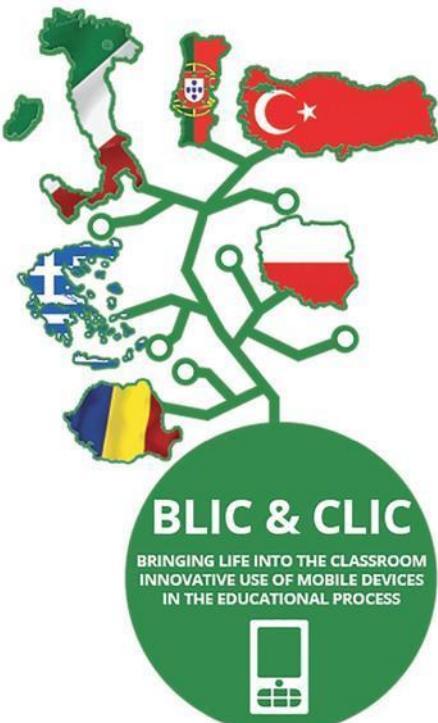


**GUIDELINE:**  
**Tips and tricks for effective use of  
mobile devices in education**





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## TITLE

GUIDELINE: Tips and tricks for effective use of mobile devices in education

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## PREFACE

The emergence and development of the Internet in recent decades has led to a radical shift in our perceptions of education. From a closed, conservative system, it has become an open system in which education is no longer the exclusive attribute of certain institutions or individuals strictly qualified in this field. Opening schools to open-ended education has become a necessity and at the same time a challenge not only at the institutional but also at the individual level. The current society is characterized by an increasingly digitization. The fierce competition that characterizes the economic and social environment in which we operate is fully exploited by various great actors. The European Community makes no exceptions.

The European Commission adopted on 10 June 2016, The new Skills Agenda for Europe, that include 10 actions to make the right training, skills and support available to people in the EU. Among them, was established 'Digital Skills and Jobs Coalition' launched in December 2016 with the goal of improving the digital skills of the wider population, not just IT professionals.

The Coalition on Digital Competitions and Jobs, launched by the EU, aims at developing digital talents on a widespread scale. It also aims to ensure that individuals and the workforce in Europe have the appropriate digital skills required by the labour market.

The strategy developed for this "includes:

- Establishing national digital skills coalitions connecting public authorities, business, education, training and labour market stakeholders.
- Developing concrete measures to bring digital skills and competences to all levels of education and training, supporting teachers and educators and promoting active involvement of business and other organisations.<sup>1</sup>

The focus is on digital skills, that must be develop at any level, in any context, in a close connexion between educators and other stakeholders, beneficiaries of skilled workers and, in a broad sense, citizens.

Given these issues, it is self-evident why the current trends in European legislation are so surprising. Although there are global initiatives that want to contribute to the development of digital skills not only of young people, but also of people of all ages, like Hour of Code or Code Week, to which the European Commission has also joined, it is often deny the role of such initiatives in personal development of digital abilities.

We have mentioned this movement, as it is an example of cooperation that involve official institutions together with organisations from industry and the non-profit sector in recognition of the vital need to empower young people to understand the theory and application of coding. This example can be spread for others initiatives, which will help the main purpose of empowering young generation with proper digital skills for labour life and not only.

As teachers, many of us also as parents, we are anyway in the middle of these disputes. That's why it's our job to look for solutions to the issues raised by the use of mobile devices and dedicated applications in order to achieve the goals listed above.

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<sup>1</sup> COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS A NEW SKILLS AGENDA FOR EUROPE Working together to strengthen human capital, employability and competitiveness. COM/2016/0381 final.

Retrieved in <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52016DC0381>



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Why Mobile Devices? Because this is a trend, given the benefits offered, such as freedom of movement that does not restrict access to resources. And in terms of costs, this approach is better. If we also appeal to the BYOD method, the advantage that schools have it is obviously.

The exponential development of using the Internet and mobile devices for access and exploitation of digital resources by students has forced us to adapt the techniques and methods that we, as teachers, use in classrooms. However, these devices have expanded the educational process beyond the school boundaries, increasingly collaborating teacher-students, students-students or teacher-teachers, who are outside the same classroom, most of the time. But are we prepared for these radical changes in the educational paradigm? Young generations of teachers in some countries benefit from such specialized courses, during faculty, unfortunately only on a small scale. But what do we do with generations that have been educated before the emergence of such technical cooperation and communication possibilities?

We have to recognize that society, stakeholders, are trying to solve this problem for teachers, to be well trained professionally. There are different entities that organize courses for teachers in the attempt to provide them with the necessary digital tools or to update their knowledge to meet these challenges. Even for that, there is a big issue. Any course can't cover all fields of skills and information that we need or we can meet, trying to exploit the Internet's resources and usage of mobile devices. A new contribution is welcome, especially if it is based on practical experiences of a large number of teachers, having the necessary theoretical support, pedagogically and technically.

During the activities that we have proposed in the Blic&Clic Project we have faced the same problems. Based on surveys' results addressed to teachers and students on our schools, we accomplished that are common issues we must face. Our guide try to offer possible solutions to these issues, in an attempt to make much easier the integration of mobile devices into our classes, as solutions that can be applied in different schools, by teachers who want to integrate digitalization in their courses.

The existence of a variety of digital resources, of which we chose those with a wide range of usage, being free and usable on most types of mobile devices, is the basis for our practical approaches. The experience gained during the course of the present Project, both during the short-term learning activities for teachers or during students' mobility, as well as the work on the other intellectual products we have achieved, is presented in this guide. It is our way of helping to establish a balance between the sceptics and the optimists about the contribution of digitization to the achievement of long-lasting competences of the students and, why not, of our teachers.

This Guidebook belongs to a series of Intellectual Outputs forming a support package for a better understanding of the importance of digital technologies and mobile devices in education. Written by the team members of the project, Blic&Clic, the guide has benefited by the contributions of a large number of teachers and students from our schools, participants to our surveys, and who gave us the results of observations in their classrooms. We are grateful for their help, their suggestions and comments.

*Petronia Moraru  
Blic&Clic Project Coordinator*

## INTRODUCTION

A Guideline can be “information intended to advise people on how something should be done or what something should be”<sup>2</sup> or “a piece of information that suggests how something should be done”<sup>3</sup>. That is what we intend to do, based on our research and expertise.

This Guide aims to present theoretical and practical aspects that are due to the experience of teachers and students in the schools that are part of our consortium for Blic&Clic Project and to contribute to the development of an institutional culture in schools, aiming at encouraging formal and non-formal learning, supported by access to digital resources, through mobile devices. We want to promote the use of mobile devices for the benefit of learning, not for themselves, in a lifelong learning perspective.

The chapters in this guide relate to some of the most difficult aspects of using digital applications and managing mobile devices in classrooms. There are references to extending their use outside of the school, or for education in a wider sense. For some applications or for the management of integrating mobile devices in classes, we present advantages as well as disadvantages, that we found using them.

## UNDERSTANDING THE GENERAL CONTEXT

Digital technologies have had an explosive development ever since their emergence. If we were to consider the Enigma device as the precursor of the current devices, then we could say that their history began 80 years ago. Shortly before, the first radio transmission of a lesson was made, which is the prognosis of future uses of radio communications at a distance for educational purposes. The 1970s represented the transition to today's computers used in classrooms by the emergence of handheld computers and the first device for test evaluation with multiple answers, Scantron. At the same time, the public broadcasting system (PBS) was set up in homes and classrooms. PBS has enabled educational programming for a wide range of subjects to be watched on a TV, in class or at home. Devices like Apple II, IBM personal computers, or the computer named Plato, an early computer introduced into the education market, although they did not have access to the internet, represented an important step towards connecting computers to education. Simultaneously with the widespread access to the Internet at the beginning of the 1990s, are intuited its potential and the value it can add to learning, although the technical conditions were far from the current ones. From now on, the path to today's technology that we have in classrooms, or that sustains education, wherever it unfolds, has been opened. In just two decades, technology has made tremendous improvements in teaching. The availability of IT equipment in the classroom, which empowers teachers and contributes to students' learning, has increased considerably.

However, the huge leap is achieved by the gradual introduction of mobile devices in schools, starting with mobile phones. Lower costs, as well as their size, potential for communication, have allowed access to these equipment to a more and more wider audience.

Confronted from the outset by the opposition of schools leadership, or with waves of criticism reflected by a part of the media, the introduction of these devices into the educational environment has also led to changes in the educational paradigm. It is noteworthy that technological advances

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<sup>2</sup> Cambridge Advanced Learner's Dictionary & Thesaurus © Cambridge University Press

<sup>3</sup> Cambridge Academic Content Dictionary © Cambridge University Press

Retrieved in <https://dictionary.cambridge.org/dictionary/english/guideline>



are often much faster than adapting pedagogical methods and techniques to include them in the daily routine of classrooms.

Laptops, but especially tablets and smartphones, due to their versatility and multi-functionality, have a widespread among children and adolescents. The advantages of using them outweigh the disadvantages. Usability, portability, versatility, ability to customize the owner's personal experiences, adaptability, are qualities that also recommend them for education. Exploiting information beyond the physical or temporal boundaries of classrooms opened the way for new types of education. Terms such as M-learning (mobile learning) or e-learning (learning based on electronic technologies, usually based on internet use) were introduced to describe new learning experiences. Both describe a teaching and learning approach that allows to acquire any knowledge users want, no matter where they are and when. Thus there is an expansion of education, to everything, anytime and anywhere, a globalization of it in time and space. Considerable efforts have been made to investigate these phenomena, to set new approaches to integrating mobile devices into lessons, in schools, and into education in general.

That is why it is frustrating to see how after a period of relaxation with respect to the specific legislation aimed at accessing and controlling mobile devices in classrooms, lately there has been a return to restrictions that have characterized the beginning of the use of BYOD method or the use of mobile devices that schools make available for students. With such restrictions, the potential of these devices is far from being fully exploited. They are mostly used for access to knowledge rather than as tools that enable students to contribute to knowledge creation, developing high-levels of competence such as critical thinking or problem-based learning.

## UNDERSTANDING THE PROJECT CONTEXT

The present paper is based on the study conducted in the framework of the "BRINGING LIFE INTO THE CLASSROOM: innovative use of mobile devices in the educational process" project, Blic&Clic, aimed at teachers' perception of the use of mobile devices in schools, their pedagogical training for this use, the disadvantages of education based on digital technologies, as well as the experiences gained from the participation in the short-term learning events of the teachers, carried out within the project. This intellectual product of the Blic&Clic project aims to provide teachers, educators in general with a guide, with suggestions for integration and management of mobile devices in classrooms, the use of various applications to help empowering teachers for a new pedagogical approach to digitized education.

We intend the guide to be a reference for addressing mobile learning and the daily use of mobile devices in classes. It has been developed to help educators wishing to integrate mobile devices as an explicit teaching tool for m-learning and e-learning. The applications selected to be presented in the guide were selected by teachers from the consortium' schools based on their experience.

We believe that the suggestions we present, the advantages and disadvantages identified for different uses of mobile devices in schools or various applications will help to increase confidence in the use of these techniques and methods.

## 1. LET'S GIVE TEACHERS THE CONTROL ON WI-FI. HOW CAN WE MANAGE A WIRELESS IN A CLASSROOM

Our direct work as teachers often causes us to learn methods and techniques for which we have not been prepared before. Some of them refer to the management of mobile devices and access to Wi-Fi, during and in classrooms. It is challenging the correct management of these, which can become scary, for most of teachers, at the beginning.

To overcome this challenge, one suggestion is to understand the usefulness of internet access through mobile devices in the classrooms and not only, for teachers and students. The questionnaires applied to pupils and teachers in the schools that are part of this consortium on this theme can be a good starting point, reflecting the current practices of six European schools.

### 1.1. Students opinions

According to the questionnaire applied to students about the usage of mobile devices most students use often the Internet Technologies for educational purposes, such as to research and find information on specific topics, to prepare and create homework tasks, to study online resources, to find lesson plans or e-books, to watch educational videos and, generally, to enrich knowledge acquired at school, to memorize information, to take notes, to clarify doubts and to find exercises for the tests.

Students use a significant variety of applications for educational purposes on their mobile phones, such as Animoto, Can Scanner, Chrome, Duolingo, EBA, Edmodo, Excel, Gmail, Goanimate, Google Docs, Google Drive, Google Keep, Google Maps, Google translate, Ibooks, Kahoot, Khan Academy, Kizoa, Lideno, Lisego, Memrise, Mentimeter, Messenger, Mindmup, Mindomo, Moodle, Nesa, Online arabic, Online dictionaries, Padlet, Photomath, Popplet, PowerPoint, Powtoon , Prezi, QR Reader, Quizzi, Reading Holy Book, Scappel, Slideshare, Socrative, Symbolab, Tonguç akademi, Translater, Trello, Tureng, Voscreen , VoxVote, Wattpad, Word, YouTube.

We must state that some of these applications are dedicated, being developed only for the educational system in one of the countries represented in the present consortium. An example is Lideno. Although the Internet and resource access through it is global, it is encouraging that there are applications developed only for speakers of one language, which can facilitate the use by non-speakers of another language.

Students believe that these applications are very useful for their education, because they offer easy and instant access to many different kinds of information / subjects and better planning of lessons, they facilitate collaboration and communication between peers in a task, as well as between teachers and students, enrich knowledge, research and reading skills as well as memorization process. Also, through their use courses can become more interactive, lively, interesting, gameful, alternative, fun and pleasant.

For example, as mentioned by the Portuguese partners, some students use Edmodo to study with the PowerPoint presentations posted by the teacher. YouTube is also used by students to watch videos that help them solve problems of maths. Gmail and Google Drive are used to receive various material sent by teachers. Students also think that the use of apps makes presentations of their work more interesting and "dynamic", as pointed out.

Most of the students think that the use of mobile phones and tablets in educational process contributes significantly in their learning, offering a variety of information in many subjects, supporting knowledge in innovative ways, inciting students' interest for the lesson, giving fast access to knowledge, anywhere, anytime and offering easy saving / archiving of information.

Students think that mobile devices are most useful in the classes like History, Physics, Chemistry, Biology, Geography, Math, ICT, English, Literature, Art, Kur'an'ı Kerim (Koran).

The percentage of students satisfied with the Wi-Fi access in their school differ from partner to partner. While most Turkish students seem happy with the internet access in classrooms, 65% of Portuguese students and most of Greek ones think that access to the internet in classrooms is not satisfactory, because connection is too slow, is often not available and students are not allowed to access school Wi-Fi. The majority of Romanian students, 78% of them, responded that internet connexion depend on the space that they use, some laboratories having very good access to the internet, but in other spaces it is bad or no connection.

For most students, the use of mobile devices during the courses offers innovative methods and teaching material, new and interesting ways to learn, provides easier collaboration of students for a team task and opens an ocean of knowledge. Many students expressed the opinion that mobile devices should be used more regularly. However, some students noted that mobile devices should be used "when necessary, not always" or even that their use should be limited. One of the students pointed out that "this should not be the only teaching method" and that "it's better to use traditional methods".

