 2021 <https://www.youtube.com/watch?v=F977vuuxAGA&t=639s> [access: 19.05.2021].

4. Search categories:

- type of materials search: presentation;
- accessibility: free account – basic version, paid account – additional options;
- Bloom’s taxonomy: understanding.



## Quizizz



<https://quizizz.com/>

### 1. Tool characteristics:

Quizizz is a tool for creating online tests. You can create the quizzes or use its database. After the students have solved the test, the teacher receives statistical information about individual students and the whole group (e.g. how many people took the quiz, the percentage of correct and incorrect answers, the time taken to complete the test), as well as the answers of individual participants (e.g. which questions the student answered correctly and which incorrectly). Quizzes can be shared in Google Classroom, among other places.

### 2. Possibility of using the tool in teaching (suggestions):

- test after discussing part or all of the subject matter and at the end of the semester; the test result provides feedback to the teacher on the level of understanding of the content;
- quizzes to facilitate preparation for classes;
- students repeat the material from the class;
- quizzes to show the extent of the student's knowledge before introducing a new topic.

### 3. Supplemental materials:

150



- tutorials:

Tom Driscoll: Quizizz Walkthrough for Teachers. [Film]. W: YouTube. November 21, 2020.

<https://www.youtube.com/watch?v=rUI-bWFg3rc> [access: 24.06.2021].

Maam Ann: How to join a quizizz game: tagalong. [Film]. In: YouTube. August 12, 2020.

[https://www.youtube.com/watch?v=BOKQj\\_9jiHI](https://www.youtube.com/watch?v=BOKQj_9jiHI) [Access: 24.06.2021].

#### 4. Search categories:

- type of materials search: test, game, testing tool, live engagement tool;
- accessibility: free account;
- Bloom's taxonomy: evaluation.



## Socrative



<https://www.socrative.com>

### 1. Tool characteristics:

Socrative is a tool for creating and solving quizzes, surveys and polls online and conducting them in real-time using mobile devices. Questions and answers are displayed on the screen of the device (tablet, computer, mobile) (unlike Kahoot, where questions are displayed on one device and answers must be given on the other). A teacher can (in the free version) run one virtual room for up to 50 students. Tests are arranged by a teacher account (Socrative Teacher). Students can take the tests using the app (Socrative Students) or through the site after entering the room number received from the teacher.

While students are completing the test, the teacher can watch their progress on the screen. After completion, the teacher can download a report in a spreadsheet.

Students also have the option of receiving feedback to review incorrect answers. The test can also include additional explanations that will display to students after they answer a question.





The Socrative application has three features: QUIZ, SPACE RACE and EXIT TICKET and QUICK QUESTION.

QUIZ allows you to prepare a test consisting of three types of questions: multiple-choice, true/false and descriptive questions.

SPACE RACE is a race that consists of solving a test on time and competing with other participants. It is also possible to compete in teams.

EXIT TICKET is a feature that allows students to provide feedback to the teacher. It is a very helpful feature when introducing new topics. The teacher asks the students three questions that are not graded but show the students' understanding of the material. The first two questions are programmed into the application: „How well did you understand today's material?“ (Students rate their understanding of the material discussed on a four-point scale).

“What did you learn in today's class?“ A question that the teacher creates independently

A QUICK QUESTION is a question that may come up during the class. The teacher can ask the question verbally or write it on the virtual whiteboard. The teacher can also choose an answer option by launching a Quick Question: a one-choice test, true/false or a descriptive question. The basic, free version also includes the ability to create questions with an open text field.

## 2. Possibility of using the tool in teaching (suggestions):

- creating quizzes, tests or surveys to check or summarise students' knowledge during the class or as a homework assignment
- checking students' understanding of the material covered;
- using the resources developed by other users to prepare tests by the teacher;
- using the tool for the teamwork of students as a competitive element.



### 3. Supplemental materials:

- tutorials:

Introduction to Socrative (English version). [Film]. In: YouTube. November 25, 2015

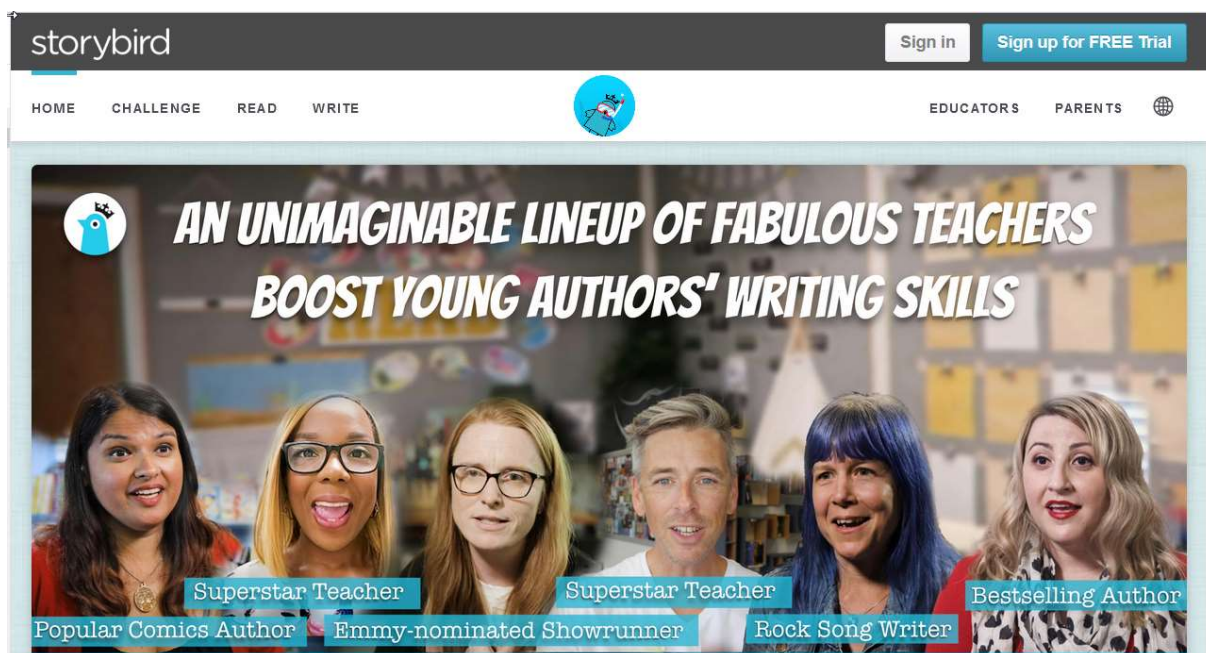
<https://www.youtube.com/watch?v=yBJmEWHXVA> [access: 22.05.2021].

### 4. Search categories:

- type of materials search: quiz, poll;
- accessibility: free account – basic version, paid account – additional options;
- Bloom's taxonomy: evaluating.



## Storybird



<https://storybird.com/>

### 1. Tool characteristics:

Storybird is an online art tool for developing language knowledge, especially reading comprehension and writing. It offers vivid-colour design and appealing illustrations, which draw readers' attention and focus on the reading and writing context. The application allows the creation of books from ready-made illustrations prepared by visual artists. Storybird centres on three types of stories: picture books, long-form books and poetry. Illustrations inspire students to write stories and engage students with age-appropriate video tutorials, writing challenges, quizzes, and more. Printing, publishing books and artwork purchases involve payment.

### 2. Possibility of using the tool in teaching (suggestions):

- the program allows to create of a group for collaborative work, similar to Canva, Pixton, MS Teams or Google Classroom platforms;



- students can work in pairs developing skills in collaboration, communication, agreement, and planning;
- creation literary texts based on graphics;
- it can be used as a story writing centre for students;
- using storytelling in the classroom.

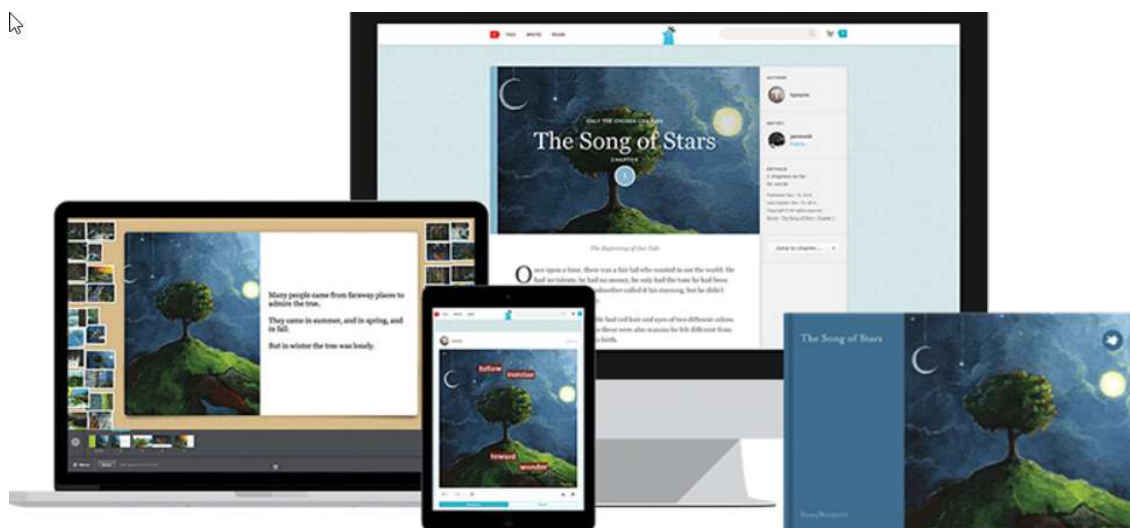
### 3. Supplemental materials:

- tutorials:

Storybird Tutorial (teacher-oriented). [Film]. In: YouTube. January 21, 2015.

<https://www.youtube.com/watch?v=h0MfZEG6hcM> [access: 28.06.2021].

- additional materials:



Create professionally illustrated picture books, poetry, and longform stories with your students.

<https://www.storybird.com/educators> [access: 29.06.2021].

### 4. Search categories:

- type of materials search: art book, art illustrations, e-book;
- availability: free account – trial version, paid account – full options, special educational account;
- Bloom’s taxonomy: applying.



## Sway



<https://sway.office.com/>

### 1. Tool characteristics:

Sway is an intuitive tool included in the Microsoft Office package, available free of charge for Microsoft account holders. It allows the creation and shares primarily multimedia presentations quickly. It is also possible to create newsletters, reports, papers, photo albums, stories, online newspapers and online articles. All materials can be accompanied by images, sound and video, for example. One of the main differences between the two Microsoft products – Sway and PowerPoint – is that Sway is web-based and accessible, while PowerPoint is a licensed tool for desktop computers.

### 2. Possibility of using the tool in teaching (suggestions):

- the teacher prepares a lecture to which he/she attaches content, photos, films;
- the teacher prepares a task for students to complete, attaches recorded voice instructions.

### 3. Supplemental materials:

- tutorials:

Benaim David: Sway: Immersive, mob friendly animated pdf alternative from Word doc. [Film]. In: YouTube. June 10, 2020. <https://www.youtube.com/watch?v=pjgtYKW53xY> [access: 24.06.2021].



Keet Jamie: How to use Microsoft Sway – Beginner’s Guide. [Film]. In: YouTube. January 7, 2021. <https://www.youtube.com/watch?v=4PbNYGOwRO0> [access: 24.06.2021]

4. Search categories:

- type of materials searched: presentation, multimedia presentation, photo collage, newsletter, blog;
- accessibility: free access (for Microsoft account users);
- Bloom’s taxonomy: understanding.