Students find that the use of mobile devices presents a series of advantages and disadvantages. Main advantages are that mobiles offer a quick access to knowledge anytime and anywhere (portability / mobility), a very wide range of information and a large variety of different tasks that can be accomplished through different applications (preparation, review, research, problem solving etc.). Also, mobile devices offer interaction, interesting innovative approaches to the lesson and help students to get familiarized with new technologies, get more motivated and learn "more and better", as pointed out. In addition, the knowledge of English language is promoted, since most apps use English. The use of less paper, is also mentioned as an advantage of the use of mobile devices.

On the other hand, most important disadvantages mentioned by students are the danger of distraction from the educational process, possible loss of contact with the teacher and peers through creating a kind of "impersonal" lesson with low personal interrelations. Excessive use of mobile devices might also alienate from the use of books, can lead to addiction and possible health problems. Also, it is possible to lead to misinformation, due to the difficulty of having a qualitative assessment of useless or false information. Finally, technical problems might occur, making difficult the whole process.

The use of mobile devices may face various problems, such as: the relatively high cost of equipment and internet access (some students have no financial means to acquire it), possible health problems, harmful access to useless or false information (misinformation), distraction, addiction dangers or even inadequate teachers' professional training. Also, various technical problems can occur, such as the small size of the screen, difficulties to display the content due to different format reasons (especially in tablets), the discharging of devices, and problems of connection to the internet, school's obsolete technology and infrastructure.

## 1.2. Teachers opinions

Most of the teachers in the schools involved in the project use internet for educational purposes both outside and inside the classroom.

It is a common belief among teachers, that the educational use of Internet and mobile devices is necessary, as they can promote interest, interaction, collaboration and participation of students in the educational process but some point out that sometimes their use can be distracting for students.

Teachers use PC and laptops, mobile phones and tablets connected to the internet. A lot of online devices and applications are used depending on the educational purpose and the means available. For example in the Portuguese school the online devices that teachers use are: Khan Academy, Virtual School, Edmodo, E-books and laboratory simulations from PhET for their lab lessons, homework, interactive games, research and evaluation.

The applications most used in Portuguese schools are: Classdojo, Kahoot, Clipit, Socrative, Padlet, Quiz, Mentimeter, TedEd, Tellagami, Voki, Mural virtual, Evernote, Geogebra, Tangram, and Powtoon. In the Greek school Google Drive, Google Docs, Wiki, Social media (Facebook mainly), YouTube, PowerPoint, Prezi , Kahoot , Edmodo, Mindomo , Blogs, Timetoast , ApplInventor, e-class and Animoto are mainly used. Some applications that are usually used in the Turkish school are Starboard, Tableblazer, Google Keep, Edmodo, Kahoot, Padlet, translate and dictionary tools, YouTube, Microsoft Office and other types of video recording and playing. Apart from these a National education information network (EBA) is broadly used. In Romania, the majority of teachers use specific application, related to their discipline, like Geogebra, PhEt, YouTube dedicated channels, Vimeo, or general applications, like Google Docs, AwwApp, Lino, and Padlet.

Teachers think that the applications they use can be highly beneficial for students, in the following ways: to motivate them to learn and research on specific topics, to work collaboratively with their peers, to work creatively, using various -possibly unexpressed- skills. Also to have a specific aim, work to produce a specific product, organize better their work, participate actively and abandon passive stances towards the educational process and acquire confidence for the results of their work and skills.

Teachers also think that mobile devices used while teaching increase students' pace, especially of those who are already familiar with the use of new technologies. In addition, they believe that the usage of internet more widely by students in class affects positively the quality of education, mainly because it improves communication and collaboration, provides with a lot of different sources of information, presents many different points of view, promotes critical thinking and facilitates research in less time.

From this point of view teachers mostly see mobile devices as innovative, challenging, instructive, timesaving, motivating, reinforcing and entertaining. They identify such advantages of mobile devices as mutual interaction, mobility, permanent learning, and illustration, being free from place and time, saving time and samples from real life.

On the other hand, teachers believe that the use of mobile devices in the educational process presents both advantages and disadvantages for students : main advantages are related to portability of mobile devices, instant access to apps and internet without depending on school's equipment, access to additional learning material, potentiality to continue and complete the tasks outside of the classroom, that mobile devices revive the students' interest, facilitate research and are excellent tools for team work, interaction and collaboration. Especially Portuguese teachers consider very important that all the schoolbooks as well as the library books can be available on mobile devices any time, offering alternative ways of teaching and learning; they can be used in evaluation as well if used in various formats (questionnaires, polls through quick questions etc.); they can be very useful during experimental activities for recording the various phases of work and/ or results and providing immediate feedback etc. .

As disadvantages, teachers mentioned that mobile devices: provide a lot of opportunities for students to get distracted in the classroom (use social networks, games, applications, without the teacher's permission) and possibly get exposed to internet hazards. Main disadvantages are that students might get used to easy ways of learning and sometimes get a "lazy" attitude towards (conventional) studying, or can possibly be disorientated from teaching goals.

Problems that may occur while using mobile devices in education are mainly technical issues (connection overload, inadequate equipment), legislation prohibitions of the use of mobiles at

school, students' distraction by other apps / social media etc. Turkish teachers note that the cost of internet can be high in some regions, states or nationwide. Students may not be allowed to use internet or devices on their own. The restriction on internet builds boundaries around devices. Another problem might be that all types of contents cannot be displayed on the screens of mobile devices as they are partly not compatible with devices. The last statement by teachers are about the screen size of mobile devices, which is likely to limit the works done when using them. Also, Greek teachers think that a lot of training is needed in advance on the use of certain apps since most students are not familiar with the use of mobile devices for educational purposes but only for entertainment and social communication. In addition, excessive work by teachers might be needed to prepare appropriate material, while following the curriculum and use of mobile devices at the same time might be incompatible. In Romania, there are many courses for teachers who want to learn about applications to be used with mobile devices, their integration into the curricula or the management of the access to Wi-Fi. The problem is the price, which they must pay for these courses and the lack of time. Also, they request for a dedicated person for managing the school network as well as the control of access to Wi-Fi for students.

As far as the effects of mobile devices on class management is concerned, teachers noted that they can facilitate the educational process, they can create a pleasant atmosphere in the class, add interactive features, they can transform lesson to a game (gamification process), help students learn how to learn, revive class's interest and keep students busy and concentrated., as well as motivate students to collaborate and interact effectively. Apart from these positive effect, there can be also negative such as difficulties in keeping everyone synchronized, loss of concentration, noise and technical problems.

Concluding, most of the teachers involved in the project think that mobiles, as long as they are part of everyday life, they should be used during courses, but their use should be well-planned and properly designed and carefully implemented. Generally, mobile devices are an interesting option and can be really effective if a number of prerequisites are met (technical support, training, specific educating goals, appropriate implementation etc.).

### 1.3. Giving teachers control of wireless: EBA, the case of Turkey.

In Turkey, with Fatih Project, the Ministry of National Education provides internet usage in classes for educational purposes. It is Internet connection in every class also a smart board. An application called Starboard is already loaded to these smart boards for teachers to be used during lessons in various ways. And with Wi-Fi connection in classes both teachers and students can reach the web sites that are allowed from the point of education. Besides, Ministry of National Education designed a national educational platform called **EBA** (Egitim Bilisim Agi'- Educational Informatics Network), both for students and teachers. E-Okul is another application for students, teachers and parents to reach students' educational progress and grades online. Both EBA and E-Okul (e-school) can be used in mobile devices. So, education is easier, faster and accessible.

#### 1.3.1. Teachers' survey on EBA

According to the survey conducted to the teachers of the Turkish partner school, Toki Halkali Anadolu Imam Hatip Lisesi, major percentage expressed that they use EBA and Starboard during their courses (36 out of 40). When they are asked how often they use EBA and Starboard, they tell that they often use those according to their subjects, class' level, time, etc. trying to motivate their students and enriching their courses by utilizing the audio-visual materials presented on EBA and Starboard. In our survey, we ask the teachers that for what purposes they use EBA and Starboard and we get plenty of answers. We could summarize their purposes like that:

- To have students watch videos, slides and listen to songs related to the subject covered.
- To attract students' attention
- For revision

- To gather data
- To help class management
- To visualize the presented subject
- To find essential sources and documents
- To practise after covering the subject
- To show maps
- To have the PDF files from the platform
- To download e-books and use/read them
- To have students watch the “experiments” before doing them
- For pronunciation and listening practice in ELT
- To make students listen to the verses of the Koran (as our school is a vocational high school)

When our teachers are asked whether there are sufficient materials and sources or not, half of them tell that the sources and materials on EBA and Starboard are not adequate. 7 teachers out of 40 say “No” to that question and 10 teachers tell that the sources and materials should be enriched and improved.

We ask the teachers whether they upload materials to EBA and Starboard or not. 10 out of 40 say that they upload some materials. That percentage shows that teachers should spend more time to develop their own materials.

When the teachers are asked about the pros and cons of EBA and Starboard, we come up to a wide range of various answers. To summarize those answers:

#### ***1.3.1.1. Advantages of EBA and STARBOARD***

- It's easier to keep in mind when students are exposed to those visual materials included in EBA and Starboard.
- It makes the courses more visual and effective.
- It contributes to the students' audio-visual competence.
- Since Starboard has sample questions, it contributes saving time, besides you can have practice exams.
- It helps us to enrich our lessons in terms of audio-visual materials, presentations.
- It makes students learn permanently and we can save time.
- You can access information and materials easily.
- It helps students to revise and practise, also get prepared for the exams.
- It's a crucial advantage that Starboard doesn't require internet connection.
- You can access information immediately.
- EBA is an open source, you needn't pay or submit to use that platform.
- You can add notes onto the course book with Starboard.

#### ***1.3.1.2. Disadvantages of EBA and STARBOARD***

- Checking the tasks is hard.
- You need password to use the EBA actively.
- Students' attention can be spoiled.
- There aren't adequate authentic and “up to date” materials in ELT.
- Teachers should do some plans and preparations (search and prepare materials, then upload them to the Starboard) before covering their subjects via Starboard.
- The programs on Starboard haven't been matched with the students' tablets and the school's Wi-Fi/network is sometimes not sufficient enough.
- The content is mostly limited.
- Some presentations or practice samples do not make students participate the course actively.
- Network/ Wi-Fi connection problems might take place.
- There aren't ample or sufficient sources in each field.

- You can't use EBA when you are off-line.

### 1.3.2. Students' survey on EBA

185 participants (students) of Toki Halkalı Anadolu İmam Hatip Lisesi answered the questions of EBA Students' Survey. Most of these students mentioned that they use EBA once a week or once a month in various ways and for different purposes. These can be summarized as:

- To do homework, task, project
- To get prepared for the exams
- To cover the subjects of the day when they are absent from school (as there are tutorial videos)
- To research something about lessons
- To revise the subjects

According to the survey they use EBA mostly before the exams. As there are different materials which are uploaded by different students, teachers, schools around the country students are able to find related worksheets or sample exams of different courses like Maths, Physics, Language, Biology, Chemistry, Literature etc.

On EBA platform there are many modules. These are EBA course, content (including news, videos, albums, books, audio lesson materials, magazine, and lesson materials like worksheets), contests, applications, EBA Radio, E-course and distance education. Students mention that from these modules the ones that attract their attentions most are these:

- Videos
- Documents
- Games
- Tutorials
- Course books
- Tests for Revision

Students mentioned the lesson they use EBA mostly as in the following:

- Literature
- English
- History
- Biology
- Geography
- Maths
- Physics
- Chemistry

When asked if they have downloaded EBA to their mobile devices/phones, most students mentioned they haven't downloaded EBA to their mobile phones or tablets. They usually use EBA on smartboards in classrooms before, during or after lessons. (There are smartboards with Wi-Fi connection in each classroom).

Most students mention they don't have much difficulty in accessing EBA. When asked what you would like to add EBA as students, their answers are as follows:

- more educational videos/funny videos (within the frame of educational purposes)
- more sample examples about courses/more lesson tutorials
- interviews with specialists, scientists etc. (there are already some on EBA)
- virtual contests
- quiz shows with rewards
- short notes about courses

As a conclusion, we can see that most teachers and students know the main concept of EBA and Starboard. They use EBA when they need before, during and after courses. However, most teachers and students prefer using EBA and Starboard on smartboards in classrooms instead of on their

mobile devices. Students use EBA mostly for revision and getting prepared for exams and teachers mostly for enriching their presentations during courses.

## 1.4. Conclusions and suggestions for using wireless in classrooms

The access of wireless is possible by using, by students and teachers mobile devices, along with other possible devices that are in a classroom or schools like a printer, video projectors or other devices. Normally, students use only their own mobile devices or those provided by schools, that is why we will talk mostly about them.

There are different views on the use of mobile devices in schools, both by teachers and, especially, by students. These opinions start from the idea that in modern times Internet access is vital for communications, research or even work. There is a regression of internet use on PCs, instead is a migration to mobile devices, as a more convenient and flexible alternative. Flipped Classroom ideas begin to gain ground in more and more educational environments, based on new technical requirements. BYOD (bring your own device) technology is increasingly accepted as a cost-effective solution as well as from the perspective of user-friendliness, especially regarding the habit of using your own mobile device. If from this approach, most of the opinions converge, things are becoming increasingly different in terms of how they are used.

### 1.4.1. Conclusions and suggestions for students using wireless in classrooms

In the students' view, they want free, unlimited internet access. Because of the high costs of connection, for many students, the solution would be free access to the Wi-Fi provided by the school. If we will try to limit students' access to the internet, it is possible to have a kind of censorship, if we will use overly restrictive filters. It is possible that some needed educational websites to be blocked, by filters applied by schools' internet administrators.

We must think that it is impossible to keep these filters during all days, until our students will become adults, and will be responsible. Also, we must think that using overly filtering we don't help our students for real life. We must help them during schools' time to develop skills that provide them with the ability to evaluate information and their sources, regarding the reliability and the accuracy.

Another possible consequence of excessive filtering in schools, for internet access, is that social media sites such as Facebook, YouTube, Vimeo, or Instagram may become inaccessible, which may cause their socialization role to be cut, or even eliminated. Let's not forget that there are countless educational resources that can be found on these social sites, not to mention the positive character of the inclusion in school of the learning experiences pupils can have outside. It is another reason that must determine us to find solution to educate students on using proper the internet, from the point of view of time, sources and resources, instead of using arbitrary filters.

### 1.4.2. Conclusions and suggestions for teachers for control wireless in classrooms

Interesting are teachers' views on how they see the same problem to clarify doubts and to find exercises for the tests. If the majority accept that students need access to Wi-Fi, how psychological to handle that represent a big problem. Perhaps the main obstacle for teachers to see practical solutions to controlled students' access to the Internet during classes is that most do not have the necessary technical knowledge. Although there are many teacher empowerment courses for the use of digital technologies to support educational activities, very few issues related to the management of these technologies are taken into account by both potential course authors and teachers when choosing a professional development course.

Another aspect that we must consider when looking at the teachers' reserves to allow students to use mobile devices during classes is the psychological one. It is frustrating to find that although intentions are good, students often take advantage of any situation to access exciting sites from their point of view, less of that of teachers, and much less related to the subject that is discussed

at that moment. Not to mention the fact that many teachers are still keen on the idea that the role of the teacher is to dictate any action/behaviour of the pupils, that those must be faithful executors of the orders received so that the course is a pedagogical success.

From the point of view of the school, as infrastructure, we have to mention that the use of the Internet has imposed, since from the beginning, financial efforts, which have materialized not only through the purveyance and making to schools of intranet but also with software for the management of restricted / controlled access of students at internet. If managing students' Internet access through workstations has a relative history, who has given time to make the software necessary to restrict students' access to online resources, cannot be said the same about managing students' mobile devices. On one hand, the diversity of these devices is a big challenge; on the other hand, schools must invest for the acquisition of new technologies and for teaching the personnel how to handle them. For many school leaders, these issues can be summed up as follows: "Is there an economy changing access to the Internet through workstations with BYOD, if it is necessary to invest in infrastructure and staff training?" Maybe the first answer is no, but only for short-term. Because mobile devices have such characteristics that will impose their use, and schools must be prepared to benefit from them.

As teachers, we can contribute to the decision that schools must take if we can prove that internet access through students' mobile devices can be handled, without many efforts, not only by teachers who are specially trained, and that are ways to do that without special funds.

To summarize, we have to answer the following questions:

- Is the Internet useful for my classes?
- Is there a Wi-Fi in school that I can access with my students?
- Am I prepared to face the challenges of giving students access to the internet using their devices and school resources?
- Am I willing to spend the time to find the best methods for my students to coordinate their online activity, in classroom and outside the classroom?

All these questions can have different answers that can contribute to pros or cons argues for BYOD. It is important to accept that BYOD, which is a trend in education, have not only benefits, but also have potential dangers, that we must face. Important is to find a balance, to avoid excessive use of mobile devices and resources that they facilitate, so that students to become aware that mobile devices are not indispensable, being only tools that can help us in proper time.

The clever and pedagogical methods that we can use can help us to avoid many of the dangers that the use of mobile devices for our students.



Some tips are:

- Establish rules for using mobile devices during classes, together with your students, asking them to propose at least some rules, and to vote for the best proposal.
- Don't take out the students' device; let them keep it, to avoid losing the time to recover them from the potential storage place when they need them.
- Instead of stocking them, ask students to place them with the screen on the table, on standby.
- Try to be consistent - if a student does not respect the rule of use of the mobile device only at the moment indicated/permitted by the teacher, he will be only an assistant to the activity of another student. Tasks will be done later, outside of the class hours.
- Manage as much as possible the time spent on the use of mobile devices by students. If they do not have over-estimated time to solve a task, they will not be able to access other sites that distract them.
- Ask to submit the results of the work tasks online so that you can present them to everyone. To avoid unwanted comments, they will work more carefully.

- Allow students to take the initiative. Often, students are so inventive that they know/propose different sources from those we recommend or have knowledge that they can build new online digital solutions for their assignments or in-class tasks.
- There are students without mobile devices, or these devices are not performing well enough to be used for the teacher's proposed task. If a school does not have mobile devices available to you, use the work method in pairs/small groups. We recommend that in this case, not only students who don't have the necessary devices should be part of pairs/small group, so as not to turn these disadvantaged students into marginalized students.
- Use as much as possible the proximity' control. Walk around the class will help you to see what students do, and will help them, to avoid wrong using of their devices.
- Place tables on such a manner that can make supervision easier. Don't forget that preventing is easier than correcting.
- Ask students explicit use of their devices. In that case students will become aware of the role of their mobiles, or tablets, versus distracting.
- Find exciting reasons to use mobile devices for educational purposes, instead of boring ones. Not only the content but also the design of a site can help you with that.
- Breaks between two consecutive uses of mobile devices should be at least as exciting as online activity, so students will not just look forward to the new digital episode.
- Ask students who have better computer skills, to become your assistant. For them, it will be an opportunity not to get bored, and for others it can be an urge to prove they deserve the same status.
- Ask students to take screenshots to document their activity. They will have less time to access other sites and will develop skills for valuing their work.
- Use the apps that are downloaded on mobile devices, for working offline. Pay attention to use only those apps that work on all devices in a class. For that, you must know the digital architecture of your class, devices, and platforms that students have at their disposal.
- You always have a backup option. The Wi-Fi connection may not work, some devices will stop working, students will have less digital knowledge than you have imagined, etc.
- Keep calm and never give up. Your students need to know that you are confident and give them credit that they will use properly their devices.
- If you have printers or video projectors with wireless connexion, use them in class, so students to see another application for this kind of connexion. If the command can be done by mobile phone, use it, to support your assertion.
- Even if it looks a bit hilarious, give mobile devices a surprising destination to help students understand the role of their tool For example, ask them to use mobile phones to draw lines, parallel or perpendicular, or simply to compare different features. You can also ask them to vote for the best answer by lifting the phone as a tribute to the winner.
- Ask students' to evaluate classes, for the way that they used proper use of mobile devices, from different viewpoints, efficacy, necessity, confidence, cooperation and so on.
- Ask students about other suggestions about how they can use mobile devices during classes. In this case, even with minor changes, apply at least one suggestion. Students will appreciate this, thus contributing to increasing their inventiveness and involvement in their own education.

All these or part of them can be starting points for making your own rules or guidelines on using mobile devices, that means Wi-Fi access for your students, in a way that can be a benefit for them, and avoiding disruption of attention.

## 2. ONLINE AND OFFLINE VIRTUAL COLLABORATION. WHEN, WHY, HOW?

Online collaboration are applications that, in addition to giving the students the chance to help each other, facilitating the way they work, provide the teachers with a panoramic view of the progress of the activities. The exchange of knowledge and the sense of belonging to a team contribute a lot to the productivity of the work, because they make the students feel responsible for the results of the whole group. Being connected to the internet, with good collaborative tools, team students can work remotely from their devices (computer, smartphones, tablets, etc.). This means that it is possible for a team to be fully mobilized, in several places, but they continue to work in an organized way. Students in different cities or even countries can easily work together on the same project.

There are different types of collaboration that we can use in educational purposes, some of them with mobile devices, others without any support of technology. Even that we know and use such types, it is good to remember the most important advantages and disadvantages of the most used, with a focus on the methods that we used in particular through the mobile devices integration.

### 2.1. Face to face collaboration

In traditional classes, collaboration was possible only if students were in the same place, in the same time that means a type of face-to-face collaboration. At present, the facilities offered by the Internet have led to the emergence of new types of collaborative work based on the use of digital technologies. Mobile-mediated collaboration can be exploited at various stages of an educational activity, in a narrow sense, as a common activity in order to solve an assignment, or in a broad sense, such as teacher-student interaction, discovery-based learning, or for students evaluation.

#### 2.1.1. Advantages of face-to-face collaboration:

Because face-to-face interaction, based on mobile devices, between teacher and students, is less approached, we will present some facts based on our **experience**.

Using mobile devices in a face-to-face interaction, for evaluation purposes allows instant questioning or simultaneously examination to all students in the classroom.

Feedbacks such as “well done” can be sent back to the students, and the number of these “well done” show the attendance rate of each student.

The teacher and the student can manage the smartboard from the tablet.

The teacher can see the sites accessed by students in real-time and limit the access, if **necessary**.

#### 2.1.2. Disadvantages of face-to-face collaboration:

Disadvantages are mainly determined by the technical conditions in which the activity is carried out.

Due to the network problem, the internet connection can be lost. It takes time for a new login, and this will facilitate distraction. For a synchronous evaluation, all students must have proper devices.

To have equal chances, students must have compatible mobile devices that have similar technical features. If this condition is not fulfilled, there is the possibility that only some students have access to all the necessary resources, which would be a handicap for the other students.

The optimal solution is that schools provide similar student devices. Unfortunately, this is unlikely to be done in most schools due to lack of funds.

### **2.1.3. A critical analysis of some complex applications used of the consortium schools.**

For some of the most used applications or platforms that can be used by students after teachers have set up work assignments or introduced assessment tools, we will present both their advantages and disadvantages through the experience gained.



#### **2.1.3.1. EBA case**

##### **Advantages:**

EBA is a platform that provides great convenience to teachers and students in education. With this system, communication between teachers becomes easier.

EBA provides students with more of the facilities it provides to teachers. For example, a student logged on EBA can reach a very rich content. Students using EBA can easily access the notes, presentations, visual materials shared by other students and benefit from these materials as they wish.

The performance can be prepared and sent through EBA setting a date to the students to do and follow up their inquiries.

Teachers can upload contents to EBA as they want, while they can also easily access notes and presentations shared by other teachers.

It allows to exchange information with social network structure.

It also includes students with different learning styles (verbal, visual, digital, social, individual, auditory learning).

EBA has modules such as voice, news, and video. The desired operation can be performed by using these modules.

The teacher can add questions or an effective practice into EBA and prepare exams using the questions in EBA.

It is ensured that inappropriate added content is not included on the site.

All teachers are brought together in a common space and so they can give guidance to education.

It is a social education platform designed to use technology as a tool, not as a goal.

##### **Disadvantages:**

It is compulsory that students have a strong internet connection for the computer.

The possibility of listening again in the event of a missed course undermines the importance of school and class.

Students can have difficulties finding qualified video recordings.

Problems stemming from technical problems can be experienced.

It affects the reliability if the student does not do the test.



#### **2.1.3.2. STARBOARD case**

##### **Advantages:**

With this program you can prepare your own lessons, you can draw on pdf files, take a screenshot, draw shapes, draw maps, you can even do blackboard writing works.

It can provide interdisciplinary teaching by establishing a link between the classes.

It allows you to prepare and implement events. In addition, we can incorporate various animations into the starboard to make the lesson more interesting and richer.

The courses can be recorded in '.yar' format and used by other teachers.

With the screen recording feature, lessons can be recorded and the lesson can be followed by the students who do not attend the lesson.

***Disadvantages:***

Transferring pdf documents to StarBoard program can be late.

The program cannot open files with more than one ".yar" extension at the same time

Intelligent structure does not recognize mathematical expressions and functions

The display light can quickly tear the eyes.

Screen recording of the course may weaken the interest of the student in the course thinking that they can follow the course from the recording later.



***2.1.3.3. EDMODO case***

***Advantages:***

Edmodo is similar to Facebook in terms of its use and design.

Edmodo provides a collaborative environment for group work. Edmodo first advantage is that it's easy to use.

There are no inappropriate ad content on social network sites. It is for educational purposes.

The use of Edmodo increases motivation and the assignments given on Edmodo make it easier to understand the issues.

In particular, it makes the student-teacher communication continuous, increases the interest in the lesson and helps to understand the topics.

It is also positively that the questions asked and the comments written are encouraging to investigate.

In Edmodo environment, it is observed that almost all the students actively participate in the lesson, give importance to the assignments to be delivered on time and they contribute to the learning of their friends by sharing the things they have done and comments they have written.

According to the results of the research, it can be said that Edmodo may be an alternative for educational environments.

It is positive that the questions asked and the comments written in the classroom are encouraging to investigate.

Thanks to the generated classes, specific shares can be made for each class.

In Edmodo we can send quizzes, questionnaires, homework and grades to the students and get feedback from students.

Students can submit their assignments via Edmodo. Control is easy in this way.

***Disadvantages:***

The absence of private messaging between students is expressed as an advantage by some participants while it is expressed as a disadvantage by other participants.

The most important problem experienced in the process of using Edmodo is that it does not have an entirely Turkish interface.

The absence of private messaging between students is expressed as an advantage by some participants while it is expressed as a disadvantage by other participants.

The most important problem experienced in the process of using Edmodo is that it does not have an entirely Turkish interface.

# Kahoot!

## 2.1.3.4. Kahoot

### Advantages:

The classical and the oral examinations we do are not the most desirable examinations for the students. We all aim to make both our lessons and examinations richer and more enjoyable, because only then we can create real and memorable learning environments for students.

Kahoot is a platform that is very simple to prepare and implement. It is a tool to practice the exams, prepared by the teachers entering the questions and answers with the help of a code, to the students in the classroom.

With the Kahoot application, students can see only colour cards on their mobile phones or tablets. They have to look at the projection or the smart board to see the choices. This allows us to use the technology in education without inactivating the teacher. The observation of the analysis after each question gives instant feedback to the student. This is an important detail in terms of seeing their deficiencies. At the end of the application, students are ranked according to their success scores, which increases the sense of competition. It makes them more careful. Whether you enter literature class or music, it is a platform that all branches can easily use.

They experiment with names they choose, what they like.

Questions must be answered within the specified time, which adds enthusiasm to work.

When the student sees that the correct answer is given by him, he / she increases the level of satisfaction and the sense of competition.

The coexistence of games with the topics they find boring can increase interest in these topics.

### Disadvantage

In fact, there is no situation we see as a disadvantage. Internet connection is the biggest problem of today's schools. This may disrupt the use, or the tablet may not have been distributed in schools that are not covered by the Fatih project. In this case it is useful to find an alternative.

## 2.2. Non-face-to-face communication and cooperation activities

As an alternative to face-to-face activities, is more and more developed in educational purposes. A general feature is that it defeats distances, which allows access to resources and tutors otherwise difficult or impossible to access. Remote activities, which we can also name non-face-to-face, have been developed to provide access to education to students in remote areas of Australia and Canada, first through radio. The emergence of the Internet has given other valences to this type of communication and collaboration, which often has legal regulations.

Some features that we would like to draw attention to for this type of activity in regular courses are:

### Advantages:

We can include a student from a different class through the code given to him.

### Disadvantages:

The network connection is disconnected due to network problem and it takes time to log in again.

There are many different applications for remote communication. We will just outline the most used, according to the surveys we applied in the consortium schools and we have also used in our Project.



### 2.2.1. Skype

<https://www.skype.com>

Skype is an online collaboration tool that allows video chatting and exchange of messages. It encourages group learning because one video call can include more than two people. Instructors and students can have online learning session and exchange learning materials.

It is easy to collaborate with more than one classroom and it is effective for distance teachers, for group learning and teamwork: It encourages tutoring:

But, we have to bear in mind that Skype has been used by students to carry out cyber bullying.

Live video communication. Brings together students and teachers who are in different places. Skype has features like “group video calls”, “group screen sharing”, “video messaging”, “instant messaging” and “send files” who allows and enhances communication.



### 2.2.2. Mentimeter

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

Is a collaboration and presentation software featuring unlimited votes, polls, word clouds, multiple choice questions, quiz and more, showing results live while participants are voting.



### 2.2.3. PowToon

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

PowToon is a web tool to create an animated presentation. It can be used in the classroom and at home, for educational and business.

#### 2.2.3.1. Example of using PowToon and Mentimeter

We will present the example of using both application in the High School Debating “Society” of Secondary school of Maia (**SdDESM**).

In addition to the purpose of making known the competitive debate in the World Schools Model, the objectives of the debate society were intertwined with those of the Blic&Clic project. Therefore, the objectives of the SdDESM, like improving the following skills: critical thinking, questioning, interpersonal communication as well as public speaking competence were associated with those of the Blic &Clic project such as develop the acquisition of the new digital skills by students and teachers, develop skills in the application of pedagogic innovative scenarios with mobile learning resources, exchange pedagogic practices experiences among teachers and promote the use of mobile devices in learning.

The methodology used comprised the following steps:1-Creation of 5 videos tutorials on the World Schools Debate Model about “What is competitive debating”, “Motions and Debate Model”, “Arguments”, Prime Minister and Leader of the opposition” and “Adjudication” using PowToon sent to the all the countries in the project;2-Training and communication of the World Schools Debate Model through Skype with all the countries in the project (3 video calls);3-Final debate in University of Minho between multinational teams using Mentimeter to understand the popular vote and how this could change with well thought arguments, before and after the debates.