## Tagxedo

### Tagxedo

Home | Create | Shop | Like! 94 | Tweet

Welcome to Tagxedo, word cloud with styles

Tagxedo turns words -- famous speeches, news articles, slogans and themes, even your love letters -- into a visually stunning word cloud, words individually sized appropriately to highlight the frequencies of occurrence within the body of text.

[Create Gallery](#) [Shop](#) [Learn](#)

The following are a few examples to show the versatility of Tagxedo, especially how tightly the words hug the shapes. Feel free to click the pictures and play with them in Tagxedo. If you like these word clouds, you must also check out the [Tagxedo Facebook page](#) which has many more candies for your eyes, and read about the [101 Ways to Use Tagxedo](#). Now...



**Start Now.** or make a Tagxedo out of your blogs, tweets, or tags...

|                             |                                    |   |
|-----------------------------|------------------------------------|---|
| (1) URL<br>e.g. www.cnn.com | (2) Twitter ID<br>e.g. BarackObama | (3) Del.icio.us ID<br>e.g. John.Smith   |
| (4) News<br>e.g. World Cup  | (5) Search<br>e.g. Yellowstone     | (6) RSS (Lookup)<br>e.g. techcrunch.com |

Shape:  Classic  Apple  Dove  Heart  Star

Orientation:  Any  H  V  H/V

Font:  Theme:

[www.tagxedo.com](http://www.tagxedo.com)

#### 1. Tool characteristics:

A word cloud is a collection of keywords presented using graphics. It is a tool for getting students active in class and avoiding one-way presentations. Word cloud work can be integrated into any stage of the lesson. The tool can be used at the beginning of a class, before introducing new material, as a test of students' knowledge of specific topics. It can be used as a brainstorming activity at the beginning of a unit or as a debriefing activity at the end of a unit. The tool can also be used for taking notes. The word cloud can be presented in any shape you choose (depending on the shape models offered by the word cloud generator). The shape can be chosen according to the topic, e.g. when working on the topic of Africa, students can be asked to create a word cloud in the shape of the African continent. Word cloud generators also offer different fonts, colours and directions of words writing, which not only have a graphic effect but also help in remembering key concepts. Ready word clouds can be downloaded in the form offered by a given generator (PDF, PNG, JPG).



## 2. Possibility of using the tool in teaching (suggestions):

- brainstorming before introducing a new topic – students write all the associations with the given topic;
- the teacher prepares a word cloud with key terms, which are then discussed during the class;
- summarising the lecture or classes by collecting the students' keywords related to particular topics, entering them during the lecture into the generator, displaying the created "cloud", and finally, if possible, sharing it with the students via the platform or tool that we use at the university to communicate with the group;
- the word cloud as a homework assignment for students;
- the word cloud as a class note.

## 3. Supplemental materials:

- tutorials:

How to use Tagxedo – Create Word Clouds tutorial (English version). [Film]. In: YouTube. May 31, 2011 <https://www.youtube.com/watch?v=6ZwVogFP-NE> [access: 27.05.2021].

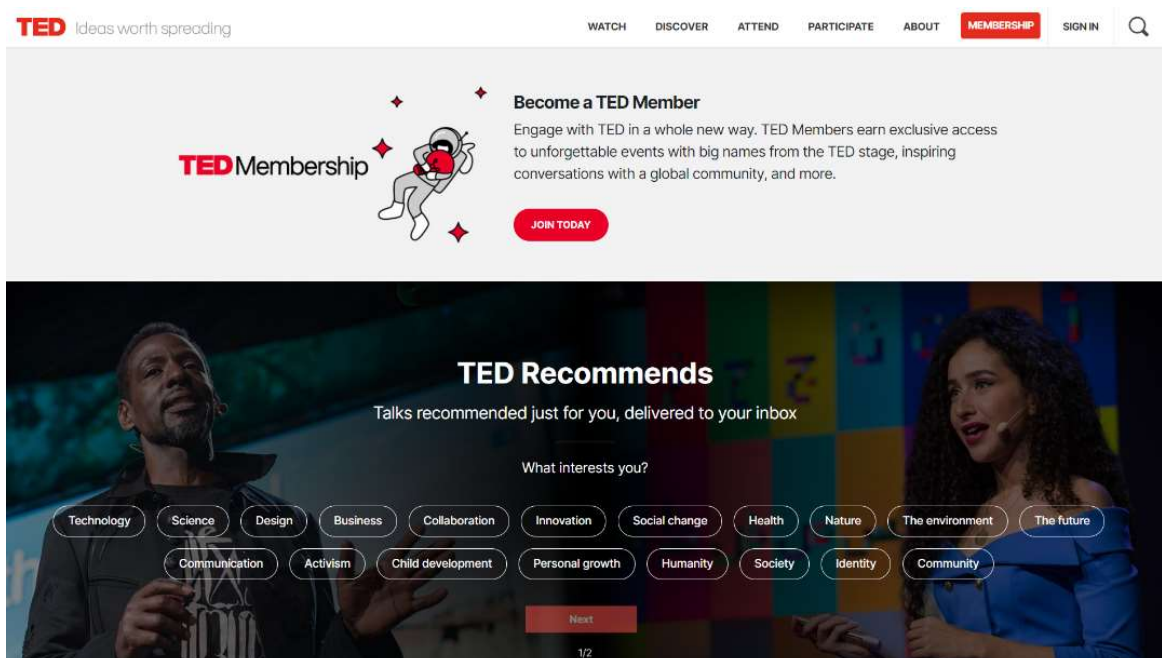
## 4. Search categories:

- type of materials search: word cloud, tag cloud;
- accessibility: free account;
- Bloom's taxonomy: understanding.





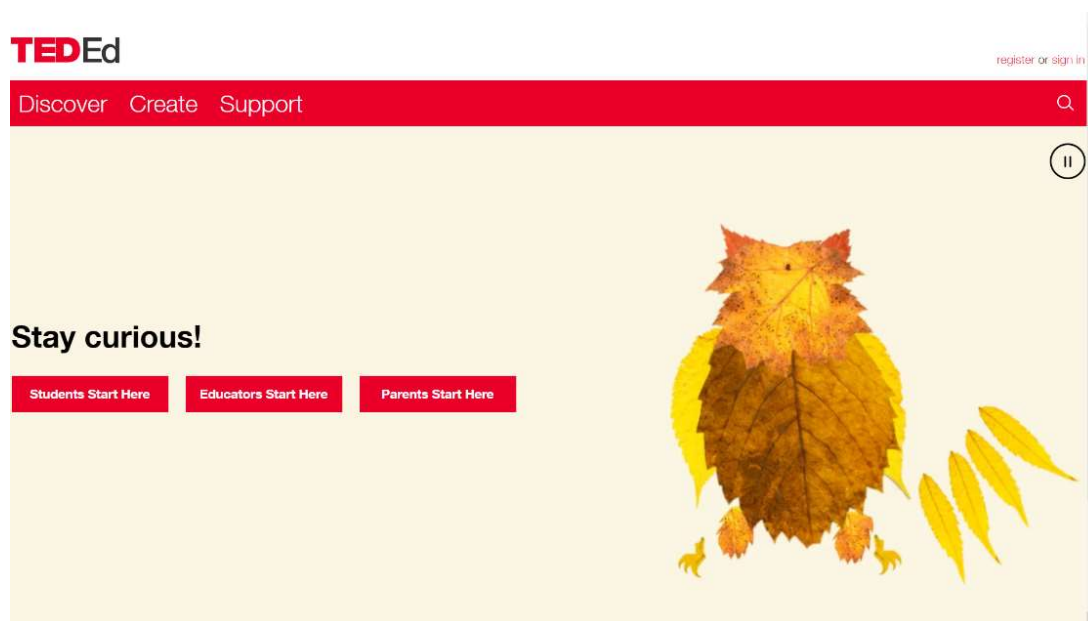
## TED



<https://www.ted.com/>

### 1. Tool characteristics:

TED (the acronym stands for Technology, Entertainment and Design). It is a scientific conference that has been held regularly since 1984. The speeches, which are limited to 18 minutes, are available on the website and can be used for teaching purposes. We can search the videos by topic and by speech length. The speeches are in English, but with the possibility to run subtitles in the language of your choice. Based on the website, the educational platform TED-ED Lessons Worth Sharing was created, where we can find video materials from the TED portal but also other educational websites. We can also use the ready-made lessons, which consist of audiovisual materials and materials in the form of, for example, questions to the lecture.



<https://ed.ted.com/>

2. Possibility of using the tool in teaching (suggestions):

- the teacher can start the class with a short film or a lecture as an introduction to the topic;
- during the class, students watch a documentary proposed by the teacher and answer questions based on the documentary watched;
- students prepare for class on the basis of the document suggested by the teacher (a film, an interview, a lecture).

3. Supplemental materials:

- tutorials:

TED – Ed: How to use TED – Ed – Ideas for the Flipped Classroom (English version). [Film]. In: YouTube. May 30, 2018. <https://www.youtube.com/watch?v=1fL9YIxMB88> [access: 20.07.2021].

TED – Ed: Creating a TED Ed Lesson (English version). [Film]. In: YouTube. March 22, 2020. <https://www.youtube.com/watch?v=J1u2AFWHg9k> [access: 20.07.2021].

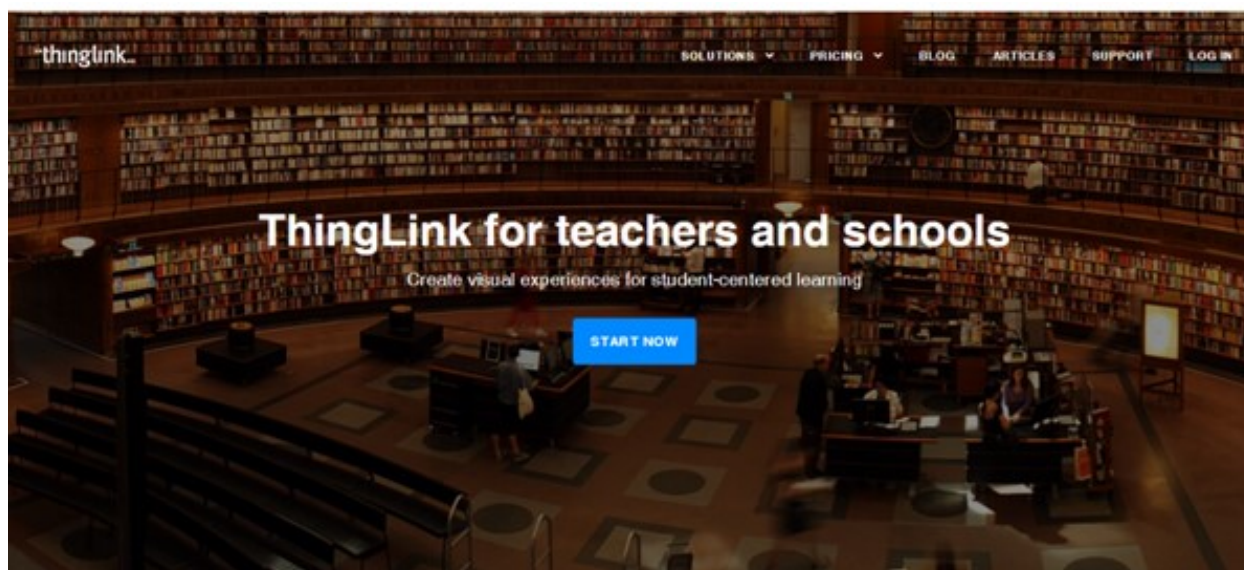
4. Search categories:



- type of materials search: lectures, understanding exercises;
- accessibility: free account;
- Bloom's taxonomy: remembering.