Students improved, considerably, the abilities to speak in public, to use APPS and mobile devices, along with interpersonal communication skills. The acquisition of new digital skills was also significant among teachers by the application of pedagogic innovative scenarios with mobile

learning resources. Ultimately, the goal of this experience was to teach other high schoolers from a variety of nationalities how to debate and inspire them to create a debate society of their own.



#### 2.2.4. Padlet

<https://padlet.com/>

Padlet is like a wall paper online where the students and teachers can put pictures, videos and texts about a subject. They can use pc, smartphones or tablets to access the contents and after show and discuss the results at the padlet.

##### 2.2.4.1. Example of using Padlet on a Biology classroom.

**Objective:** Study the relationship between the composition of the drinking water (biosphere) and mineralogical composition of the aquifers (geosphere). Biology of the 10 year.

##### Methodology:

1. Division of the students in groups (four or five elements). They choose who they want to work with.
2. Distribution of three labels of national and international bottles of water
3. Students within the group analyse the composition and discuss the results to the different labels; hard or smooth water, the dominant ion and acid or basic pH.
4. They localize the water spring zones geologically and consult the geological maps of the areas.
5. When they have all information, the students within the group, must discuss the kind of water, the dominants ions, the lithological composition of the spring zone and the relationship, was or not, between the hydrosphere and geosphere
6. The students put the photos of the water label's and the geological maps, and the results in a padlet. Send it to the teacher.
7. At the end the teacher shows the padlet to the class and all made a final conclusion.

This activity promoted the autonomy, the organizational management of work, the creativity, the use of another language, the interpersonal relations and the integration of several tools. During the process the student had to reflect on their learning and develops competences of individual and group work and they involved more than others projects. The answer to the initial question, if exist or not a relation between hydro e geosphere, is done by the students after the discussion of the results.



#### Dropbox

#### 2.2.5. Dropbox

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

Dropbox is probably one tool that we use most for collaboration. With this little software, we are able to have access to all our documents, files, articles and everything else. Dropbox can help us to access our files from each gadget we own. It is compatible with all popular computer- and mobile platforms. Dropbox is a must-have for everyone.



#### 2.2.6. Google Docs

<https://www.google.com/docs/about/>

Sometimes we need to work on one document together at the same time. With Google Docs we do that very easily. This tool allows our teachers and students to create online

documents, presentations and spreadsheets. You don't even need to have any office software installed – everything happens right in your browser or via the mobile app for iOS and Android.

It is an online collaboration tool that allows creating and sharing of learning documents. The documents created in this platform can be accessed and edited by students. Tables, information, and images can be added into the documents and saved. Once the teacher goes through the assignment, he or she can leave comments for further improvements.

User-friendly and accessible from all devices: Google docs are easy to use and friendly for beginners. It does not require a special skill to know how to use it. Efficient in sharing information: The google docs are saved online hence can be accessed by a large number of people. Once the document has been uploaded, you can automatically view, edit, or leave comments through the Google Drive.

Anyway, Google Docs has not integrated the Google Calendar feature hence setting assignment deadlines, and reminders is a challenge.



#### 2.2.7. Slack

<https://slack.com/>

It is probably one of the best ways for teams to communicate with your team members. With this communication tool you can get all your different conversations sorted into different “channels”, you can integrate tons of services and so much more.



#### 2.2.8. Google Hangouts

<https://hangouts.google.com/>

With Skype we can only video-chat with up to 10 people and this is why we sometimes use Google Hangouts. This tool allows us to have a video-conference with up to 100 people for free. Thanks to it you can keep all your communication in one place.



#### 2.2.9. Trello

<https://trello.com/>

Over the last few months we have tested in our school many free tools out there. After trying them we didn't feel that these tools made our lessons more attractive or educative. From that time on we started to use one tool which is different and very helpful. We work with Trelo Application which uses a card-based system for keeping our project overview as simple as possible. It is very simple to use. It also has the best mobile and tablet collaboration app.



#### 2.2.10. Google Maps

<https://www.google.com/maps/>

Google Map "My Maps" provides a quick, easy start to putting your data in a map online, collaborating with others, and sharing it with a target audience. Collaborators only need permission to access the map, a Google account, and a web browser.

The free Google Maps "My Maps" allows users to visually edit and save points of interest on their own personalized map.

On the other hand, creator and collaborators need a Google account so as to save and access the "My Maps". There is a limit on the number of points of interest that can be stored in one "My Maps".

### 3. ONLINE AND OFFLINE VIRTUAL COLLABORATION. WHEN, WHY, HOW?

#### 3.1. Cooperation versus collaboration

To identify the meanings of working in teams, in a virtual environment, based on mobile devices, we organized a debate for Romanian students and teachers involved in Blic & Clic project.

The first issue we tried to clarify was the understanding of the significance of cooperation and collaboration in teamwork.

Among other skills, collaboration is one of the most important for students, in a long life learning perspective and not only. Today, the digital technology changed the expectation for working, more and more jobs are available online. From commerce, to digital architecture, from blogs to research, new domains are added to those who can benefit from the internet. That is why we must prepare our students for this kind of work, giving them the opportunity to develop those abilities and skills required for it.

Virtual team or virtual collaboration, online or offline cooperation or collaboration are terms that are more than usually nowadays. Many of these terms that we used here can be a little confused. If we will understand the correct meaning and if we will differentiate them, we will be one step forward to accomplish the task of creating the space where our students can develop the new skills required, according to their personality and interests.

A team is a group of students, in our case, that has a common interest or that work together for a project, or to accomplish a common task. A team can work in the same space, or separately. Because we are social beings, from the childhood we work in teams. Growing up, students worked more and more in working teams, an activity that contributes to their development, preparing them for future jobs.

Digital era imposed many changes in teaching, as well as for any other activity. Now, we face new challenges, trying to give to our students' ways to develop those skills that they need, for working in online environments. We must take into account that working online can modify the social behaviour. In order to combat the alienation tendencies of the internet users, we have a duty to inspire to our students the desire to be part of a team, who work cooperatively and collaboratively. Although the two terms appear to be synonymous, there are differences that allow us to even make a hierarchy of them.

Cooperation involves a process of working together in order to achieve an objective rather than working independently to compete. A team who work cooperatively has specific roles; each member knows what to do, to contribute to achieving a task. Altogether, works under a plan, having a hierarchy of the team. It is the first step towards collaboration, which is an active participation in achieving a common goal.

Most of collaborations require leadership. The collaborating group can be decentralized and egalitarian, which determines the form of leadership atypical, social. There is a common leadership based on the recognition of values and acceptance, although this is quite volatile. The roles within the team can be changed, depending on the stages of work, the problems encountered, the personal developments of teammates. Because it involves introspection about behavior and communication, being engaged in problem solving through collaboration, this type of team can contribute to the development of other competencies, equally useful to prospective graduates.

Collaboration must be coordinated, as a synchronous activity, based on a shared conception of a problem. In a cooperation team, the task is done by the division of labor among teammate. Each of them is responsible for solving a part of the problem, so the whole task is accomplished as in a puzzle. Collaboration gives some space to each one, for his initiative, imagination, and reflection.

But mostly, collaboration means respect, for himself and the others, that must be gained, not imposed, for roles, ideas, work, even for falling down.

What is interesting is that best collaboration is between students that came with a diverse educational and cultural background. That show another role of collaboration, that of facilitating the acceptance and tolerance as common values. As we can see, collaboration offers students many benefits, and implicitly is an argument for working in teams.

Virtual collaboration is a particular case of collaboration. Not as efficient as face-to-face interaction, because of technical limitations, virtual collaboration is increasingly used outside the educational environment, mostly by business teams or scientific teams. In this case, virtual collaboration has the role of facilitating the transfer of information, as a filling the transfer made in direct meetings. Virtual collaboration is accomplished through digital communication, having in the real world strict rules on the security of the information transmitted and the people involved. A particular mention is that a virtual team will always have benefits if it will be accompanied by face-to-face meetings. That is why for schools, virtual collaboration is recommended because students in virtual teams can have both, virtual and face-to-face meetings, working in both environments.

Students have confessed that they feel more comfortable in a team that cooperates because not all are willing to go out in the spotlight. When it comes to predefined roles, it is much easier to look for solutions to get the punctual job done than to imagine the whole range of tasks required to complete the task as a whole. For shy pupils, it is an opportunity to work comfortably, without obeying the judgments of others.

From the teachers' point of view, working cooperatively is just one step that facilitates integration into a performant team. The entrepreneurial spirit of students can be facilitated by attracting pupils to the core issue, where diverse solutions are subjected to analysis, and where decisions are made. But they agree that assigning roles can be a step to that ideal.

### 3.2. When to use virtual teams?

Education is a long process that is currently not limited to schools or classes. It goes beyond these barriers, being encouraged by the facilities offered by online communications. That's why it's probably the best solution, to organize virtual teams for activities in projects that target students that do not belong to the same school. Any educational project, like Erasmus+ or eTwinning projects, that exceeds the school barrier, can benefit from virtual collaboration.

Although the use of virtual collaborations in inter-school projects is the most known, whether it is done locally or internationally, there are many other possibilities to use this type of collaboration, which is helpful to students, especially from the point of view of their personal development.

At the school level, we can use virtual collaboration for projects that involve students belonging to different classes, which can hardly meet at school, due to their different schedule. There is possible to use virtual collaboration for projects that cross the school's border with students from different schools.

For students that belong to the same class, virtual collaboration can be a solution for extracurricular or trans-curricular projects. Also, there are virtual classes that can be used when teacher or students are not physically in the same class, no matter the reason, or if teachers want to develop new courses. In that case, a teacher can give access to students that are in the same class, or to a group of students, that can be or not from the same class. We recommend that to be a collaboration, the course must involve a part, at least, where students to make virtual teams for solving common tasks, to involve peer-reviews, as steps for achieving the desired goal, or other types of collaboration.

### 3.3. Why to use virtual collaboration?

Mobile devices are more and more present in our life. They replaced heavy devices, like PCs, not only for their massiveness but also because of their size. Not to mention that humans travel more and more, no matter if they travel for business, education or pleasure. We want to be mobile, so, due to that characteristic, we can name virtual collaboration, mobile collaboration. After the pioneering of distance education by radio, in the 1920s, or by television, in the 1970s, internet facilitates remote education shortly after his appearance.

Teachers quickly grasped the possibilities offered by this new technology, managing to impose, many times, the development of dedicated digital applications or platforms. Some of these developments, like one-to-one tutoring, to one-to-many tutoring, with one teacher for a large class, are present nowadays too. It can be a solution for homeschooling, for disadvantaged students, as well as for students that live in geographically isolated areas.

But we have to point out that the previously mentioned distance education systems are not the same as a virtual collaboration. Although we may think that one-to-one collaboration is done in the smallest group, with a teacher and a student, we will refer to virtual teams that include a larger number of students, and where the role of the teacher is passed into the secondary plan. Only if there is a two-way communication between the participants in a virtual team there are prerequisites for a collaboration.

For this kind of groups, it is important that they have the means and technology for a remote activity, to keep their mobility. The means includes online collaboration tools, who are web-based tools used by teachers and students to perform a wide range of tasks. Some of them can be interactive discussions, online collaboration activities, sharing and accessing electronic learning resources and many others.

### 3.4. How to use virtual collaboration?

There are two kinds of virtual collaboration, in terms of time to work, synchronously and asynchronously. Both have advantages and disadvantages.

There are two kinds of virtual collaboration, in terms of time to work, synchronously and asynchronously. Both have advantages and disadvantages.

#### 3.4.1. Synchronous collaboration

Synchronous collaboration means collaborative interactions in real time. In-class activity is an example of synchronous collaboration. Using the Internet, these types of activities can be chat, video/audio conferencing, and shared applications.

##### 3.4.1.1. Advantages for synchronous collaboration in education

- Real-time collaboration.
- Can be asked question in real-time
- Immediate response and feedback.
- Can be established connections between peers, a benefit for social behavior.
- Many low-cost and free solutions.
- Recommended for 1 to 1 communication, if the equipment and internet connexion is ordinary.
- Body language and tone of voice as part of communication facilitated by video/web conference.
- Increased motivation and engagement with course concepts.
- Increased social presence.
- Instant recognition and answers.

### 3.4.1.2. Disadvantages for synchronous collaboration in education

- Interactions can be focussed on concrete task-related issues instead of global goals
- If technology fails, the collaboration session is not possible.
- Large time commitment for collaborators.
- Difficult for one-to-many communication.
- Lacks documentation.
- Not possible if learners don't possess minimal technical skills.
- Difficult to establish a schedule accepted by all.

### 3.4.2. Asynchronous communication

It is a time-delay between communications of two or more persons that belong to the same group. Often, asynchronous applications have a synchronous aspect, which can be due to the access of two or more collaborators, at the same time, on the same application or platform. Sometimes, there is a technical blended of the two types of collaboration that can be used according to agreements or technical facilities of the collaborators of a virtual team.

#### 3.4.2.1. Advantages for asynchronous collaboration in education

- Available anytime/anyplace.
- Can incorporate a variety of media.
- Flexible access.
- Access to the documentation and rules of collaboration process, based on use of cloud technology.
- Can be used both for one-to-one communication and one-to-many communication.
- More time for reflection.
- Contribution to discussions can be more evenly distributed.
- More opportunity for students to share multiple perspectives.
- Avoidance of undesirable classroom behaviour/bullying, if is well conducted.
- Students can become active participants at their own pace, changing their status from observer to contributor.

#### 3.4.2.2. Disadvantages for asynchronous collaboration in education

- No immediate feedback.
- Difficult to keep track of collaboration.
- Effective technology can be costly.
- Information must be organized and searchable, or it is lost.
- Written ideas may be misinterpreted.
- Lacks a true 'social presence.'
- Less engaged evaluation due to a different time for access
- Possible delays in response time to forum posts or questions.
- Possible irregular or inconsistent contribution by individuals

If we compare the two types of synchronic and asynchronous collaborations, we will find both similarities and differences.

If both can be used by accessing online resources / applications / platforms, in the case of asynchronous collaboration there is the possibility of having an offline component. This means that the workload is at least partially solved so that the results are then communicated to the team via the internet. From the point of view of possible equipment failures or interruptions of online communications, the asynchronous version is considered, even as a backup option.

In education, we use synchronous and asynchronous collaboration for digital courses that can have a collaborative component. In that case, if we draw an online course, we must take into account some general ideas.

### 3.5. Possible components for a synchronous course.

**Online whiteboard:** gives colleagues the ability to collaborate online, under or not the supervision of a teacher; useful for sharing ideas in real time, brainstorming.

**Chat:** anyone can ask questions and can share resources and insights. It is optional for an online course/class, but many platforms have one included, that can be accessed by any device/browser

**Voice / audio communication:** a great way to conference call with the teacher and peers, using either the computer or a mobile device.

**Video or web conferencing:** a feature that can be used to mimic a classroom experience, for a facile transition of students to more sophisticated online courses/ study groups. Using the webcam, it is possible not only to have a face to face conversation, but also to share media (like documents, presentations, and poll questions). Some of these apps give the possibility to save the video or web conference to review again later for study.

**Live Streaming:** can be used for emulating a traditional classroom, by live streaming the professor's lecture, as in the classroom. A live stream can be recorded for later use.

### 3.6. Possible components for an asynchronous course.

**Library/Digital Curriculum Materials:** more present in asynchronous learning like in synchronous one. Materials uploaded can be diverse, from PowerPoint presentations, to document sharing, to podcasts and video streaming.

**Email:** beside the role of creating/accessing an account on the course, can be a tool for asking questions, keeping in touch, and receiving materials, updates, reminders, or assessments. There are online course modules that have incorporated the possibility to contact the teacher or other pen pals by email directly, without ever leaving the online course module.

**Discussion Boards/Forums:** it is used to facilitate debates, collaboration, and discussion about course content, just like in a physical classroom. In contrast to a physical classroom, in a forum can open new discussion item in a popup in and comment can be done at any time during the course.

**Social Networking:** are more and more inserted into courses to facilitate collaboration and learner interaction.

**Wikis and Collaborative Documents:** both are based on making a website or database developed collaboratively by a community of users, allowing any user to add and edit content. Even if Classroom and Free Wikis are closing, the concept is picked up by others platforms because can be a way for online courses to build and maintain class notes and references. Collaborative documents also facilitate group work, creating a way for classmates to work together on a shared project.

In practice, many times we use a mix of synchronous and asynchronous tools that we can adapt to our goals, our resources, and classes. It is better to try multiple platforms or apps, in order to choose the one that fits our interest and knowledge. For flipped classrooms, students must express their personality, that is why we must put at their disposal at least some apps from which they will choose the best ones that they consider, in order to achieve their tasks.

In the last time many sites are closing, no matter why, like wikispace.com or instagrok.com, that had many features useful for students and teachers too. Other sites or applications such as Padlet, for example, limit their freeware offering, which also needs to be considered if we have several classes in our portfolio with different padlets, boards or canvas. That's why we need to keep in mind a backup option that allows for migration to other sites or applications that meet our requirements.

### 3.7. What to do if sites or apps you use announce that they are closing or change the plan for a type of user

First, try to understand the problem, the deadline for change, how it can affect you.



Look for alternative solutions. One option would be to use specialized sites such as <https://alternativeto.net/>. This site offers not only possible solutions but also a description of them, grouped according to the operating system, categories, and, most importantly, user comments.

If the change plan affects your boards/canvas number that you can have, a solution can be to create another user account, which will come with new offers that can supplement the decreased that you want to neutralize.

For some sites, the account is related to an email address or social media account. A solution to have multiple accounts, on that kind of sites, is to create multiple email addresses or social media account. We don't recommend the second solution, because can create a big confusion for your contacts or your followers.

If you use multiple accounts, try to create your own system to manage them together. It is embarrassing if you tangle your accounts so a post is loaded for the wrong group or if you do not get the expected answer because the question was not addressed to whom you should.

Don't forget to announce all users of your course / all students connected to the same virtual space that you own about the change that will be done. Try to help them to migrate to the new space/platform/site.

Don't hesitate to ask students' help. Sometimes, they can offer the best solution, avoiding you to lose time for searching one.

Don't jump to the first alternative you found. Try it first, to see if it is suitable for you and your goals.

If you want students to use their own mobile devices, you must know what devices they have, and their OS. Don't forget that is nice to offer to them apps or sites friendly, that have a mobile version.

## 4. DIGITAL RESOURCES FOR EDUCATORS

It is generally accepted that technology has changed the world, generating new forms of education that we need to adapt. Our students are deeply involved in the online environment. They are more digitally focused than ever, spending more time interacting with mobile devices than with their parents, colleagues or friends. Therefore, if we want to guide them towards the subjects we want to learn, a solution would be to get into their universe through this digital environment. We cannot get into the universe of our students if we do not have the necessary digital skills and if we do not use adequate digital resources. That is why a contemporary teacher must have his own digital resources that he can use, based on his knowledge and skills.

First of all, we have to answer the following question: Are resources only for teachers that students cannot use? And if the answer is yes, what is the limit between shared resources and resources just for teachers? We think the answer is quite easy to guess. We cannot establish a clear boundary, because any student at any given time can take on the role of a teacher, using digital resources in the effort to teach others. That is why there are only resources more recommended to teachers because of the additional knowledge and experience they have towards their students, as well as the ability to select the best from a pedagogical point of view.

In this age of technology, as educators we cannot avoid using technological devices in classrooms. Despite having disadvantages, advantages are much more crucial, if we use them properly.

We teachers are confronted with students who are already digital natives and knowledge is within reach of a digital touch. Many of us are not very knowledgeable about digital technology and the use of these tools may seem like an insurmountable challenge.

However, there are numerous digital resources that are easy to use and do not require specialized training to be able to use them efficiently by including them in the classroom methodology that we intend to follow.

As far as what the 21st Century teacher could do, we will only mention the most important aspects, in our opinion. These are:

- Proper access, create and edit digital audio
- Use of video content to engage students
- Create screen capture videos and tutorials
- Exploit free digital images for classroom use
- Make and use of infographics to visually stimulate students
- Use Social bookmarking to share resources with and between learners
- Use Social networking sites to connect with colleagues, grow professionally
- Use blogs and wikis to create online platforms for students
- Create and deliver asynchronous presentations and training sessions
- Compile a digital e-portfolio for their own development
- Have a knowledge of online security
- Understand issues related to copyright and fair use of online materials
- Be able to detect plagiarized works in students assignments
- Curate web content for classroom learning
- Use and provide students with task management tools to organize their work and plan their learning
- Use polling software to create a real-time survey in class
- Free and Easy Poll/ Survey Tools for Teachers
- Exploit computer games for pedagogical purposes
- Use digital assessment tools to create quizzes
- Use of collaborative tools for text construction and editing
- Use of mobile devices like tablets or mobile phones

- Identify online resources that are safe for students browsing
- Use digital tools for time management purposes
- Learn about the different ways to use YouTube or Vimeo in your classroom
- Use note taking tools to share interesting content with your students
- Annotate web pages and highlight parts of a text to share with your class
- Use of online graphic organizers and printable
- Use of online sticky notes to capture interesting ideas
- Use of screencasting tools to create and share tutorials
- Exploit group text messaging tools for collaborative project work

#### 4.1. Digital resources suitable for classrooms use

There are numerous digital resources that are easy to use and do not require specialized training to be able to use them efficiently by including them in the classroom methodology that we intend to follow. Some of them are:



##### 4.1.1. Web Whiteboard

It is an app which allows writing and drawing together with other people. It is optimized for instant access and ease of use. The link for this app is <https://webwhiteboard.com/>. As it is written in the welcome screen, passwords and accounts are entirely optional. An online whiteboard can be created with one click and shared live by sending the link to people. The freeboard expires in 21 days and the people that receive the link can draw and write. To keep the board permanently, you must create an account, but, unfortunately, to pay for that. After register, you have access control, which means you can make boards that are private or read-only. Also, you have 1 month for trial - the first month is free, in case you change your mind.

For the following online whiteboards in the order of complexity, specific features include drawing lines, creating shapes, filling shapes with colours. Depending on the specific program, the next feature of an online blackboard is to allow uploading files such as PowerPoint presentations, audio files, photos, and documents that can be shared with other collaborators. We must mention that web whiteboards are developed not specifically for education, but for business, that is why the term "collaborator" is used, instead of "student". Some online blackboard can also allow chatting with people invited to share the board, either through text or through a video feed.



##### 4.1.2. AWW A Web Whiteboard

<https://awwapp.com/>

A good example that we suggest to be used is AWW A Web Whiteboard. Aww is a simple, free whiteboard that anyone can access using any web browser, whether on a tablet, smartphone, or computer. There is a basic version and a premium version. The basic version is for those who don't want to register. The boards can't be saved and they will disappear after two hours of inactivity. Some tools, like voice call, multiple pages, management of participants and PDF upload isn't allowed for that version. If you want to export the board as a PDF file, they will have a watermark.

An intermediate version is that you get if you choose to use "Get a premium trial" option. After a full 14-days free premium trial, it is possible to return to the basic version or to use a premium membership. The point is that if you choose to go back to the basic version, you will still have 3 premium boards.

Because many of teachers use the basic version, we will present some features of it, as well as suggestion of use. In a premium version there is access to all tools, an unlimited number of boards that can be saved into a personal repository. We recommend selecting Education/School teacher

as domain when register for a free trial. For tutoring needs, there is a fully customizable API, while teachers can use the simple IFrame link.

Any board can be a good starting point for a lesson or a course. Onto a whiteboard can be uploaded a PDF, PPT and image files. Every slide will upload on a separate board page.

To work collaboratively, you must add people that can be students or not. For that, you can choose how to share the board:

- Via URL link provided for each board, or using a QR code, via social media that can be Facebook or Twitter
- Via email, when you must enter the emails addresses
- To embed into a site, using Embedded via IFrame option.

Also, when you invite students, you can choose how your students will use the board. There are three options:

- Allow everyone to draw: students will draw together on the board
- Allow everyone to view: students will only see the board content
- Share a board copy: students will draw on their own board, starting from the same sketch.

### Tips



Below, we present some ideas from our experience of this application.

#### General tips

Depending on students work, you can change your student's drawing rights during the session. In the Manage Participant's menu, for every student, you have a toggle to permit or disallow them to draw. You can use it, in case that your students don't respect rules that you establish for their collaborative work to the board.

Use a touch screen device, if it is possible, for an easier access to drawing tools. If you have not such a device, use a mouse, an optical pen or a graphical tablet, instead of touchpads, if you have, because of their better precision.

Start working with students on AWW Whiteboards by a session when to establish and exemplify rules of working collaboratively.

If multiple students work simultaneously on the same board, can be a crowded space. Teach them to use the hand tool, for finding and working on an empty space, without interference with others' work.

Use the different size of coloured pencils according to the drawing that you have to do. A large size pencil line can replace a brush, saving time.

Don't draw a line for a long time, as a single continuous line. If you want to correct it, you will erase the entire line, wasting a lot of time.

Use Eye tool, on the top right corner of the board, to help you with orientation in a large board.

For a digital collaborative and visual work in class

AWW can be used for flipped classrooms because students use their own devices to see the same board. That is why with AWW you have no any constraint for placing their working seats.

Use the freedom of movement given by an AWW whiteboard for your students in class, to encourage them working in pairs they choose.

Use your own device to work on the AWW whiteboard, to be more mobile, to be much closer to students, helping them when they need, individually.

You can nominate a student to coordinate the others students' work. Your contribution can be sent in that case by text on chat.

AWW whiteboard can be used during a presentation of a story. Students can draw an image of a story or historical event they've studied to show what they know. Or they can point different locations on the same map.

Support your students' thinking with graphic organizers. Give students a graphic organizer template choosing to Create from template option for the new board. Ask students to fill in the graphic organizer, with their ideas, after a debate. You can split them into small groups to work on different parts of the same organizer.

Make digital posters to support their understanding. Students can use the upload function to fill in images that support their concepts. Add text captions under them. Don't forget to teach them about copyright and to mention the source. Tell students to use text blocs if they want to develop by word the idea they have. Once finished, download the board, as a PDF.

You can use diagrams for ideas that lend themselves well to a visual diagram. You can use a template, or let students create their own visual diagram, collaboratively.

#### ***For a digital assessment***

Using AWW for group assignments on an online collaboration board you can uphold personal development of students, for growing up their collaborative and creative skills.

Group assignments to entire class can be sent instantly, through the same board

Export boards to PDF for homework assignments

Individual responses to assessments can be viewed in real-time and teacher can give immediate feedback.

Use immediate formative feedback to build up your students' self-confidence by boosting their understanding, both for regular work and assessments

#### ***For a digital contribution to your students' personal development***

You can help the introverts using anonymously users who are normally students too shy to ask for help

AWW can be a way to store students' portfolios.

Also, you can store your entire student's work in a cloud for a later review

Engage students that are not in class, no matter why, with lessons in real time. That means that you can involve your absent students with real-time online lessons.

AWW boards can be used for asynchronous work. For that, you can export a lesson in PDF and send it to students, collaborators or other stakeholders.

Share lessons with parents and involve them in the classroom. It is a great way for parents to see how their child is involved in a collaborative lesson.

There are many others online whiteboards, freeware or not. Some of them are parts into more complex sites. But most of them have the same basics functionalities, plus specific tools for the given apps.



#### **4.1.3. Ziteboard**

<https://ziteboard.com/>

One of these, a little bit more sophisticated online whiteboard is Ziteboard that is a zoomable real-time whiteboard for shared teamwork

collaboration. The app allows vector design, sketch drawing, shape recognition, tutoring, and meeting. As AWW, Ziteboard (Zoomable Whiteboard) also can be accessed by any device.

With Ziteboard, you can give an explanation, sketch something, which can help you to present a subject. A video conference, that can be part of an online course, can benefit from an extension with visual teamwork. Drawing tools are better than for AWW.

Ziteboard can be used as a digital version of a traditional whiteboard or flip chart. It is the reason for that a guide is not necessary, because it just emulates a whiteboard with pens and sticky notes.

Even for the free version, there is a lot of option that you can change in Settings. For example, for voice chat or video chat, you can use Skype, phone, Google Hangouts, Google Talk. Unfortunately, only for Pro users, that means payed version, this feature is incorporated.

When you invite someone to collaborate, no matter the number of people that can work on the same whiteboard, you can keep them focused on the same portion of the canvas, even if they use different devices, with different screen dimensions. It is like all devices are sync.

Another great feature is that you can insert, from a PDF file, only the desired pages, not the whole document. This feature is useful to support your ideas, to keep the focus on them.

Export options are multiple, serving to different purposes. Not only that you can choose from PNG format (only visible screen), SVG file, i.e. the whole board, or as a PDF file, with A4 format, but you can choose to download the file directly to your device, or to send it via email, to one or more recipients.

Another great point for Ziteboard is that has incorporated a powerful line smoothing and shape recognition algorithm. It can be useful for those who don't want to spend more time with drawing exact shapes.

Having a WordPress plugin, or using Google Chrome Extension you can to leverage the collaboration tool integrated with other tools already used. For those that use Chrome extensions, it is a great opportunity to have at your hand this kind of tool, which works as you want, synchronously or not.



#### [4.1.4. Kaizena <https://www kaizena com/>](https://www kaizena com/)

It is a free online tool that fosters social learning through feedback. The tool allows the instructor to provide multiple forms of feedback, including text comments, voice recording, attaching files, and rating students' skills. Students can instantly respond directly to the instructor's feedback, which turns feedback into a conversation rather than a one-sided learning experience.

As teachers, we can say that feedback is the most effective way for students to learn, but providing meaningful feedback in the classroom isn't always possible. Kaizena makes feedback fast and personal without taking up classroom time. It is the easiest way to provide constructive feedback to your students.

The new version of Kaizena can be found inside Google Docs: voice comments can be recorded, pre-made comments can be used and skills can be rated right on the student's assignment. Teachers can save time during their lessons also they can give fast feedbacks.

Voice comments are a fast and effective way to bring teachers' feedback to life for students. It's also a great way to demonstrate pronunciation for language students. Students don't need to sign up, or remember a password or sign into another website - they just open the program in Google Docs to hear teacher's feedback.

When teacher leaves a feedback on a Google Doc, students receive an email notification: this includes a link to the Google Doc and instructions for opening or installing Kaizena.

In order to review teacher's feedback, students need to have permission to edit the Google Doc. When students open Kaizena, they can see all messages teacher have added.