## ThingLink



<https://www.thinglink.com/edu?btnSource=logout>

### 1. Tool characteristics:

Thinglink is a tool most commonly used to create interactive posters with points, which can be linked to elements such as an image, video, text, link or audio recording. The points can also link students to quizzes or other games to check their understanding.

### 2. Possibility of using the tool in teaching (suggestions):

- the teacher prepares for the lecture its summary in the form of a poster containing interactive points, to which he/she attaches supplementary materials in the form of e.g. text, links, films;
- the teacher prepares a poster on which he marks points referring to quizzes testing students' knowledge;
- students work on a specific topic in the form of a presentation.

### 3. Supplemental materials:

- tutorials:



Worg Michelle: How to create an interactive lesson using Thinglink. [Film]. In: YouTube.  
May 11, 2020. [https://www.youtube.com/watch?v=s\\_ys5bH9ArU](https://www.youtube.com/watch?v=s_ys5bH9ArU) [access: 24.06.2021]

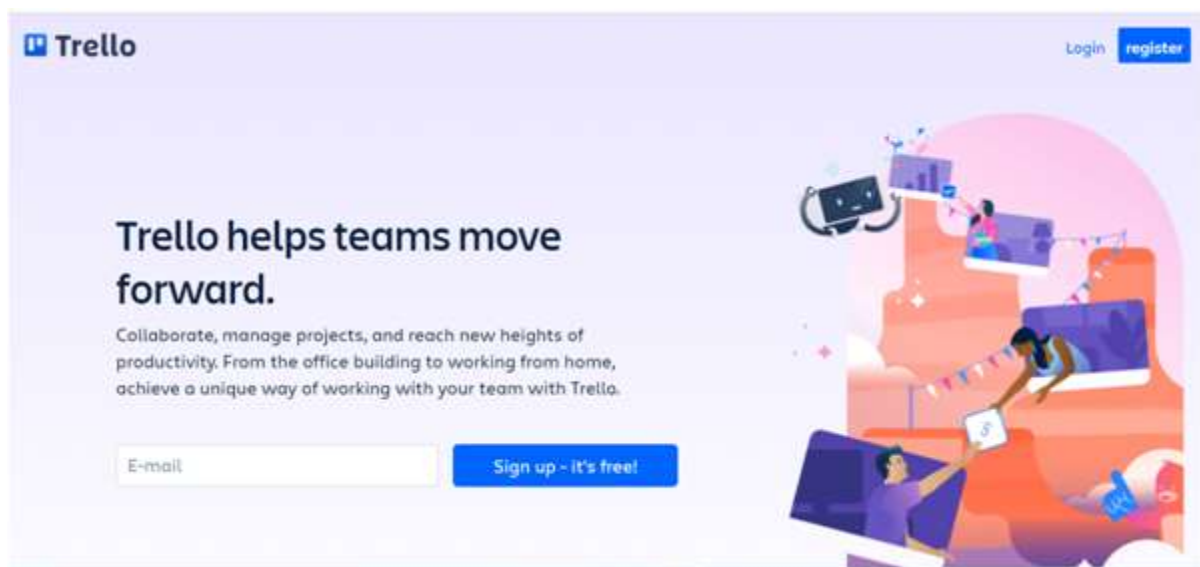
The Thinglink guide for Teachers. [Film]. In: YouTube. June 25, 2021.  
<https://www.youtube.com/watch?v=FC0ZrNMBcjU> [access:24.06.2021].

#### 4. Search categories:

- type of materials search: presentation, interactive presentation, poster, quiz;
- accessibility: free account – basic version, paid account – additional options;
- Bloom's taxonomy: understanding.



## Trello



<https://trello.com/>

### 1. Tool characteristics:

Trello (virtual whiteboard) is a tool used primarily to organise all kinds of tasks that we need to do or speed up their completion. The tasks to be completed are grouped on virtual whiteboards, thanks to which we can see the progress of work on individual projects. Trello provides a seamless transition from one whiteboard to another and moves tasks and resources between them. It resembles other virtual whiteboards but offers more capabilities (e.g. compared to Padlet). Facilitates teamwork, allows sharing of information between team members. For teachers, it can help make lesson planning, collaboration and organisation easier. Trello also helps store, organise, share collected resources (e.g. links to sites, inspiration for activities, recordings).

### 2. Possibility of using the tool in teaching (suggestions):

- is a place for group work – teams are given different topics, and they write their findings on the boards, they communicate;



- the teacher maintains the whiteboard, which is used for communication between the teacher and the students.

### 3. Supplemental materials:

- tutorials:

Digital Project Planning For Academics: Trello Tutorial And Free Pre-made Boards. [Film]. In: YouTube. July 14, 2020. <https://www.youtube.com/watch?v=HYIx51Jeumg> [access: 24.06.2021].

Free Trello Vs. Trello Gold | Is It Worth It?. [Film]. In: YouTube. March 19, 2021. <https://www.youtube.com/watch?v=2iWikT3eg8c> [access: 24.06.2021].

Grey Jean: Trello for Tutors and Teachers. [Film]. In: YouTube. August 16, 2020. <https://www.youtube.com/watch?v=Pp5-wJsV6J4> [access: 24.06.2021].

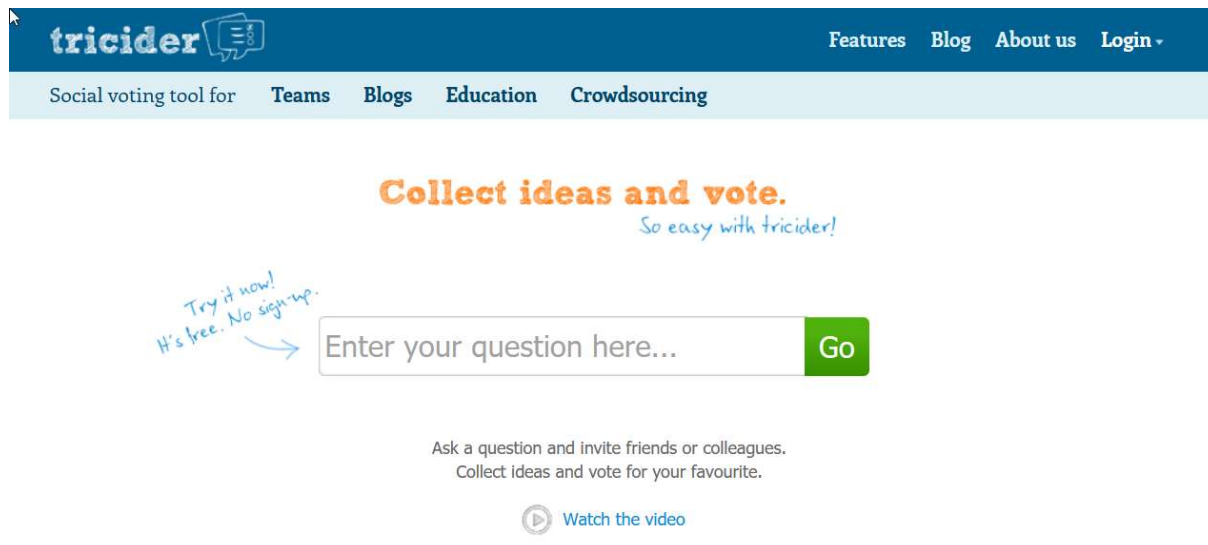
How Teachers Can Improve Their Productivity with Trello. [Film]. In: YouTube. July 13, 2020. <https://www.youtube.com/watch?v=Xf-Lj53-8Q> [access: 24.06.2021].

### 4. Search categories:

- type of materials search: whiteboard, discussion forum, project, online newspaper, live engagement tool;
- accessibility level: free account – basic version, paid account – additional options;
- Bloom's taxonomy: remembering.



## Tricider



<https://www.tricider.com/>

### 1. Tool characteristics:

Tricider is a collaboration and idea-creation program that enables online brainstorming, voting and decision making. It is suitable for preparing and publishing questions that are voted on by students invited to collaborate. The teacher can create a discussion forum, students discuss and share ideas and opinions on the topic. The ideas developed can be shared on social media or via email.

### 2. Possibility of using the tool in teaching (suggestions):

- moderated discussion;
- advanced brainstorming;
- debates.

### 3. Supplemental materials:

- tutorials:

A quick guide to Tricider.[Film]. In: YouTube. February 14, 2018.  
<https://www.youtube.com/watch?v=ECO2ZnCunvc&t=4s> [access: 30.06.2021].





Teacher Tech. [Film]. In: YouTube. February 26, 2015.  
<http://asilataner.weebly.com/blog/tricider> [access: 30.06.2021].

How to use Tricider for online discussions and brainstorming. Film]. In: YouTube. August 14, 2020. <https://www.youtube.com/watch?v=vJkB90GBroM> [access: 30.06.2021].

- additional materials:

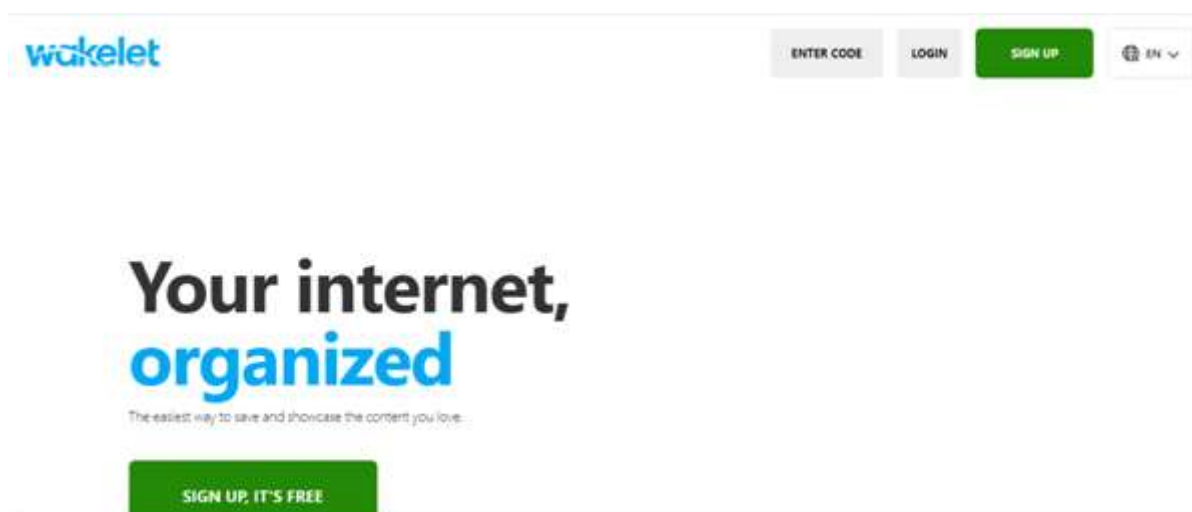
<https://www.tricider.com/> [access: 30.06.2021].

#### 4. Search categories:

- type of materials search: interactive whiteboard;
- availability: free account;
- Bloom's taxonomy: understanding.