#### 4.1.5. *FlipQuiz* <https://flipquiz.me/>

It is an online review game creation tool. It provides educators with a quick way to create their own gameshow-style boards for test reviews in the classroom. Traditionally, these are created tediously, using poster board, chalkboards, and PowerPoint or dry-erase markers on overhead slides. The review questions themselves are usually written on a separate sheet of paper.

With FlipQuiz, questions are displayed on-screen and boards are saved for later use. Combined with a beautiful board, students are more likely to be interested and stay engaged with the test review process.

This application allows the teachers the freedom to create beautiful game boards that they can take with them from class to class, school to school, and at home. They don't need to worry about their teaching materials being locked into a place that is controlled by a school or school system.

Teachers can sign up for a free account for immediate access to create their own game boards.

They can create their own quiz boards, they have all the tools they need to set up all of their different game boards.

They can easily throw that quiz board up on-screen in their classroom and dazzle their digital-native students.

With FlipQuiz, boards can be created that will be saved in users' account for future use. When they come back next week, next month, or two years from now and they will still have access to all their own boards.

Not only can they add their questions to each of their game boards, but they can also add the answers if they desire. This allows them to be virtually hands-free as they walk around the classroom hosting the game.



#### 4.1.6. *Showbie* <https://www.showbie.com/>

It is a free educational application used by teachers and students. Teachers use it to assign, collect and review students' works. Students can access Showbie via laptop, Chromebook or even Android phone. Some features of Showbie are:

- It keeps teacher and students on the same page, whether teacher is using an iPad, iPhone, or a computer or device with an internet connection..
- With Showbie, it's easy to stay in touch with students and provide valuable feedback when it's needed most.
- Documents, images, instructions and comments can be added to the shared folder are instantly distributed to all students in a class.
- Documents can be added from computer, favourite iPad app, Dropbox or Google Drive in a couple of taps.
- It's easy to upload teachers' own math or language arts content or select from hundreds of assignments and lessons plans, already loaded into Showbie.
- It's a good advantage to quickly add instructions, guidance, or links to assignments. Even a voice note can be added with verbal instructions for students.
- Showbie displays PDFs, images, eBooks, audio and video.
- Students can use the pen to draw right on teacher's documents or on their homework. Showbie Pro classrooms can use a wide variety of colour and line thicknesses. Or teacher and students can type text directly on the page, with control over font size, colour, and alignment.

- The teachers can record audio and pin it right to the page so they can make their students reading, singing, or practicing a new language with a single tap!
- Teacher can take a look at his/her class list and know instantly who asked a question, who submitted an assignment, and whose work is past due. He/she can even lock.
- Teacher can set dates when assignments are due, locked, or set to ‘view-only’ mode, giving teachers full control of who can see what, and when. When typed in a student’s name, his/her progress is quickly can be seen.
- Teacher can invite a co-teacher to join his/her class, allowing teacher to view each other’s students, assignments or feedback.
- Teachers can create an announcement group for all parents in the class, and send out the next permission form without hitting the copier.
- Class Discussion allows teachers’ entire classroom to communicate and share files as part of a real-time conversation.
- Teacher can mark and this way grade his/her students’ work by using the class listing within the Shared Folder.
- Teacher can easily grade student work while viewing it, and add grades as a value, number or text.
- Students can showcase their pride by adding work when their teacher enables it, allowing them to curate their learning journey.
- Portfolio items are listed chronologically from all classes shared by the teacher and student. Students can even track portfolio items year-to-year!
- Teacher can invite parents to Showbie to view their child’s ongoing portfolio of work, or give them complete access to assignment notifications and feedback in Showbie Pro.

#### 4.1.7. *Popplet* <http://popplet.com/>



It is a tool for the iPad and web to capture and organize teachers’ ideas.

In the classroom and at home, students use Popplet for learning. Used as a mind-map, Popplet helps students think and learn visually. Students can capture facts, thoughts, and images and learn to create relationships between them.

It's a free application and easy to use. Teachers don't need to sign up. If teacher doesn't know anything about it he/she can watch introduction videos. Teacher can easily create popplet by watching key points. He/she can prefer this application if you want to present a subject by brain storming, inductive or deductive methods or show relations among concepts. Learning teaching process become enjoyable with videos and pictures. You can record your popplets you created in picture or pdf format, or send as email, embed your website or share on Facebook and Twitter.



#### 4.1.8. *ToonDoo* <http://www.toondoo.com/>

It is an application. It is fast and easy way to create cartoons. There are a number of functions that allow teachers to create, personalize, and publish their cartoons. It's free.

Illustrations have a number of possible benefits to learning. Some concepts, especially in the sciences, can be difficult for students understand textually, but are better communicated in pictures. Illustrations can be used to get students attention and increase their emotional interest in a topic. Other illustrations can be used to summarize or rephrase information and help students build their framework of understanding.

There are even more benefits to be gained by having students create their own cartoons in class. By creating cartoons, students interpret a concept from verbal/textual form (provided by teacher) to visual form (created in ToonDoo), organize science concept to fit a limited-panel representation, create their own new, unique representation of an idea, appreciate the difficult scientists encounter when trying to communicate their ideas to others, demonstrate computer skills and motivating for shy students who avoids talking in classroom.

Teachers need to create an account with a user name and password, so he/she can benefit from the rich library of ToonDoo. He/she can choose any character from the library and set the scene and design this cartoon as the way you like. Then teacher can save and print this cartoon.



#### 4.1.9. Khan Academy <https://www.khanacademy.org/>

It is a non-profit organization created in 2006 by American Salman Khan and, as stated on its web site its mission is to provide a free, world-class education to anyone, anywhere.

Khan Academy positions itself as a supplement to in-class learning, a modern education tool which aims to humanize the classroom using technology

Khan Academy offers practice exercises, instructional videos, and a personalized learning dashboard that empower learners to study at their own pace in and outside of the classroom. We tackle math, science, computer programming, history, art history, economics, and more. Our math missions guide learners from kindergarten to calculus using state-of-the-art, adaptive technology that identifies strengths and learning gaps. We've also partnered with institutions like NASA, The Museum of Modern Art, The California Academy of Sciences, and MIT to offer specialized content."

They provide free tools for parents and teachers and their resources are being translated into more than 36 languages.

Teachers can create an account or login with google or Facebook. Khan academy can be used as a tool for individual study but teachers can create his class and add students to recommend subjects exercises, videos (short lectures in the form of YouTube videos). With supplementary practise exercises he can see the progress of his students. Students can complete this exercises and obtain feedback.



#### 4.1.10. Edmodo <https://www.edmodo.com/>

It is an educational microblogging owned by LinkedIn. The application allows teachers to create a specific group for students and exclude those who have

not been invited.

Teachers can post tasks for the students and create a digital library. It allows students messages. It allows students to ask their colleagues and the teacher questions. Teachers can also post messages for all students to read in a timeline. Teachers can create groups of students according to the subjects they teach as well as group students if the work is as a team. He can use surveys to get feedback from his students and attach links and files to each question and try out various formats: tests of multiple choice, true or false, small answers. He can also allow students to check their grades immediately. Students can submit the papers by uploading them to the site. Teachers can correct, comment and give the grade directly by Edmodo. Also, they can create groups and connect with other teachers to share ideas, teaching strategies, and project development.

Through Google Chrome, every time you find something interesting on the internet, you can click on the extension of Edmodo or favour it so that it is transferred directly to the library of Edmodo



#### 4.1.11. Consumer Classroom

<https://www.consumerclassroom.eu/>

It is a website funded by the European commission. It is a community website for teachers bringing together an extensive library of consumer education resources from across the EU, along with interactive and collaborative tools to help prepare and share lessons with students and other teachers. The subjects are diverse. From art to biology, consumer studies, economics, drama and more. It also provides inter-school projects to involve your students in a project by finding a partner school across Europe. Thanks to the interactive tools and forums teachers can create and share an intercultural experience of learning.

# CLASSFLOW™

4.1.12. *ClassFlow* system  
<https://classflow.com/>

Designed by teachers for teachers, ClassFlow is cloud-based lesson delivery software with advanced collaboration tools for student engagement." The most important is that ClassFlow is a free software for interactive learning and collaboration. The system is a mix of different features that can contribute to an immersive lesson, including the ability to differentiate lessons, adapting them for different students' needs, add interactive content, collect real-time feedback on formative assessments, and track student behaviour. The community of teachers that uses this software makes a big collection of freeware resources, which can help any teacher.

To understand the possibilities offered by ClassFlow, let's see what the main features are and what we can do with this suite. Of course, you will start with Create feature. This include:

- Lessons
- Assignments
- Assessments
- Content Bundles
- Item Banks
- Rubrics
- Badges
- Activities
- Notebooks
- After creating your desired content, a possibility is to Deliver:
  - As in a real class, you can Collaborate for:
    - ❖ Collaborative Lessons
    - ❖ Teacher Spaces

For evaluating the work you done, using ClassFlow you can have Reports. These can be

- Performance Reports
- Item Analysis Reports
- Platform Usage Reports

For their work, you can Reward your students with Students Badges, which can be a good way to motivate them.

Like in a real class, using ClassFlow you can **Manage**

- Classes
- Resources
- User Management

To inspire you, there is a Marketplace, from where you can search for ready-made resources created by other educators, for free or for purchase. Also, here you can offer for free resources that you created or to sell them.

Many teachers use Google Drive and Google Classroom. For them, ClassFlow has an integration, with ClassFlow Drive App.



## Tip

Lessons created while using ClassFlow Drive App will be saved in your Google drive as well as ClassFlow resources.

Among many other facilities, ClassFlow offers a desktop application, to be runned on your computer. This application, installed on teacher's computer, will allow an interactive experience with students without needing to use a prepared ClassFlow lesson or connection to the internet. All the things that are on the desktop can become materials that can be shared with students. There is also the option of logging into teacher's online account, giving access to his ClassFlow resources.

There are many activities that can be done using the application. Some of them, are presented below:

- ❖ Create a new lesson, activity, or assessment
- ❖ Convert a Flipchart, or PDF to a lesson
- ❖ Launch and interact with applications on your computer
- ❖ Use Instant Whiteboard to quickly communicate students' thoughts
- ❖ Create shapes and use the tools within the toolbox to enhance lessons
- ❖ Use the text recognition selector to convert annotations
- ❖ Capture an image, video, or audio recording of your lesson
- ❖ Connect to your online ClassFlow account to search resources and upload lessons
- ❖ Connect with an existing class or choose to connect with no class
- ❖ Share an image of teacher desktop with all connected students, or selectively with groups or individuals
- ❖ Run polls and evaluate results
- ❖ Deliver lessons, assessments, and activities from My Resources to a created class or an Ad Hoc session
- ❖ There are facilities for students, that can:
  - ❖ Connect to the class session
  - ❖ View content you share with them on their devices
  - ❖ Respond to polls and assessments
  - ❖ Come to the front of class and use the Instant Whiteboard

**Tips:**



- You can make an assignment collaborative:
- You can draw a collaborative assignment, by selecting the group of students.
- Any lessons attached to a collaborative assignment will become Collaborative Lessons.
- For a collaborative group, the students will submit a single assignment, as a team.
- As a teacher, you can also be logged in on two separate devices (i.e. your projector computer and an iPad or mobile phone). If you will do that, you can simultaneously see students' responses on one device, and use the other device to show the presentation.



**4.1.13. Google Keep <https://keep.google.com/>**

It is an app to make notes during lessons. Teachers also can place there important for us texts that we can share with other users. Thanks to this possibility teachers can cooperate on particular task using written text, add pictures, drawer make lists. This application gives teachers also possibility to sort our notes in required groups and label them, what makes searching for needed note easier.

It can help teachers and students in so many ways:

**Organizing:** It organizes a research paper or essay with notes. When students gather information for a big project, it can be hard for them to picture everything and put it in order mentally. Instead, they can put important ideas — or even individual facts — in separate Keep notes. In a new Google Doc, they click Tools > Keep notepad and drag their ideas and facts from Keep into the doc.

**Saving time:** It saves time by adding common comments from Keep. When grading assignments in Docs, if comments are typed, probably the same comments will be typed over and over. Instead, a checklist can be created in Keep and typed those commonly typed comments there. Go to Tools > Keep notepad to open Google Keep in a sidebar. When teacher needs one of those comments, highlight and copy it from his Keep notepad and paste it into the comments.

**Saving notes:** Teachers can grab and save whiteboard notes. If teachers write a bunch of notes on their whiteboards, they can take a picture and save it to Google Keep. Students can do this, too.

**Sharing:** Teachers can connect to-do lists with another person. Teachers' sticky notes in Google Keep can be shared with others by entering names or e-mail addresses. Teachers can share important department notes. Students' excuses of "My partner's sick and he has all the notes" are eliminated.

**Saving websites** to a note with one click: If a teacher finds a suitable video or material to use for courses and does not have time he can use the Google Keep Chrome extension. He can save websites to a note with one click. Once added to teacher's Google Chrome web browser, he can click the little lightbulb button in the top right corner of his browser to create a note with a link to that website and can type text in the note and give it a label right from the Chrome extension. Then he can check it out later.

**Saving big notes:** Teachers can move big notes to Google Docs. If teacher's Google Keep notes gets too verbose then he can use the "Copy to Google Doc" option to save it to his Google Drive and open up more formatting options.

**Recording inspiration** when it happens: Google Keep is available on a variety of platforms. When teachers need to jot down an idea, Google Keep can help them. Teachers can type an inspiring idea on their phone immediately before it escapes their mind. Then, they can retrieve it or add it later on his computer.

**Searching ideas:** Teachers can quickly search good ideas for their courses by searching bar at the top of Google Keep, even the ones you've archived when you're done with them. If the text is clear and easy to read, it will even search the text in your images!

**Reminding:** Teachers can get reminders when and where they need them. They can add a reminder to a Google Keep note so it will call their attention to it at a certain time or when they are at a specific place. Their device needs to identify their location with GPS for the location feature to work. It's pretty impressive when it does — when they are walking in the school and their phone buzzes with a timely reminder.

**Transcribing printed notes or words into text:** Teachers can snap a photo of someone's notes or a quote they need to transcribe. Choose "Grab image text" from the three dots at the bottom. Keep reads the text and changes it into editable text in your note. (Note: It struggles with handwritten text, especially if it's small and it's not in straight lines.)

Google Keep has great practical and time-saving benefits for students and teachers.



#### 4.1.14. EBA

(Eğitim Bişilim Ağı /Educational Informatics Network )

It is an educational platform led by The General Directorate of Innovation and Educational Technologies by The Ministry of National Education of Turkey. Teachers and students use this platform in Turkey. On this platform, there are many educational contents both for teachers and students. The educational contents are mainly EBA Course, EBA Gallery (Content) including news, educational videos, visual materials, audio materials, e-books, magazines and documents, EBA Contests, EBA Applications, EBA E-Course and Distant Learning. Teachers can share the news about the activities, projects or other educational events on EBA News section. On this platform there are many parts.

Some of them are:

- **EBA Course:** EBA Course is a learning management system (EBA, 2017). EBA Course provides visual and audial materials, interactive contents, and question banks to both

teachers and students. Teachers can create classroom lists and create worksheets or other lesson materials and send their students. They can specify the time limit of the homework they send online. They can see student's status.