## Wakelet



<https://wakelet.com/>

### 1. Tool characteristics:

Wakelet (virtual whiteboard) is a simple tool used most often to collect and share information in digital form (e.g. files, links to any websites). A feature – Wakelet Spaces – allows you to create separate profiles within an account where you can create collections dedicated to a specific topic or can provide a place to collaborate with students or with teachers if a link or code for collaboration is provided. The teacher manages the permissions of invited guests. The student can only view the collection, add their resources as an author and edit the collection as an administrator. Wakelet is integrated with educational services from Google and Microsoft (especially Teams).

Useful features include:

- the built-in Flipgrid camera allows you to record videos (up to 10 minutes) directly in Wakelet; videos, once approved, are immediately available in the collection;
- immersive reader allows customising the text from the collection in terms of, e.g. font size and type, translation of the text into other languages, switching on the reader's voice and a picture dictionary.

### 2. Possibility of using the tool in teaching (suggestions):

170



- teacher maintains a whiteboard which is used for communication between teacher and students;
- teacher and students create a blog where they share ideas and electronic resources, post links to articles;
- space for group work – teams are given different topics and write down their findings;
- the teacher prepares a presentation for the lecture and posts it on Wakelet.

### 3. Supplemental materials:

- tutorials:

Wakelet for Teachers: Virtual Lessons Made Easy. [Film]. In: YouTube. February 28, 2021.

<https://www.youtube.com/watch?v=H2wBSp7acL0> [access: 24.06.2021].

Wakelet Tutorial for Teachers. [Film]. In: YouTube. March 8, 2021.

[https://www.youtube.com/watch?v=RO\\_9wpcA7yQ](https://www.youtube.com/watch?v=RO_9wpcA7yQ) [access: 24.06.2021].

### 4. Search categories:

- type of materials search: whiteboard, discussion forum, blog, presentation, project, online newspaper, live engagement tool;
- accessibility level: free access;
- Bloom's taxonomy: remembering.



## WordArt

The screenshot shows the WordArt.com website interface. At the top, there is a navigation bar with the 'WORDART' logo, links for 'GALLERY', 'PRICING', and 'COMMUNITY', and buttons for 'CREATE', 'SIGN UP', and 'LOGIN'. The main content area features a large word cloud art piece of a snowman, where the words are arranged to form the snowman's shape and features. To the right of the snowman, there is a short introductory text: 'WordArt.com is an online word cloud art creator that enables you to create amazing and unique word cloud art with ease.' Below this, another text block states: 'Professional quality results can be achieved in no time at all, even for users with no prior knowledge of graphic design.' A green 'CREATE NOW' button is positioned below the text. At the bottom of the page, three key features are listed: 'Easy' (We put a lot of efforts to make WordArt.com easy to use. No prior knowledge of graphic), 'Fun' (It's fun playing with word cloud art, experimenting with plenty of options and seeing), and 'Customizable' (You can customize every bit of word cloud art including: words, shapes, fonts, colors, layouts).

<https://wordart.com>

### 1. Tool characteristics:

A word cloud is a collection of keywords presented using graphics. It is a tool for getting students active in class and avoiding one-way presentations. Word cloud work can be integrated into any stage of the lesson. The tool can be used at the beginning of a class, before introducing new material, as a test of students' knowledge of specific topics. It can be used as a brainstorming activity at the beginning of a unit or as a debriefing activity at the end of a unit. The tool can also be used for taking notes. The word cloud can be presented in any shape you choose (depending on the shape models offered by the word cloud generator). The shape can be chosen according to the topic, e.g. when working on the topic of Africa, students can be asked to create a word cloud in the shape of the African continent. Word cloud generators also offer different fonts, colours and directions of words writing, which not only have a graphic effect but also help in remembering key concepts. Ready word clouds can be downloaded in the form offered by a given generator (PDF, PNG, JPG).



## 2. Possibility of using the tool in teaching (suggestions):

- brainstorming before introducing a new topic – students write all the associations with the given topic;
- the teacher prepares a word cloud with key terms, which are then discussed during the class;
- summarising the lecture or classes by collecting the students' keywords related to particular topics, entering them during the lecture into the generator, displaying the created "cloud", and finally, if possible, sharing it with the students via the platform or tool that we use at the university to communicate with the group;
- the word cloud as a homework assignment for students;
- the word cloud as a class note.

## 3. Supplemental materials:

- tutorials:

Wordart com (English version). [Film]. In: YouTube. April 9, 2018

<https://www.youtube.com/watch?v=gYLQOoFmRX4&t=121s> [access: 22.05.2021].

## 4. Search categories:

- type of materials search: word cloud, tag cloud;
- accessibility: free account;
- Bloom's taxonomy: understanding.



## WordItOut

<https://worditout.com>

### 1. Tool characteristics:

A word cloud is a collection of keywords presented using graphics. It is a tool for getting students active in class and avoiding one-way presentations. Word cloud work can be integrated into any stage of the lesson. The tool can be used at the beginning of a class, before introducing new material, as a test of students' knowledge of specific topics. It can be used as a brainstorming activity at the beginning of a unit or as a debriefing activity at the end of a unit. The tool can also be used for taking notes. The word cloud can be presented in any shape you choose (depending on the shape models offered by the word cloud generator). The shape can be chosen according to the topic, e.g. when working on the topic of Africa, students can be asked to create a word cloud in the shape of the African continent. Word cloud generators also offer different fonts, colours and directions of words writing, which not only have a graphic effect but also help in remembering key concepts. Ready word clouds can be downloaded in the form offered by a given generator (PDF, PNG, JPG).



2. Possibility of using the tool in teaching (suggestions):

- brainstorming before introducing a new topic – students write all the associations with the given topic;
- the teacher prepares a word cloud with key terms, which are then discussed during the class;
- summarising the lecture or classes by collecting the students' keywords related to particular topics, entering them during the lecture into the generator, displaying the created "cloud", and finally, if possible, sharing it with the students via the platform or tool that we use at the university to communicate with the group;
- the word cloud as a homework assignment for students;
- the word cloud as a class note.

3. Supplemental materials:

- tutorials:

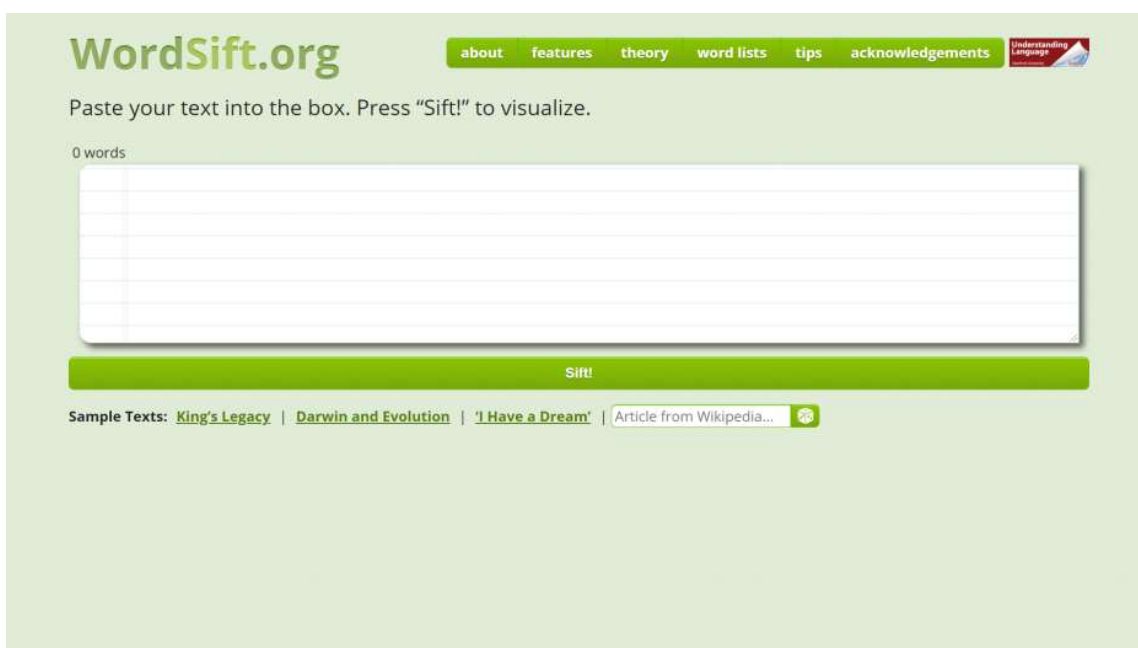
Quick and Easy Worditout.com Tutorial. (English version). [Film]. In: YouTube. January 28, 2020 <https://www.youtube.com/watch?v=myc73rmERqc> [access: 27.05.2021].

4. Search categories:

- type of materials search: word cloud, tag cloud;
- accessibility: free account;
- Bloom's taxonomy: understanding.



## WordSift



<https://worditout.com>

### 1. Tool characteristics:

A word cloud is a collection of keywords presented using graphics. It is a tool for getting students active in class and avoiding one-way presentations. Word cloud work can be integrated into any stage of the lesson. The tool can be used at the beginning of a class, before introducing new material, as a test of students' knowledge of specific topics. It can be used as a brainstorming activity at the beginning of a unit or as a debriefing activity at the end of a unit. The tool can also be used for taking notes. The word cloud can be presented in any shape you choose (depending on the shape models offered by the word cloud generator). The shape can be chosen according to the topic, e.g. when working on the topic of Africa, students can be asked to create a word cloud in the shape of the African continent. Word cloud generators also offer different fonts, colours and directions of words writing, which not only have a graphic effect but also help in remembering key concepts. Ready word clouds can be downloaded in the form offered by a given generator (PDF, PNG, JPG).





2. Possibility of using the tool in teaching (suggestions):

- brainstorming before introducing a new topic – students write all the associations with the given topic;
- the teacher prepares a word cloud with key terms, which are then discussed during the class;
- summarising the lecture or classes by collecting the students' keywords related to particular topics, entering them during the lecture into the generator, displaying the created "cloud", and finally, if possible, sharing it with the students via the platform or tool that we use at the university to communicate with the group;
- the word cloud as a homework assignment for students;
- the word cloud as a class note.

3. Supplemental materials:

- tutorials:

WordSift.org Tutorial. (English version). [Film]. In: YouTube. December 9, 2018  
<https://www.youtube.com/watch?v=k1-2CcJEDlg> [access: 27.05.2021].

4. Search categories:

- type of materials search: word cloud, tag cloud;
- accessibility: free account;
- Bloom's taxonomy: understanding.



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Tomasz Kopczyński

## **4. Methodology's principles; it could be: goals, justification, students and teachers responsibility, learn from experience, stages, teaching quality, focus on students and their skills**

### **Introduction**

Online learning has quite a rich tradition, especially in countries with distances to large cities, and therefore, schools and universities are significant. Examples of such early approaches include Australia and the United States and some areas of India. (Dylak, S. 2013).

The last stage of teaching, which is undoubtedly the education of students at the university level, is the stage with which should be associated the most significant possible independence in the three basic activities that are required for the functioning of the information society. These activities include: information acquisition, processing information, presenting the information.

Modern Information Society is increasingly based on information processed in ICT systems. The processes mentioned above of acquiring, processing, and presenting information and making inferences from the collected data greatly influence individual life and entire communities' functioning. It brings both opportunities and threats. Contemporary didactics seems to provide modern tools in this strongly interdisciplinary area. (Dylak, S. 2013).

It is worth analyzing what is and how the information society came into being in the methodological context. Because on its basis grew the need for a new way of transferring knowledge, information. Information, which grew at an exponential rate. Furthermore, society had to deal in some way with such an increase in information. Standard transmission, traditional in a lecture or passing knowledge by teachers, no longer passed the test.