- **EBA Gallery** (Content) includes news, video, visual materials, audio materials, book, magazine and documents. Teachers also can share photos, videos, lesson materials in this section. Students can select photos or videos they need for their homework, performance or project works. Schools can share their educational events, activities as news to be seen nationwide.
- In **EBA Applications** section there are many applications from different fields. For example there is an interactive Maths dictionary. It's an Android based application. Or there is a virtual laboratory application where you can conduct chemistry experiments on different levels.
- In **EBA Contests**, contests are held in various topics such as documentary, comics, experiment, music, movie, photography both for teachers and students.

# StarBoard®

## 4.1.15. Starboard

It is a convenient and easy-to-use electronic whiteboard. It has a number of features to make teaching process easier. Two people can input simultaneously with dedicated purpose tools or contents. It is effective for class and presentation. Characters or images can be written into presentations created with Microsoft PowerPoint, which significantly improves the expressive power of the presentations. Characters or images can be written onto captured video image displays. This makes it easy to use video materials in lessons or presentations. You can access many more features through options and the toolbar placed on the screen.

We wanted to present EBA and StarBoard, although they are used only in Turkey through the Fatih program, as an example of how to integrate different applications into a complex educational platform, unique at national level.

In countries that do not have such a unique integrated platform, we can use applications that do the same thing at large but are applicable at local or regional level. However, it is difficult, on the one hand because of the axes to be supported, on the other hand because of the need to have a person or more qualified to maintain such systems. Hence, it is not possible to use such platforms, at least at present, by teachers individually, but with efforts that are not always justified.

## 5. DIGITAL RESOURCES FOR STUDENTS

Technology is increasingly growing its importance in the education sector. The more technology advances, the more benefits it provides for students at every education level.

Technology that is made use of in the classroom is very beneficial in helping the students understand and absorb what they are being taught. The programs make available to students quizzes, tests, activities and study questions that could help the students continue with the learning process when they are out of the classroom. Students make use of computers and mobile phones to come up with presentations and also make use of the internet to carry out research on a variety of topics for their essays, projects and papers.

Learning through mobile devices in classes for students is fun. They feel comfortable when they use them and learn the course much more easily. Computers, tablets, smartphones, and the internet are the same tools that they use at home. Students are already comfortable using these tools to connect with other students, and their teachers.

Tools like websites, apps, learning games, e-books, and virtual tutoring help the student learn at their own pace. Digital materials can support classroom learning topics, and introduce different teaching methods for each student's unique learning needs.

### 5.1. Examples of digital resources that can be used by students:



**AGENDA WEB** <https://agendaweb.org/> English exercises: grammar, listening and reading, comprehension, exercises to learn English online. Suitable for beginners, intermediate and advanced level esl.



**WhatsApp Web** <https://web.whatsapp.com/> Quickly send and receive WhatsApp messages right from student' computer or especially student' mobile phone, to share everything about school subjects. Works great for groups, to develop collaborative skills. The laptops can be used with the multi-windows feature, for example students can use simultaneously Translate, helping them for an online conversation into a foreign language.



**Wikipedia** <https://www.wikipedia.org/> Wikipedia is a free online encyclopaedia, created and edited by volunteers around the world and hosted by the Wikimedia Foundation. For scientific reasons, is a good start for students, but must information be checked for consistency. There are special pages in many languages, that can help students that don't know enough a foreign language.



**Google Slide** <https://www.google.com/slides/about/> Students can create, edit and collaborate with others on presentations from their Android phone or tablet with the Google Slides app. With Slides, they can prepare projects, homework. Another advantage is that students no need any licence to work with it, because it is free, they need only a Gmail account.



**Popplet** <http://popplet.com>: Students use this application in the classroom and at home for learning. It is used as a mind map, it helps students to learn visually. Students can capture facts, thoughts and images and learn to create relationship between them. For the moment, works only on web, iPad and iPhone platforms, that is why for android users must be used the web platform online.



**PowToon** <https://www.powtoon.com>: Students can make videos in minutes with PowToon and use library of styles, characters, backgrounds and video, or upload their own.



**Google Translate** <https://translate.google.com>: It is an online dictionary. Google's free service instantly translates words, phrases, and web pages between English and over 100 other languages. Students mostly use it for

English language. Another feature is that students can use it for translating an entire document. Also, can help students to develop their skills for a foreign language, offering definitions, synonyms, idioms and examples for a selected word. The limitation is that the translated page doesn't keep formatting for the original page, for example images are not on translated page.



**Tureng Multilingual Dictionary** <http://tureng.com>: It is a multi-lingual online dictionary. Students use this online dictionary to translate words and terms with different pronunciation options. For the moment has only four online dictionary and an English Synonym version.



**YouTube** <https://www.youtube.com>: It's a website. Mostly used by students to watch tutorials for different school subjects. YouTube is a sharing platform, so students and teachers should use it with educational filters. Internet safety is important. Students should be conscious about unwanted distractions, about video or advertisements.



**Messenger** <https://www.messenger.com>: You can instantly reach the people in students' life for free. Messenger is just like texting, but the user don't have to pay for every message. Students can create groups for collaborative work, where can include teachers, as tutor. Another facility is that all messages can be kept to document their work. Anytime, another person can be added to a group, can surf from one group to another (useful for working in multiple groups simultaneously)



**Star Chart**: It is an astronomy app that lets the user clearly see all the stars, constellations and other astronomical objects. Students can see stars and constellations in the sky at the date and the location of their choice. Students can see and learn about thousands of stars, constellations, planets and even the moon. The app can be found on Google Play or iTunes, for downloading and install.



**EBA** [www.eba.gov.tr](http://www.eba.gov.tr): Educational Informatics Network (EBA) led by The General Directorate of Innovation and Educational Technologies by The Ministry of National Education of Turkey . It's an educational platform used in Turkey by teachers and students.



**duoLingo** [www.duolingo.com](http://www.duolingo.com): It's an online the most popular language learning platform in the world. It is enjoyable to learn language with duoLingo. Students can learn anytime, anywhere. It immediately gives positive reinforcement. The application works on iOS, Android and Windows 8 or 10 platform, being suitable for the majority of students' devices.



Erasmus+



**PhET** <https://phet.colorado.edu>: Free interactive math and science simulations that can be used by students. There are simulations that can be used online, and simulations that can be downloaded, for offline use. Some of them are like small virtual laboratories. The HTML5 version for sims make them seamlessly available across many platforms and devices. The sims can be used on laptops, iPads, chromebooks, or BYOD.



**CK-12** <https://www.ck12.org/student>: Provides a library of free online textbooks, videos, exercises, flashcards, and real world applications for over 5000 concepts from math, science, English etc.



**Physclips**

<http://www.animations.physics.unsw.edu.au>:

Free platform for learning or teaching physics.

Physclips is a multimedia introduction to areas of physics, which integrates detailed explanations, movie clips or experiments, simulations, simple lab experiments, covering most of mechanics and optics.



**Khan Academy**

**Khan Academy** <https://pt-pt.khanacademy.org>

Expert-created content and resources for many subjects and levels. Students can find practice exercises, instructional videos, and a personalized learning dashboard.



**The Critical Thinking** – [www.criticalthinking.com](http://www.criticalthinking.com):

Platform with PreK-12+ books, e-books and software to develop critical thinking in core subject areas.



**Kahoot!** [www.kahoot.com](http://www.kahoot.com): It is a tool to create discussions, quizzes or surveys related to the specific topics either for an assessment or feedback. Kahoot! is a game-based learning platform, free for teachers and students. Can be used on android as well as on iOS.



**Mentimeter** [www.mentimeter.com](http://www.mentimeter.com): It is a software used for unlimited votes, polls, Word clouds, multiple choice questions. The free version has limitations, like the number of questions per presentation or number of quizzes. Any version has unlimited audience size, unlimited presentations, unlimited Quick Slides and access to core question types, that is a good point for a free version.



**GoConqr** [www.goConqr.com](http://www.goConqr.com): It is personal learning environment that allows students and teachers to create, discover and share learning resources. It includes study tools to create Mind Maps, Flashcards etc.

These applications can help students find and associate information, work in groups and communicate more and more in an appropriate manner.

## 6. CLASS MANAGEMENT THROUGH MOBILE DEVICES

One of the greatest challenges of today's education is the integration of BYOD into the learning process. As for any other novelty in education, there are pros and cons of using mobile devices in classrooms for any subject. If we remember how ICT classes were a few years ago when computer science laboratories began to be widely developed, their use in schools was accepted only to the extent that teachers had total control tools on the computers they were working on students. The ability to take control of student desktops, the full visualization of each of them, was considered absolutely necessary and natural. That is just an extension of the old concept of education, in which the teacher had the central role, with an absolute control over the students' activity during the classes. This type of interpretation of teachers' role has been formally developed because there are fears about the potential activities of pupils, who could distract their attention.

Although in recent years the school has changed, becoming more democratic, it is still haunted by the reminders of this type of attitude. If both practitioners and theoreticians in pedagogy agree that major changes need to be made to the role of the student in their own training, the society is not yet ready to accept it. The flipped class model, for which many efforts and money have been spent to become a real alternative to traditional education, is accepted by most teachers, students and other stakeholders. However, few recognize the importance of direct student access to information through mobile devices as an important part of this model. School principals were among those who welcomed the BYOD idea as a possible solution to the technological endowment problem of schools. This is mainly due to the lack of funds needed to make the rapid changes in the field.

At the pressure of all those concerned, from the total ban on mobile devices in schools, it has slowly gone into tacit acceptance of mobile devices in classrooms, as teaching tools, until this authorization has been legalized. Unfortunately, there is a rebound in the fears of those who believe that mobile devices, whether personal or not, are a potential threat to the attention that students have to give to classes.

We must recognize that mobile devices do not only offer students the opportunity to search for relevant information wherever they are, or to communicate their ideas, to work together on the same project, but they are also the gates of unexpected distraction and undermine the process of teaching.

But is this a new situation we are facing? The evident answer is no. Psychologists agree that the role of games is extremely important for the development of pupils' skills and knowledge, and it is often a form of adaptation to a new or boring situation. As proof of that, gamification has deeply penetrated into the practices of many teachers.

That's why the ban on mobile devices in schools is not a solution. It has become obvious that their advantages should be explored. That is why we must answer at least to some important questions - how can we maximize the use of mobile devices while reducing their potential for distraction? How can teachers create a safe and productive educational environment?

If we want to continue to have access to these resources, we need to work to demonstrate that there are ways to keep students focused on educational activity, even if we use the BYOD method. In fact, it's about finding ways to manage mobile devices in classrooms, even if this can be a challenge when trying to keep students in the task.

Teachers mostly focus on class management through mobile devices from the point of distraction and interest of students. Some teachers think mobile devices are useful during courses as they can enhance students' interest. For some lessons like language which require speaking skills in addition

to other skills, students can record short videos about a subject as homework and send it to teacher to be evaluated. However, some teachers think they aren't useful as they cause distraction. They suggest that constant web access and fun apps can be tempting, thus class management turns to become a more difficult process.

Different disciplines use educational technologies both in similar and different ways. For example, in geography classes, the teacher uses maps, graphics or tables on smartboard about climates, movements of Earth, natural phenomena etc. The teacher shows related maps or graphics and gives related links to get extra information on Starboard, also he/she can draw maps, shapes or graphics. Students can practice on Starboard, too. So, they become more active during the course and engage on the task individually, do pair work or group work. With EBA, Starboard and internet access, the geography teacher can design his/her course in an easier, funnier, communicative, collaborative way.

Consequently, many teachers agree that mobile devices may turn to be an advantage or a disadvantage according to many factors. Of course not in all type of courses and not in every lesson hour mobile devices can be used. Number of students in class, type of class (language class, Maths class etc.), level of students, and duration of courses, teachers' and students' competence about technological devices affect a lesson's design from the point of educational technologies. For instance, in the same class a teacher can catch some students' attention and thus learning & teaching process ends in success; however in the same class the same process may distract other students' attention. Using technological devices may lead a more entertaining and interesting learning and teaching process provided that teachers are well equipped in terms of educational technologies. On this very point, international school projects like ERASMUS+ or in-service trainings about educational technologies are quite necessary and useful to enhance these kind of class management skills.

The simplest way for us seems to be if we have in school an administrator for the Wi-Fi network. He can set the equipment for Allowing or Denying the access to some sites. Even if can be the easier way for a teacher, that often don't have needed ICT knowledge for that, it is not the best solution for a school. There are many reasons for that:

- It is possible for personal mobile devices to have installed games that can be used offline; students can play these ones, even if the Wi-Fi forbids the access to games sites.
- There are sites restricted for access that can be useful for some educational research, under the supervision of a teacher.
- We can't be all the time with our students, which is why we must teach them how to avoid some sites, as well as wasting time; an external control that does all these for students don't help them to become aware of their responsibilities.
- In a research, we go from one site to the other, from one filter to the other, that is why is difficult to predict all setting that can be established for a safety, but yet permissive Wi-Fi connection.

Similar to desktop management solution, used from many years ago in ICT laboratories, there are modern solutions to manage mobile devices, named MDM - Mobile devices Management. There are different types, according to the possibilities and needs of different users. If a school can afford, there are paid solutions. But the good news is that are free solutions that we can use, with quite enough privileges that can be set. We didn't apply such solutions, but, during our documentation for this book we found information about such free solutions, which seems to be applicable by a teacher, no matter his/her ICT skills. We only want to mention some free solutions found, for which we will present the features considered most important, written on the home page of each.



LanSchool Lite <https://www.lenovosoftware.com/lanschool/lite>.

It Addressed to teachers, librarians, tech coordinators or administrators who can monitor student computers for free

- Monitor up to 3000 students
- Real-time computer thumbnail monitoring
- Thumbnails can be arranged and saved to represent the classroom layout
- View the student's active application and last visited website
- View a full screen view of the student's monitor
- Monitor battery status
- Receive questions from students



## Mobile Device Manager Plus

### Mobile Device Manager Plus

free edition <https://bit.ly/2mQ4r0c>, which can manage up to 25 mobile devices. Suitable for a classroom or laboratory.

The main features are:

- Mobile application management
- Mobile security management
- Secure content distribution and management
- Remotely troubleshoot mobile devices
- Simple mobile device enrolment
- Profile configuration and management
- Mobile OS update management
- Complete asset management
- Conditional Exchange Access (CEA) for managed mobile devices (available only on-premises)
- Secure e-mail access and management
- Containerization and BYOD management



**Our tip.** Can be used in a classroom with up to 25 mobile devices that belong to school and are the only devices used during classes. Not suitable if other devices are used, or for BYOD method.



**Veyon** <https://veyon.io/>. Features found on <https://github.com/veyon/veyon>

Can be used in:

- Overview mode (allow previewing screens for each pupil computer in a small preview window)
- Remote view: Previewing (remote view) computers in predefined classroom segment
- Remote control: Allows taking control of an individual computer for demonstration, assistance or other necessary action
- Demonstration mode (either in a frame or window) - where the teacher's screen is broadcast to all of the pupil's computers in real-time
- Locking student computers, in order to direct attention to other tasks, items of related interest, alert students to proper internet and classroom etiquette.
- Send text messages to students
- Powering on, rebooting or shutting down individual, or all, computers off over network (Wake on LAN)
- teacher can open a website on all computers in the classroom
- screenshots for evidence protection, e.g. during infringement of any user rules



**Comodo ONE Free Mobile Device Management** <https://bit.ly/2KtTVer>

Allow you to deploy or retire, secure, monitor and manage Android or iOS mobile devices with GPS location, wipe, and device encryption.