The term information society (original version: jōhōka shakai) was introduced as early as 1963 by a Japanese Tadao Umesao in his article on the theory of evolution of society using information technology. The term was popularized by Kenichi Koyama in 1968 in a treatise titled. Kenichi Koyama popularized the term in 1968 in a dissertation titled “Introduction to Information Theory”. (Introduction to Information Theory). In 1971, Japan created a plan to implement the information society, which was set as a goal for the year 2000. According to it, Japan was to become the first information society in the world. (Webster, F. 2002; Webster, F. 2014).

The term came to Europe for the first time in the late 1970s, thanks to experts – Alain Minc and Simon Nora. In the United States, it spread thanks to the works of Macro Uri Porat and Fitz Machlup. At the turn of the twentieth and twenty–first century, the value of information as a valuable product for society has increased dramatically. Since then, it has been the foundation of functioning economies. It is considered to be one of the resources next to labour and capital.

The term was first introduced to Europe at the end of the 1970s by Alain Minec and Simon Nora. In the United States, it became famous thanks to Macro Uri Porat and Fitz Machlup. At the turn of the twentieth and twenty–first century, the value of information as a valuable product for society has significantly increased. Since then, it has been the foundation of functioning economies. It is considered to be one of the resources, along with labour and capital. (Webster, F. 2014).

The main values of the new society have become information and knowledge. Modern technological solutions made it possible to switch the economy from manufacturing to one based on services. Technology was used to automate activities, communicate, store and transform information, and support decision–making.

According to theories of social development, the information society is the next stage of social development, following the industrial society. It is also referred to as post–modern or post–industrial society. From the perspective of the social division of labour, the information society can be called a community. More than 50% of professionally active people are employed in information processing. Daniel Bell defined the work of pre–modern man as the play of man



with nature, modern man as the play of man with inanimate nature and the work of post-modern man as the play between people. (Webster, F. 2014; Buckland, M. 2017).

It should be emphasized that with the development of the information society, polarization processes are intensifying in the global space, and a group of excluded population is emerging, that is, deprived of access to widely understood information technology and the ability to use it. Consequently, uninformed and uneducated people are more likely to be unemployed, become increasingly “cut off”, and have limited contribution to the information society. (Martin, W. J. 2017).

## **Purpose and Justification**

Until recently, universities could exist side-by-side with the “job market”, the former Humbolt model, where the state plays a secondary role and does not interfere in the university’s internal affairs, has become obsolete. Because more and more often, employers and society (parents, who are the payers of the system) are asking for the quality of education. As a result, in the popular press and reports, we increasingly read about the gap between what the university offers and what the labour market expects. (Cabı, E. 2018).

In today’s competitive economy, employees’ competencies, which ultimately determine a company’s market power, are becoming increasingly important. Organizations should be supported in this regard by universities that educate potential employees, both theoretically and practically. Preparing employees for the labour market requirements at the level of university graduates is a very responsible activity and requires well-considered actions. (Blázquez, M., Herrarte, A., & Llorente-Heras, R. 2018).

In doing so, the university and employers must collaborate in shaping the competencies of university graduates. The best action aimed at this goal is close, long-term cooperation between the university and employers, both at the stage of planning the curriculum and introducing practical elements (internships and student placements). Cooperation between universities and enterprises at the level of designing the study program, defining the necessary competencies of study graduates, and implementing internships are key activities for implementing the graduate program to the labour market requirements. (Cabı, E. 2018).



The aim and at the same time the idea of modern methodology corresponding to the requirements of the information society is not, as it is customary, to fill up an “empty blackboard” with successive factual information but rather to show how to fill this blackboard in a fast and effective way. It is what the methodology should be about, tailored to the needs of modern society. The question should be: what methods and ways should be used to make this filling of the board as beneficial as possible? If a teacher chooses those elements that optimize activities in acquiring, processing, transferring information. They try to optimize tasks in this way – their own and their class, students – using technology resources. Skilful search for information and use of technology to solve problems, optimization of activities become inseparable aspects of the development of every person, literally everyone. Therefore, they should not be missing in an excellent methodological workshop of any teacher. One of the key elements of such methodology will probably be Google hacking. (Mider, D., Garlicki, J., & Mincewicz, W. 2019).

## **Responsibility of students and teachers**

An excellent question in the age of education today is the question of teacher responsibility, where almost any knowledge is at your fingertips. It used to be that a teacher’s responsibility came down to the “transmission” of knowledge in a given field. Because many items, including books, were not available, or if they were, access to them due to their physicality was limited. Today this access is almost unlimited, which paradoxically is also a problem. Therefore, many authors (Rutledge & D. Slykhuis 2015) writing about a teacher’s responsibility in the 21st century bring the matter down to the skilful search and verification of information available on the Internet.

Many students, college students, and even adults carry from school the misconception that the only way to learn is: someone has to teach you something. In a figurative sense, it is the teacher who: dictates information for students. Moreover, the student writes it down and possibly memorizes it. It is the cause of failure at school, at work, and in private life. There is no more significant educational harm in secondary and higher school than involuntary dictating something into a notebook.



According to the assumptions of information redundancy, no one can learn everything they need to know to function well in an information society. In the information society, we take responsibility for our own “learning”. This course is a substitute for imparting a particular way of thinking, a specific idea, a methodology, a workshop that will be useful no matter what you do or will do in life. The ability to “learn” and find information is arguably the most valuable competency of the 21st century. When combined with the use of communication technology, it becomes the skill most desired by employers. (Alekseeva, I. V., Barsukova, N. I., Pallotta, V. I., & Skovorodnikova, N. A. 2017).

## **Learning from Experience “Flipped Classroom”**

Traditional teaching models, i.e. teaching in a cueing and passive sense like a monograph lecture, no longer work because such methods do not allow for full involvement of the group and especially its experience. The idea behind this approach is straightforward. For it consists in replacing the traditional model of teaching, which can be summarized in two stages:

1. Imparting knowledge;
2. Consolidating it through the task.

In the flipped classroom model (Ayçiçek, B., & Yanpar Yelken, T. (2018), the main goal is not to consolidate the knowledge acquired during the classes but to prepare for what will happen in that lesson. That is, students, come prepared for class.

What steps does the teacher take:

1. The teacher prepares and provides students with a “starter packet” with the most critical materials for the next lesson (video, podcast, articles, quizzes, interactive tasks, presentations);
2. The student takes responsibility for learning at home before the lesson. They do it at their own pace, in their conditions, on their own rules, the way they like;
3. Knowledge is consolidated and tested during the lesson. There is time for questioning, practical, engaging, and unconventional exercises, and feedback.





In “Review of flipped learning”, (Hamdan, McKnight, & Arfstrom, 2013) outlines the four pillars of flipped learning. Just as no two classrooms are the same, the same is true for flipped classrooms. Because the flipped classroom model focuses on meeting individual student learning needs, as opposed to an established methodology with a clear set of rules. A team of experienced teachers from the Flipped Learning Network and Loizou, M. (2020) developed key features, or pillars, of the flipped classroom that then allow flipping to occur. The four pillars are a flexible environment, a culture of learning, intended content, and a professional teacher.

#### 1. Flexible environment:

Teachers must expect classroom time to be “a little chaotic and noisy”, and that timeliness and expectations for learning–related assessments must also be flexible. The flipped classroom allows for a variety of learning models. Teachers often physically rearrange learning spaces to accommodate an activity or some element that may include group work, independent study, research, assignment completion, and assessment. They create flexible environments where students choose when and where they learn. Loizou, M. (2020).

#### 2. Culture of learning:

The classroom becomes student–centred. According to the guide: “students move from being the product of learning to the centre of learning, where they are actively engaged in the formation of knowledge by being able to participate in and evaluate their learning in ways that appeal to them most. Students can theoretically adjust the pace of their learning by reviewing content outside of the group learning space, and teachers can maximize the use of face–to–face interactions to test and ensure students understand the material. Loizou, M. (2020).

#### 3. Intended content:

Teachers are required to assess what they need to teach directly so that classroom time can be used for other teaching methods, such as active learning strategies, student–led instruction, or Socratic methods, depending on the grade level and topic. Loizou, M. (2020).

#### 4. Professional teachers:



Instructional videos used in the flipped classroom cannot replace trained, professional teachers. Professional teachers with the right skills are more important in the flipped classroom model than ever and often more demanding than in the traditional model. They must determine how and when to shift direct instruction from group to individual learning and maximize the amount of face-to-face (direct work) time between teacher and students. During lessons, teachers are constantly observing students, providing appropriate feedback at the moment and continually evaluating their work (Hamdan, N., McKnight, P., & McKnight, K. 2019).

**When preparing “flipped classes”, we should keep in mind the following necessary steps that are given by different authors (Vaughn, M. 2015; Baytiyeh, H. 2017):**

1. Lesson planning and the process of lesson preparation (teacher’s work at home) – analyzing the method, planning the objectives and realized content. This stage is extremely important – we have to choose the material for the student to make it easier for him to assimilate the content independently (traditionally given by the teacher in the classroom);
2. Preparation of self-study materials for the student and exercises that the teacher will provide during the lesson (the teacher at home must do this work, yes, no one said it would be easy). With this method, you need to work hard, but good preparation guarantees later success. It’s best to follow the CEIS method (materials should be concrete, engaging, intriguing, short);
3. Conduct an introductory lesson, during which you will introduce students to the flipped classroom idea, give the topic of the next lesson (preferably interesting and intriguing), and post on the e-platform materials for self-study;
4. Students should work on their own on the given topic (at home) — it is best to spend about 3–5 days on it;
5. To conduct classes during which we verify the knowledge gained at home, organize the information and engage students in practical exercises;



6. Discuss and summarize the topic and the learning process. Make time for this, as it is a key part of seeing whether the topic has been sufficiently covered.

Essential tools and places on the web where we can prepare and plan flipped classroom classes are described in more detail in section *Methodology's on-line tools: catalogue of tools and platforms available* (p.).

Working with the flipped classroom method, we develop in students key competences and digital skills necessary to function in the job market of the future, which may include: independence, ability to search and sort information, critical thinking, cooperation in task teams, creativity, interdisciplinarity, task- and process-oriented thinking, and foreign language skills.

It is important to remember that “flipped teaching” requires maturity and responsibility, and mutual trust. Without careful thought and planning of the work and appropriate materials for the student, the lesson may be great fiction. In addition, the teacher should be ready to leave the comfort zone and give the students the responsibility for the knowledge acquisition process — the paradigm of the teacher’s role changes. The expert role and the only source of information is forced to give up. The teacher becomes a guide, partner, and inspirer of the student, and not, as before in the classical view, a “transmitter of knowledge”. (Bhat, S., Raju, R., Bhat, S., & D'Souza, R. 2020).

## Summary

To summarize the value of the flipped classroom: it involves changing the purpose of classroom time to be a workshop where students can absorb lecture content, test their skills by applying knowledge, and interact with other students in hands-on activities. During the lesson, teachers act as coaches or advisors, encouraging students, asking individual questions, or motivating collaboration.



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Jacek Francikowski

## **5. Methodology’ innovations: the novel element and connections**

Innovation in education is of particular importance because education plays a crucial role in creating a better future. Therefore, innovation should be considered as a tool for necessary and positive change. Any human activity (e.g. industrial, business, or educational) requires continuous innovation to remain dynamic, adaptive. To be innovative is to look beyond the “here and now” and develop a novel idea that will help act and do work in a new way. The goal of innovation is to create something different from what has been done, whether in quality or quantity or both. To have a significant scale of effect, innovation should be implemented through dissemination and large-scale deployment.

Innovation is generally understood as “[...] the successful introduction of a new thing or method”. According to Taubaeva and Laktionova: “The innovation process is a complex activity in creating and developing educational content and organising new” In fact, “[...] innovation seems to have two components. First, there is an idea or object that is new to a particular person or group, and second, there is a change that results from the adoption of the object or idea “. Thus, innovation requires three main steps: an idea, its implementation, and an outcome resulting from implementing the idea that leads to change. In education, innovation can appear as a new pedagogical theory, methodological approach, teaching technique, instructional tool, learning process, or institutional structure that, when implemented, results in a significant change in teaching and learning that leads to better student learning. Innovative teaching methods are teaching methods that include new ways of interaction between “teacher–student”, “teacher–student”, some innovation in practical activity in the process of mastering educational materials.

Thus, education innovations aim to increase the productivity and efficiency of learning and/or improve learning quality (Cai, 2017).

Productivity can be defined by the amount of time, money, and resources required to achieve specific results. In education, learning efficiency depends mainly on the time and cost invested. Learning is much more efficient if we achieve the same results in less time and at less cost. Productivity is determined by estimating the results obtained in relation to the effort to achieve the result. So, if we can achieve more with less effort, productivity increases; hence, innovations in education should increase both learning productivity and learning efficiency. However, it seems that this approach to education does not always work. Many innovations that we want to introduce may increase efficiency but decrease productivity, i.e., generate additional costs. It clearly shows that thinking about education literally in economic terms does not always work. Often, innovation is seen as introducing costly new technologies without a clearly defined objective or verification of their effectiveness. In the following section, we will focus on educational innovations that do not involve introducing new technologies but instead are aimed at modifications at the philosophical, organisational or procedural level.

Innovation can advance one, some, or all aspects of the education system: theory and practice, curriculum, teaching and learning, policy, technology, institutions and administration, institutional culture, and teacher education. It can be applied to any aspect of education that can positively impact learning and students. Innovative teaching methods are teaching methods that include new ways of interaction between “teacher–student” and “student–student”, some innovation in practical activity in mastering educational materials. Similarly, educational innovation involves all stakeholders: students, parents, teachers, educational administrators, researchers and policymakers and requires their active involvement and support. Therefore, it is worth considering what we want to achieve and what innovations can be effective. Finland provides an interesting reference for implementing innovation in education. It points to solutions perceived as innovative, popular in other countries, which Finland has not adopted, including:





- standardisation of the curriculum forced by frequent external exams;
- narrowing the curriculum to basic skills in reading and mathematics;
- limited use of innovative teaching strategies;
- adoption of educational ideas from external sources rather than local development;
- internal capacity for innovation and problem solving;
- adoption of high–stakes accountability policies that include rewards and sanctions for students, teachers, and schools.

The Finns have followed their own path, as described by Pasi Sahlberg (Sahlberg, 2011). The Finnish example vividly demonstrates the possibility of an innovative approach to education without the high cost of new technologies for education.

A set of principles has been formulated that form the foundation of innovative learning, which is mainly based on the modification of teachers' approaches, relationships:

- student–centred approach;
- specific structure and organisation of the course and its content to ensure a coherent, “holistic” student experience;
- effective presentation of content in a variety of formats and modalities;
- immediate application of new knowledge in the authentic classroom and real–life situations and practical course outcomes;
- an iterative process of constructing knowledge and developing skills;
- situated learning that uses real–life situations as the basis for learning activities, especially in developing professional competence;
- continuous active communication, collaboration, and cooperation among students in a variety of activities in small and large groups;
- a high level of intrinsic motivation developed and continuously supported through the emotional involvement of each student in the teamwork and learning process;



- the suggestive, supportive and effective teaching style of the instructor, including continuous engagement in class; immediate, objective and stimulating feedback; continuous student support;
- systematic use of educational technology in the classroom and homework, both to assimilate content and to develop skills, communication and collaboration, and to keep students' cognitive, physical and emotional levels high;
- using evocative techniques such as relaxation, ritualistic classroom structure, positive environment, emotional engagement, and music;
- the combination of intensive work and total relaxation.

This approach should be widely implemented in the system and consistently implemented at all levels.

In education, understanding learning outcomes has changed from knowledge or knowledge and skills to competence formation. When knowledge is formed consistently, competences develop in a complex way, on many levels and over time. Competences are challenging to formulate in a single lesson, so we can speak of “learning strategies” implemented over some time. Strategies for active, innovative teaching, project-oriented and play-based learning can implement the concepts of conectivism and constructivism (Mynbayeva et al., 2018).

Active use of innovative teaching methods by teachers is a necessity nowadays. The more strategies and teaching methods the teacher has, the more interesting, diverse he conducts classes, better motivates the student's cognitive activity, shapes the experience of the so-called coping with non-standard problems, promotes in-depth training and systematic assimilation of the technology of the practical activity.

A good teacher constantly improves his teaching skills, selects and develops new teaching methods and technologies.



Concerning the above, on the one hand, the teacher subjectively decides to shape the content, methods, strategies and technologies of teaching, but the implementation of educational reforms depends on him. On the other hand, the state and society transmit pedagogical culture, valuable aspects of teachers' thought through professional preparation, professional preparation and teacher qualification system. The subjectivity of professional awareness and activity is one of the principles of modern pedagogy. This means that the use or non-use of innovative methods depends on the teacher's personality, methodological competence, and pedagogical skills. The task of the teacher training system is to realise such a need, to form methodological competence. The task of school and university is to stimulate and stimulate the development of creativity of teachers and students. The teacher's essential task is to reflect and develop his pedagogical potential constantly; then, the student will be an active and competent person under the teacher's example.

The following is a brief description of the most important methods that are seen as innovative and should be known and implemented in academic teaching:

- learning “at the intersection”;
- thinking-based learning;
- context-based learning;
- computational thinking;
- learning through the scientific process (with remote labs);
- embodied learning;
- adaptive teaching;
- emotions and cognitive processes;
- “Invisible” Assessment (Stealth);
- Virtual Reality;
- 3D printing;
- gamification;
- problem-based learning;



- flipped learning (also called in our guidance flipped classroom, flipped approach, flipped teaching).

Of all these, the flipped learning can be considered one of the most critical and popular innovations implemented in universities in different countries. The flipped learning can be defined as: a blended learning model in which meaningful and active learning activities involving metalinguistic activities are carried out as part of the team and individual work in a classroom setting, and in which low–cognitive activities and independent research according to an individual’s learning speed are carried out outside the school setting through the use of classroom videos, slides, articles and course notes on digital platforms. Cognitive meta processes play a crucial role in learning within the practices and applications of the flipped classroom model. In this context, Blooms’ recent cognitive domain taxonomy is beneficial to gain insight into flipped classroom practices. In general, low–level cognitive tasks (remember, comprehend) are performed as flipped classroom practices outside of class, while higher–level cognitive activities (application, analysis, evaluation, creation) are performed in a classroom setting (Ibrahim et al., 2018; Lencastre et al., 2020; Sokolova et al., 2019).

As it was mentioned in the previous unit, flipped learning was launched in 2012 by John Bergmann and Aeron Sams at the secondary school level. The effectiveness of this approach led a global coalition of educators, educators and researchers to form the Flipped Learning Global Initiative (FLGI) back in 2016. The organisation supports the adoption of flipped learning worldwide, including in the US, UK, Taiwan, China, Turkey, UAE, Spain and Italy. The creation of FLGI has been instrumental in replacing the popular term ‘flipped classroom’ with ‘flipped learning’ to reflect a broader understanding of this approach, which serves to teach independently of the environment and is not just a way of organising the classroom. One of the reasons this innovation was quickly adopted and implemented is the ease with which it could be integrated into classical learning environments with adequate training and motivation of the teaching staff. The implementation of flipped approach at universities proved to be feasible as it can be integrated into existing teaching and learning systems in a systematic way without having to rebuild the culture



and organisational structure of the institution. As the flipped classroom has been tested and evolved, it has been recognised that flipped learning is more than just streaming lecture recordings, as simplistically believed in the past. Students complete some of the initial objectives of an online course and complete a learning task aligned to the course objectives. In this way, students can learn the course topics at a high level and collaborate with the instructor and peers while being fully active in the learning environment (Çevikbaş & Argün, 2017; Sokolova et al., 2019).

In this technique, students become active participants in the learning process, shifting the burden of learning to them, it requires teachers to move into the role of resource providers, and students take responsibility for collecting information about concepts. The students at home study basic learning materials at home, while in the classroom, higher-level work is already taking place using them. The main goal of this methodology is to optimise class time by dedicating it, for example, to meeting each student's particular needs, developing collaborative projects, or working on specific tasks. Using various technological tools, students are encouraged to construct knowledge, fill information gaps, and draw conclusions independently when necessary. Research shows that when students are responsible for their own learning, they become more immersed in the subject matter, more interested, and learn better. As researchers suggest, this teaching method is one of the best ways to lay the foundation for independent learning (Reeve, 2013).

In the course of the development and research of this method, key elements, features and connections can be summarised in points (Çevikbaş & Argün, 2017; Strayer, 2012):

- flipped learning should be seen as a kind of blended learning, supported by a constructivist model, involving online as well as in-class interactions/learning;
- technology plays an important role by using it in both phases of flipped learning, using online platforms and digital tools – teaching content issues as well as shaping digital competences,
- creating an educationally rich environment (active learning) to foster student engagement, conscious learning and metacognition,



- flipped learning aims to develop 21st-century competencies and seeks to place them in the context of everyday life, going beyond the classroom space.

Student-centred models of teaching, including the flipped classroom, are grounded in constructivist learning theory. The basic idea of constructivism applied to learning is that the learning environment is student-centred, where the individual socially constructs knowledge and understanding. The flipped classroom environment can be considered a constructivist learning environment entirely. It includes four elements: situation, collaboration, conversation and construction of meaning. It can be summarised that in this approach, throughout the learning process, the teachers will play the role of organiser, mentor, helper and facilitator, while the students are placed at the centre of the process. Therefore, flipped learning requires teachers to change their approach and outlook on teaching and accept that they are not the source of knowledge but only catalysts between the knowledge available to them from the outside and the learners. It is necessary to create the awareness that the teacher cannot teach anybody anything, but only to create the conditions and manage the process where pupils learn. The situation, cooperation, and conversation are used as elements of the learning environment to fully stimulate the learners' initiative, enthusiasm, and creative spirit. In this way, it can ultimately achieve the goal of making meaningful constructs of current knowledge effectively actual. Also, the knowledge contained in the textbook is no longer the content of the teacher's teaching and loses its dogmatic nature but becomes an object of active construction of meaning by the students. In addition, the media are no longer a means to help teachers transfer knowledge (films, presentations) but to create spaces for collaborative learning. Communication is used as one of the tools for pupils' collaborative and exploratory learning. On this occasion, the four elements, including teachers, pupils, teaching materials, and media, have different roles and quite different relationships compared to the traditional teaching method. Nevertheless, the role and relationship are definitely clearly defined. Through the process of teaching activities or in the constructivist learning environment, the relationship between the elements of the system has gradually become a stable and key structure (Kanjug et al., 2018; Sokolova et al., 2019; Xu & Shi, 2018).



The flipped learning approach transforms the course and the participating group together with the teacher into an interactive space where information is transformed into knowledge and experience. It is expected that this active approach to learning will also be reflected positively in extra-curricular activities. Flipped learning aims to enable students to receive an education that prioritises their entrepreneurial skills, innovative thinking, and creativity. To achieve this goal, digital technologies, which increasingly affect all areas of our lives, are also used to plan and implement flipped approach educational processes. Nowadays, it is not easy to imagine flipped learning without the use of technology. It is now considered that technology should be integrated into teaching and learning in any flipped learning approach. Huge open online platforms offering courses such as Coursera, edX, Udemy or learning management systems such as Blackboard have facilitated the application of flipped learning to remote learning. Before 2012, while the idea of flipped learning was limited to the idea of the ‘flipped classroom’, technology was a standalone tool that could be integrated into education.

In contrast, it is now the essential environment of this pedagogical approach. Video or Web 2.0 tools are integrated into flipped learning. Thanks to the web and digital tools, teachers can also now apply solutions and techniques developed by others. Thus, flipped learning is an approach that integrates technology to varying degrees in order to improve the learning experience (Birgili et al., 2021; Ibrahim et al., 2018; Núñez et al., 2020).

The flipped learning method itself is not a rigid system, but it can be adapted and created in a new form according to needs:

- standard flipped learning:  
Students are introduced to information (presentations, videos, literature) before class. During the class, students process and work with the information they have learned;
- discussion-oriented flipped learning:  
As in the first point, students are introduced to the material before class (e.g. TED talks). In class, there is discussion and exploration of the topic;



- flipped learning focused on demonstration:  
Especially for subjects that require students to memorise and repeat activities accurately, e.g. lab work, it is most helpful to have a video demonstration to rewind and watch again. In this model, the teacher uses screen recording software to demonstrate the activity to allow students to follow along at their own pace:
- flipped group-based learning:  
A shift occurs when students come to class and join forces to work together on that day's task:
- virtual flipped learning:  
Both phases of the flipped learning work take place online. Assignments are assigned and collected through online learning management systems and require students to attend at specific times in synchronous meetings or tutoring;
- flipped learning with revered teacher:  
The process is not led directly by the teacher but by students who are assigned sentences.

It seems that flipped learning is one of the essential didactic innovations currently being implemented in schools and universities worldwide. It is effortless and flexible to implement regardless of the content or level of teaching. What is essential, it does not generate high costs at the level of implementation or later use but rather relies on well-prepared and motivated staff. It should be noted that active, student-centred learning systems are strongly linked to the modern vision of the university. Based on modern pedagogical concepts (constructivism) and technology, it fits perfectly into the requirements and didactic needs of modern society and individuals.





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Małgorzata Gwadera

## 6. Methodology's limitations and weaknesses

### Introduction

The innovative idea of flipped learning and the techniques used within it (e.g. gamification) modifies the current model of education by changing the roles of teacher and student. The lecturer relinquishes his or her leading position in the classroom to favour greater collaboration and cooperation in the learning and teaching process. Classes become workshops where practical problems are solved, skills are tested, and interactions with other students are established. The teacher is no longer just a mentor but takes on the role of a coach, an advisor to stimulate students. The change in the student's role leads to a shift from passively assimilating the content given to taking responsibility for their own learning, experimenting, and creatively using the theoretical knowledge acquired before the class. The purpose of the function swap is to shift priorities: from discussing the material to deeper study and mastery of related skills. However, the success of the flipped classroom depends on a fragile balance between the capabilities and limitations of both teachers and students. These processes are presented in the chart nr 1.

Among the most significant conditions critics of the method mention: the quality of teaching materials used and the appropriate selection of educational tools: awareness of the purpose and principles of using the flipped classroom; cultural, psychological, social, and economic conditions; school system and evaluation standards; and technical conditions

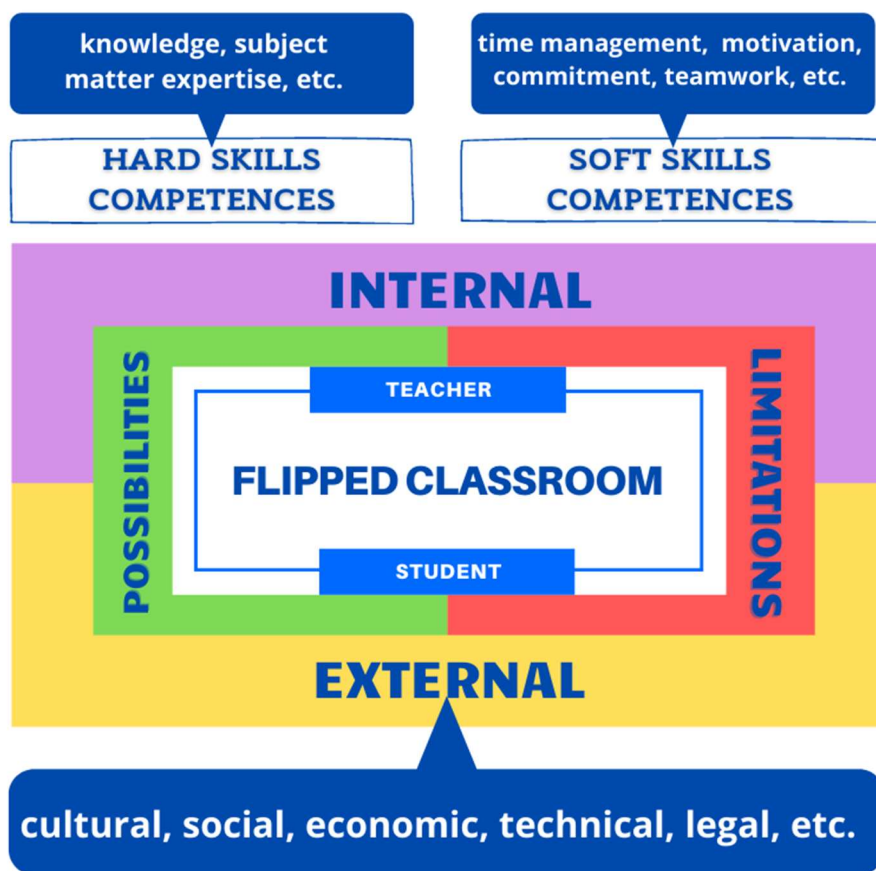


Chart 1. Determinants of implementing the flipped classroom approach. Author's own elaboration.

## Quality of didactic materials, appropriate selection of tools

The course of the teaching and learning processes and their results depend on the tools used by the teacher, appropriate selection and quality of prepared didactic materials. Poor substantive and formal level of applied didactic means (e.g. lecture in the form of audiovisual material) demotivates students, who perceive it as an unattractive, burdensome necessity rather than a form of developing their interests and passions. Creating high-quality materials available online requires a significant amount of time and effort from the teacher on the one hand and constant improvement of IT skills on the other. From the point of view of both the teacher and the employing educational institution, providing the level of materials necessary to implement and use the flipped classroom approach can be costly. Purchasing appropriate training in the ever-evolving field of new technologies in distance learning requires additional financial resources. In addition, the increase in workload at the expense of the teacher's free time is due



to the lack of ready-made online resources and the need to prepare additional materials independently for each class. Designing or finding good quality data online, presented appropriately to students' perceptual abilities and expectations, is complex and time-consuming, much more than in the case of traditional teaching. Creating and maintaining quality materials, including checking that they are not outdated or that web links are still active, requires a deep commitment. There is an unmet need for an effective and free flipped classroom remote learning management system, part of which would be an online teaching resource compatible with curricula at all levels. The Khan Academy initiative (<https://www.khanacademy.org/>) is a partial attempt to create this. It is also advocated that some of the professional commitments of university teachers could be reduced (permanently or temporarily, including granting sabbatical leave) to allow them to devote more time to teaching in the flipped classroom approach. Also valuable would be a system of support from the organisational structures of the university, the creation of faculty centres, including a forum for cooperation and exchange of best practices in this area, as well as the introduction of assistants – instructors supporting and evaluating the results of the application of the flipped classroom approach. Implementing modern technological tools only to make the flipped classroom more attractive is a fundamental and frequent methodological mistake – the tools should be “transparent”, that is, absolutely subordinated to the implementation of the main goal and concept of the program. It is their content that is supposed to capture the student's attention, not the tools themselves. Understanding this premise protects against making mistakes in material preparation and technology selection, and thus the failure of introducing the flipped classroom approach.

## **Awareness of the purpose and principles of the method**

The depth of understanding of the purpose and principles of the flipped classroom approach has a direct bearing on the level of motivation, commitment and development of the necessary personal, social, entrepreneurial and continuous learning competences. This statement applies equally to the teacher and the student. Without full acceptance of the application of the method on the part of the teachers or students, success will not occur. The less knowledge of the actual goals and directives of the change, the greater the risk of failure. One common misconception



is that the flipped classroom is a type of homework for students. Another one is the desire to use class time only to prepare students to complete tests correctly. A teacher who does not understand and accept the flipped classroom approach should not use it. There is a strong dependence between the educational process and its effects and the motivation of individual teachers, just as there is a strong dependence between the learning process and its effects and the motivation of individual students. In both cases, these motives should be autotelic (internal) and not merely instrumental. External pressures will not produce the desired results. The teacher's primary task is to explain to students the goals and principles of the flipped classroom, provide clear and precise instructions, and guidelines for participation in classes. A cycle of training in IT, self-work skills, independent learning, organisation and time management, responsibility for one's own learning style and pace, and participation in team problem solving may be necessary. Preparatory activities will make it possible to offset common fears and resistance to change and distrust of a new and different way of teaching. The teacher's competence in communicating with students will be key to clarifying concerns. A good practice is to flip a few classes and then get feedback from students. They should have a good understanding of the model and be positively motivated to participate in such a guided activity. The teacher's willingness to justify why he or she chose this method and what advantages he or she sees in it for a particular group of students gives a good chance for positive results. It also provides a correct exemplification of the understanding of the specific role of the teacher in the flipped classroom as a guide who creates conditions for creative thinking by asking questions, establishing interactions with individual students, as well as interactive group discussion.

## **Cultural, psychological, social, and economic considerations**

The flipped classroom approach does not fit the traditional teaching model, deeply rooted in culture and social mentality. Breaking patterns generates fear of change in the individual as well as group terms. This anxiety is especially true when it comes to redefining the role of the teacher and the student – moving from what is familiar to what is much more challenging. Leaving the comfort zone concerning both the teacher and the student is connected with the readiness to develop a high level of competence adequate to the changing cultural and



social reality (responsiveness to change). This activity requires appropriate knowledge as well as a degree of internalisation of key competences, in the particular sense of initiative and entrepreneurship and learning to learn competences (Recommendation of the European Parliament and of the Council of December 18 2006 on key competences for lifelong learning (2006) <https://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:394:0010:0018:en:PDF>)

The flipped classroom approach is therefore demanding and strongly influenced by the overall level of knowledge and competence of both teacher and student. Attention is also drawn to the problem of students' concentration when interacting with online materials. The inclusion of IT technology in the teaching process requires competing with other messages (often more attractive and easier to receive) present in virtual reality. Considering the perceptual capabilities of a particular group of students and meeting their expectations is a huge psychological challenge facing the teacher. Similarly, the problem of more time spent working on computers than in traditional teaching is reported. Working intensively at one's own pace but in front of a computer screen ceases to be a 100% advantage as it contributes to enforcing a sedentary lifestyle and breeds the risk of digital addictions (cyber addiction). If the flipped model is irrationally planned and the materials are poorly developed (too long), then the student is required to increase their activity in the virtual world significantly, and the chances of a successful flipped class are greatly diminished. Social pauperisation and the financial problems of some students cause not all students access to appropriate mobile devices (laptop, tablet). This dependence was revealed by the COVID-19 pandemic situation when universities had to switch to remote teaching within hours. For online meetings, the issue of the environment visible on the camera is also essential. Many students refuse to turn on the camera for this reason because they are ashamed of the conditions in which they live, non-ideal conditions so different from those promoted on social media. This determinant is a significant setback for the lecturer if they cannot work with the group remotely in an optimal way. It puts the onus on universities to ensure that students have access to the appropriate infrastructure to actively participate in preparing for classes and in the classes themselves. The forms of providing access include equipment rental and designating an appropriate location within the university where students could use the online resources without hindrance. These



solutions, while reasonable and modern, require a significant financial investment by educational institutions. Other limitations related to the financial issue include paid access to the Internet, use of paid applications in learning and teaching, advanced features of online tools, educational platforms, etc. the need to earn extra income in the case of part-time students and take up a job in full-time studies limits the temporal capacity of even committed students to fully prepare for the flipped classroom, based on prepared online materials. Therefore, the use of this approach may unintentionally contribute to social stratification – dividing students into different income groups and triggering ostracism (group work during class).

## **Education system and evaluation standards**

All stakeholders in the learning and teaching process are strictly determined by the prevailing school system, which sets the patterns of transmission and acquisition of knowledge and the criteria for evaluating the effects of both processes. Most teachers with many years of teaching experience are not well acquainted with the flipped classroom method and the principles of its application because teacher education programs in pedagogical studies do not include it. This obstacle fits into the broader context of teachers' lack of preparation for educational work using modern IT communication technologies. If graduates of pedagogical studies do not take the personal effort of professional development in teaching methods, the chances for widespread awareness of the advantages of the flipped classroom are slim. If the method is still considered experimental, teachers remain sceptical about its implementation because they fear that it will have a detrimental effect on their evaluation as teachers, their promotion, and their careers. A situation in which a teacher fails to achieve higher scores on standardised tests, for example, may be judged negatively in evaluation processes. Moreover, when using the flipped classroom approach, there is a risk that not all topics included in the subject syllabuses will be implemented as preparation directly for the examination. Flipping the student evaluation process, including modifying or developing evaluation criteria from scratch, involves additional work for the teacher. Most importantly, it requires developing a clear, coherent concept for framing the teacher's subject in the flipped classroom. The method based on active learning pedagogy, through a student-centred approach, implies a teaching style described as "learn at your own pace". In the practice of the current pedagogical model, it raises





a set of difficulties related to the pace of group work and its evaluation by the teacher. Allowing students to move at a personalised pace of work combines with mobility for individual student assessment. Therefore, the timing of tests and assignments should be set differently for each student, and their results are to be used primarily for self-assessment of the development of the person being tested or doing the assignments. This system has a chance to exist only with modification of appropriate organisational and legislative structures, as it is part of a broader institutional/systemic approach to evaluation. The differentiated pace of work, the dependence of the learning process on student self-regulation, motivation and engagement, gives rise to accusations against the flipped classroom of promoting a lax approach to learning or creating “a slow” learning environment. Full implementation of the method requires from all participants high awareness and self-reflection, cognitive and emotional maturity. On a mass scale, these requirements are not feasible in the current educational reality. Students may have problems with time organisation, planning their own development, taking responsibility for themselves in the perspective of learning. Lecturers, on the other hand, do not receive immediate feedback from students on the material presented. This barrier encourages forming a group of students who do not attend classes with prior preparation and thus may not fully understand the issues discussed and group tasks to be performed. Then the disparity in achievement between strong and weaker students widens. Those with severe learning difficulties, dysfunctions of all types, and students with disabilities and special educational needs will also not find themselves in the flipped classroom.

## Technical conditions

Among the technical determinants, the most frequently mentioned are the problems with Internet access, mainly the stability and reliability of the network connection. Rapid and continuous development of modern technologies also forces the constant updating of software. On older devices, new applications, systems, educational platforms may not work or work poorly. However, we should also consider the conditions in which the student is forced to use the Internet while attending classes. Both the space surrounding public computers (e.g. in libraries) and home computers may cause significant difficulties such as noise or limited accessibility. Another important aspect is the availability of online university library resources



and access to databases, journals, and other materials. At least some of them should be reachable through the non-university network, direct encrypted connections to resources, for example, using tools like VPN (Virtual Private Network).

## Overcoming the challenges

All the barriers and difficulties described above can be overcome or at least gradually reduced when appropriate action is taken in the areas of:

- continuous improvement of the level of information literacy of both teachers and students (to create, search for, process, evaluate, select and use the information and its sources);
- the constant development of teachers and students in hard skills competences (knowledge subject matter expertise), as well as soft skills competences (time management, motivation, commitment, teamwork);
- appropriate systemic training of teachers on the pedagogical faculties of lifelong learning (responsiveness to change) as well as on the objectives and principles of the flipped approach;
- changes in the systemic evaluation of students as well as teachers' work (more flexibility is necessary);
- overcoming technical difficulties in accessing constantly updated IT devices;
- raising public awareness of challenging teaching methods and their outcomes;
- elimination of economic obstacles to access to innovative education (social pauperisation).

## Conclusions

The flipped classroom method should not be used en masse, under duress, with the teacher and students' lack of acceptance and adequate competence, as it does not meet the conditions of egalitarianism. If the flipped classroom is not used in the right way, it may bring the opposite results: lack of motivation, discouragement, boredom, decreased attention, and poor learning outcomes. Because of the many conditions for correct implementation listed above, the method



works well as an optional rather than a mandatory approach. The assumption that one will meet expectations and interest all students in the same way, is incorrect. The flipped classroom is not a miracle cure for the traditional learning and teaching weaknesses. Therefore, it is recommended that this method be treated on an equal footing with others, leaving it to the teacher's discretion as to whether or not it is appropriate for a particular situation with a particular group of students. Building a learning culture appropriate to the flipped approach is a severe challenge that emphasises its elitism. Indeed, the flipped classroom belongs to the modern methods of educating students worthy of promotion, but with emphasis on working with mature and exceptionally gifted students. Overcoming these constraints is possible and necessary, as the flipped classroom concept fits into the model of a modern, effective and attractive education process.

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## 7. Other methodology's features

The most distinctive feature of Flipped classroom based e-methodology is its capacity – the co-occurrence of many strategies already in use in teaching as well as newly arising ones. Coexistence and assimilation mark the application of this approach in distance learning and teaching. As it has been presented, flipped learning interacts with game-based learning (gamification). This connection, at the centre of which is the stimulation of motivation, may be one of the building blocks of the advanced concept proposed by authors of the classic study bearing the significant title *Flip your classroom. Reach every student in every class every day* (Bergman, Sams, 2012). This approach was called **the flipped-mastery classroom** and reshaped into the flipped-mastery model based on the principles of mastery learning popularised by Benjamin Bloom (see the taxonomy). The key components of mastery learning are:

- students work either in small groups or individually at an appropriate pace;
- the teacher formatively assesses students and gauges students understanding;
- students demonstrate mastery of objectives on summative assessments; for students who do not master a given objective, remediation is provided.

The flipped-mastery model marries the principles of mastery learning with modern technology. However, the critical reference point in the teaching process remains the TEACHER who has to meet the following criteria to function in the flipped-mastery environment:

- should be a content master;
- must be able to admit when he or she does not know the answer to a student question and must be willing to research an answer with the student;
- must be able to flow through a class period in a nonlinear fashion;
- must be able to relinquish control of the learning process to the students.

Five main components of the flipped-mastery classroom must be in place before you start:

- establish clear learning objectives;



- determine which of these objectives are best achieved through inquiry and which are best learned through direct instruction;
- assure students access to videos;
- incorporate engaging learning activities to be done in class (also virtual one);
- create multiple versions of each summative assessment for students to demonstrate their mastery of each learning objective in a particular unit of study (Bergman, Sams; 2012).

Attention is drawn to the subtitle of the work: *Reach every student in every class every day*. As proved in section 6 of the methodology (limitations and weaknesses), the flipped classroom in its basic version is rather an elitist educational approach, requiring the students' appropriate abilities, dispositions, and maturity (responsibility). However, a version of this model extended by the inclusive classroom strategy can also be implemented when working with people with disabilities. Motivating students in the flipped classroom approach is challenging, especially for special education students, as it is extremely difficult for them to gain motivation throughout the teacher's instruction. However, this is where technological devices come to the rescue, especially for students with physical and learning disabilities (Villanueva, 2016) (McCrea, 2014). The flipped approach can also be used to offset the stigma of students with special needs (Kaplan, 2021) and in teaching students with autism spectrum disorder (social skills training) (Altemueller, Lindquist, 2017). Hence, the flipped classroom could be transformed into **the flipped inclusion classroom**.

The flipped classroom method gives **teachers more freedom for individualised education, for deciding how much time to spend with each student** taking into account his personality, temperament, level of emotional intelligence and intellectual capabilities. However, the personalisation of teaching work leads to another aspect coexisting with flipped learning: **cooperative learning** applied to the development of tasks and problem solving or possible doubts during the classes, virtual and real (see also section 1 – active learning). One of the crucial forms of collaboration in the implementation of the flipped classroom approach is **peer instruction**. It involves sharing with other students a response that differs from their own and explaining the reasons for learning from each other. This strategy is strongly linked to the concept of **learning by teaching**, in which students prepare materials to teach other students in



classes, real or virtual. In this respect, **the jigsaw technique** is also a method of organising lessons that makes students dependent on each other for success.

**Flipped adaptive learning** is the joint of flipped classroom approach and adaptive learning (adaptive teaching) that uses computer algorithms and artificial intelligence to orchestrate the interaction with the learner and deliver customised resources and learning activities to address the unique needs of each student. That pedagogical concept can help educators obtain information from the areas of learning where their students show mastery and those in which they still have deficiencies or need to improve. The teacher can use it in the organisation of class activities appropriate to the needs of students (Kaplan, 2021).

Another mixed flipped approach is the interaction with **problem-based learning** (PBL) (also see connections with section 1). It is the teaching method in which complex real-world problems are used as the vehicle to promote student learning of concepts and principles as opposed to direct presentation of facts and concepts. PBL can also be applicable for evaluation processes (students assessment) (Roehling, 2017) (Lysgaard, 2018). Similarly, the flipped classroom strategy finds its way into combination with **challenge-based learning** (CBL). It is an application introduced by Apple for higher education, the framework for learning while solving real-world challenges. The initiative is based on the cooperation of all stakeholders (teachers, students, their families, members of the local community) to discover and solve challenges from thematic all areas of society, their backgrounds, and share their ideas worldwide. It also provides collaboration with the industry. Challenge-based learning draws upon experiential learning, progressive education and critical pedagogy. Moreover, CBL encourages web and mobile technologies available to students but not often used during the classes (Gallagher, Savage, 2020).

As shown above, Flipped classroom based e-methodology is not a hermetic, closed area. On the contrary, it constantly contains new opportunities for interaction. Its mobile, flexible and adaptive elements can and should be exploited in relation to specific needs and educational opportunities. Its immanent feature is hybridity, which opens infinite possibilities for future research and its implementation, always subject to the central skill of the 21st century, which is lifelong learning. Considering the different scenarios for expanding a Covid 19 pandemic or



other similar phenomena, it seems necessary to further develop the flipped e-learning methodology towards Education 3.0. (the term describing various ways of integrating technology into teaching).

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