Distribute applications, manage data and configuration settings and patching with the complete visibility and controls you need to manage any mobile device that accesses business-critical data.

Technological solutions are just one step to solving the problem. Let us not forget that our students are full of surprises and that it is possible they find solutions to avoid the restrictions we impose on controlled access to the Internet. Therefore, it is necessary to offer these solutions together with the human management of the classes, regarding the mobile devices use.

We will begin with the need to have internal rules for the use of mobile devices in classrooms. The essence of these rules is to ensure that students are aware of what they are allowed to do and what is forbidden, of possible repercussions if they violate these rules.



**Tips.** Start with a debate on the need for these rules. Show them examples of risks, possible device malware, and their consequences, examples of Internet harassment and inappropriate behaviours that can be found in virtual communication space. Students will become more aware of their importance for the safety of the devices they use, as well as their own.

Make the set of rules together with the students. Ask them to contribute to the internal regulation on the use of mobile devices.

Include rules that both students and teachers have to respect. It is a way of demonstrating that the rules are not biased.

We consider it necessary to have two categories of rules:

- General, to use mobile devices no matter for which classroom. Some topics covered by general rules:
  - use of social media during classes
  - plagiarism - what means and how to avoid
  - piracy and copyright
  - network security best practices
  - data protection on student devices
  - protection of mobile devices that belong to other students or to school
  - good behaviour and appropriate language on communication
  - report of the inappropriate messages
- Specific, for a particular discipline or activity.



**Tips.**

If you need, you can add some specific rules.

Be sure that students will understand the necessity to have these rules.

Don't overload with specific rules. It is possible that each teacher to add his/her own rules.

Try to negotiate with your colleagues for the minimum mandatory set of specific rules, for the safe use of the internet during every of your classes.

Others simple things to do in order to a better management of mobile devices usage:

- ❖ Be the first to give a positive example: avoid as much as possible using your mobile phone or sending / reading messages on any mobile device during your class hours.
- ❖ Be consistent, applying the same penalties for the same mistakes to any student.
- ❖ Use a proper desks distribution in the classroom so you can see students' device screens more easily.
- ❖ Teach students that using mobile devices is not their natural right; it is a privilege that they can benefit from or not, according to their commitment to respect rules established.
- ❖ Go more often through the classroom to be seen by students as a potential observer of their work on their devices.
- ❖ Try to establish an online real-time system for questions and answering, between students and you. They will be more receptive to your message or more eager to put the correct

question. Try not to be predictable; also students will interact automatically, avoiding your hidden supervision.

- ❖ Use short key-words for using/ stopping to use the mobile devices, like "screen up" or "screen down".
- ❖ Treat mobile devices similar to pens and books. Students will understand that they are tools, with a greater value for research, exploration, and creation, instead of instruments for fun and gaming.
- ❖ Assign tasks for a limited amount of time to keep student attention focused.
- ❖ Keep students engaged through captivating activities.
- ❖ Do not let students get bored with an application or site. Change them often enough, but do not make it an end in itself. Our role is to teach them to adapt to diversity, looking for new solutions.
- ❖ Use online whiteboards or similar application for collaborative works.
- ❖ Use nicknames if students are too shy or if they want to keep their privacy in front of their colleagues.
- ❖ Ask them to present the results of their work in front of the class.
- ❖ Don't keep the same groups for a long period. Some students can use that in their own interest, leaving the others from the same group to work for them.
- ❖ Use class management software that allows you to keep records of your students' activities. For example, Symbaloo Lesson Plans allow you to know the time spent by each student for an assignment.
- ❖ Adapt the use of mobile devices to students' styles of learning: encourage the use of headphone to listen to the explanations from specific programs or from videos, for audio style learners; use drawing programs for video style learners; use interactive images for learners with a kinaesthetic style of learning.
- ❖ Use short polls to verify if students pay attention to the lesson.
- ❖ Let students to have fun moments. After all, life is more than work. Use that as a reward.
- ❖ Ask students to turn the volume off on their devices and to put them with the screen to the desk, in front of them. Don't let them put their devices in pockets or bags, because it is possible that they will try to use them stealthily.
- ❖ Don't use mobile devices all the time. Students must be prepared for working without them, for example for mid-term, exams, quizzes.
- ❖ If a student will break the rules, he/she will not be allowed to use the device for doing his/her task during classes. Instead, ask him/her to work at home, alone, and to present the results in front of the others in next hour.
- ❖ If a student will break the rules frequently, try to find what the reason is. It is possible that he/she not to have access to the internet outside the school. Let him/her have a time for own use of the internet in school, during the breaks, before or after the hours.
- ❖ If it is not this reason, try to discuss with him/her outside the classes. Ask for a specialized advice if is necessary, from the school psychologist or school counsellor.
- ❖ Try to verify that the apps you recommend can be used from any device your students have. Otherwise, students that can't access or use the application will be disappointed and they will have time/reason to use otherwise their devices than for tasks assigned.

There are many ideas that we presented here. But they are not all. Every teacher can establish his/her own rules that can be the same for the whole school or can be different for each classroom, even we don't recommend that. Important is to fight with the fear that mobile devices cannot be integrated into the curricula without disturbing students from their learning path since the benefits are more than the possible disadvantages.

## 7. HOW CAN YOU SAVE TIME: LIBRARY VS REPOSITORY

In a world that is becoming increasingly hyper connected and virtual, the role of online libraries in schools is increasingly important as it allows students and teachers to access reliable educational resources for their learning and teaching. Students from all grades use libraries and for doing their research work, to find information about some subject, for oral presentations, to prepare projects tasks, to clarify doubts and to find exercises for the tests. The same with repositories. Like ordinary people who use the internet as a source of information, teachers can also find and gather in a relatively short time different useful info that can be used in their activity. If most of us revert to some of the sites we consider to be the most recommended for our students, it is a question of how we store the rest of the links and information that are only occasionally used. After all, is a matter of management of time.

We want to make the following assertion from the beginning. Although there are offline solutions for managing links to different resources we use, we will only analyse online solutions ones. The reason for these choices is that, however, links are only accessible if we have an internet connection, being self-evident that their management is advisable to be done through the same route. Also, such a method can be a useful solution if we use different devices to access the same resources.

What is the most recommended way to store all these links? It depends on the skills and knowledge of the person who wants to create their information management system.

Because we access our online resources using a browser, and because the most used of them can store our bookmarks in a folder structure, it is perhaps the first way to do an own way to store the links we need. An argument to use this way to store links is also the ability of most major browsers to allow bookmarks to be imported from one browser to another, or to ensure synchronisation for different devices belonging to the same person.

The next dilemma needs to be clarified. Is this an effective long-term method? The answer is facilitated by the existence of two ways to manage the links or digital resources, which have been developed considering the needs of the users.

### 7.1. Digital repository vs. Digital library

From the institutional point of view, there are different meanings for the two categories. A digital repository is built for release to the public, free of charge and open to intellectual products of an organization or more, organized in a consortium. A digital library, on the other hand, provides access to electronic resources, including an online public access catalogue (OPAC), eBooks, e-journals, bibliographic databases, by domains of study, and which include citation management tools. Some digital libraries allow access to online references or live contact with a qualified librarian. According to these possible definitions, a digital repository can offer students open access to materials published by researchers and staff of the organization or consortium. Digital libraries are organized as portals to digital resources. Digital repositories include digital resources that can be organized, classified, described, and indexed, from different viewpoints.

Shortly," An institutional repository is an archive for collecting, preserving, and disseminating digital copies of the intellectual output of an institution, particularly a research institution."<sup>4</sup>

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<sup>4</sup> Wikipedia contributors. (2018, June 20). Institutional repository. In Wikipedia, The Free Encyclopedia. Retrieved 08:11, August 10, 2018, from [https://en.wikipedia.org/w/index.php?title=Institutional\\_repository&oldid=846693035](https://en.wikipedia.org/w/index.php?title=Institutional_repository&oldid=846693035)

Not always we want to access an online repository that belongs to a research institution or university. More often, for teachers and their students, the two terms are best described as in the presentation found on Wikipedia

"A digital library, digital repository, or digital collection, is an online database of digital objects that can include text, still images, audio, video, or other digital media formats. Objects can consist of digitized content like print or photographs, as well as born-digital content like word processor files or social media posts. In addition to storing content, digital libraries provide means for organizing, searching, and retrieving the content contained in the collection.

Digital libraries can vary immensely in size and scope and can be maintained by individuals or organizations.<sup>5</sup> The digital content may be stored locally, or accessed remotely via computer networks. These information retrieval systems are able to exchange information with each other through interoperability and sustainability<sup>6</sup>.<sup>7</sup>

### **7.1.1. Examples of digital libraries and repositories**

#### **7.1.1.1. Dropbox, Google Drive and OneDrive**

In accordance with these specifications, we may consider it recommended and we can create our own digital libraries or repositories. Perhaps one of the most convenient ways is to use a cloud-based storage, the most common being **Dropbox**, **Google Drive** or **OneDrive**. Each of them is freemium, for a bigger storage space must be paid. Each of them has restrictions but also features that recommend them as a so-called personal library. The ability to use these applications in the repository is being used by Moodle, the dedicated Learning Management System (LMS) platform. More information and ways of integration can be seen by accessing the links:

[https://docs.moodle.org/32/en/Dropbox\\_repository](https://docs.moodle.org/32/en/Dropbox_repository)

[https://docs.moodle.org/35/en/Google\\_Drive\\_repository](https://docs.moodle.org/35/en/Google_Drive_repository)

[https://docs.moodle.org/35/en/OneDrive\\_repository](https://docs.moodle.org/35/en/OneDrive_repository)

#### **7.1.1.2. Other applications that can be used as digital libraries or personal repositories in education**

 **Pinterest** (<https://www.pinterest.com/>) even it was built as a free website, with a software system designed to discover information on the web, mainly using images, and, on a shorter scale, GIFs and videos, can be used as a management system for important links collections. After registration, users can upload, save, sort, and manage images or other media content (e.g., videos), that are named pins, through collections known as pinboards. Because there is the possibility to integrate Pinterest with Dropbox, as well as Google Drive with Pinterest, we can extend links for our own works, not only for public sites. For integration between Dropbox and Google Drive with Pinterest see the next two links:

<https://zapier.com/apps/dropbox/integrations/pinterest>

<https://zapier.com/apps/google-drive/integrations/pinterest>

Using Pinterest extension, we can save directly on a selected board an interesting link. Also, we can receive via email (declared when we register to the official site) notification regarding topics that might interest us, based on our internet activity. Having "Following" function, as well as the

<sup>5</sup> Witten, Ian H.; Bainbridge, David Nichols (2009). *How to Build a Digital Library* (2nd ed.). Morgan Kaufman. ISBN 9780080890395.

<sup>6</sup> Lanagan, James; Smeaton, Alan F. (September 2012). "Video digital libraries: contributive and decentralized". *International Journal on Digital Libraries*. 12 (4): 159–178. doi:10.1007/s00799-012-0078-z

<sup>7</sup> Wikipedia contributors. (2018, August 1). *Digital library*. In Wikipedia, The Free Encyclopedia. Retrieved 08:05, August 10, 2018, from [https://en.wikipedia.org/w/index.php?title=Digital\\_library&oldid=852943545](https://en.wikipedia.org/w/index.php?title=Digital_library&oldid=852943545)

possibility to send messages with links to a specific sender, as well as to use comments, Pinterest facilitates making of a sort of digital library, tailored to each user.



**Pearltrees** (<https://www.pearltrees.com/>) is very similar to Pinterest. One of the differences between Pearltrees and Pinterest, except terms (pins became pearls and boards became trees or collections) is that comparative with Pinterest that is free to use, Pearltrees is freemium. For a basic account, there is a storage quota of 1Gb. It is a big quota, which allow to explore and share different types of content.

According to Wikipedia presentation," Functionally the product is a visual and collaborative curation tool that allows users to organize, explore and share any URL they find online as well as to upload personal photos, files, and notes. The product features a unique visual interface that allows users to drag and organize collected URLs and other digital objects, that themselves can be further organized into collections and sub-collections, (URLs). Users of the product can also engage in social/collaborative curation using a feature called Pearltrees Teams"<sup>8</sup>



**Dropmark** <https://www.dropmark.com/> is another freemium site, organize all selected links, files, and notes into visual collections. The owner can decide who sees each collection. Also, he/she can keep own content private, invite friends, or make it public. Each collection has its own shareable link.



**Symbaloo** <https://www.symbaloo.com>, also a freemium, is a cloud-based application that allows users to organize and categorize web links in the form of buttons. After registering, each user has a page

with a grid of buttons, each button can be configured to link to a specific page. The application allows users to customize each button, for a better visual significance. Each user can create different pages, named webmix a feature that is useful to separate topics and links that can be shared with other users, making them public and sending the link via email.

There are a few sites, usually specialized for certain categories of resources, which offer the opportunity to create their own warehouses. For this, users wishing to build these online deposits must sign up. In your account, they will be able to select those resources on the site they want to use, or they can contribute with external resources to contribute to the site's database. The created deposit can be private or public, for most of them, and there is the possibility to be distributed to the developers selected by the developer. Here are some examples of such sites.



**AMSER** (<https://amser.org>) According to their official page presentation, "(the Applied Math and Science Education Repository) is a portal of educational resources and services built specifically for use by those in Community and Technical Colleges

but free for anyone to use. AMSER is funded by the National Science Foundation (NSF) as part of the National Science Digital Library, and is being created by a team of project partners led by Internet Scout." There are three classification concepts used for resources:

- GEM Subject, a subject taxonomy created and maintained as part of the Gateway to Educational Materials project, with 238 classifications
- LC Classification (AKA LCC), a subject taxonomy created and maintained by the Library of Congress, with more than 430,000 classifications
- Key Concept, a subject taxonomy that Internet Scout has developed to support the AMSER collection. Includes 21 classifications, each of them with multiple sub-classification.

<sup>8</sup> Wikipedia contributors. (2018, June 18). Pearltrees. In Wikipedia, The Free Encyclopedia. Retrieved 10:17, August 10, 2018, from <https://en.wikipedia.org/w/index.php?title=Pearltrees&oldid=846440073>

A user can create folders, to manage them, private or public. Folders can be shared. The recipients don't need to be users of the portal or log in to use your folder, except if they want to create their own collections.



**MERLOT** (Multimedia Education Resource for Learning and Online Teaching) [www.merlot.org](http://www.merlot.org) is an online repository and International consortium of institutions (and systems) of higher education, industry partners, professional organizations and individuals.<sup>9</sup> From their main page, you will find that "The MERLOT system provides access to curated online learning and support materials and content creation tools, led by an international community of educators, learners and researchers." The components of MERLOT Collection and a short description of them are shown in the next screen capture of their page.

A special case is for the educational system in Turkey, which through the Fatih program benefited from the development of a dedicated EBA platform / platform based on the use of StarBoard software



**EBA**, <http://en.eba.gov.tr> "Educational Informatics Network" in English, is an online educational platform created by the Ministry of National Education of Turkey. Teachers and students can upload their own materials. Teachers have 10Gb limitation to upload their sources such as exams, abstracts, magazines, videos, flash cards, etc. Besides, Starboard, the software on which EBA is built, can be used as a repository during the courses as it enables teachers to upload and manage lesson materials in its gallery.

Some applications or sites dedicated to specific study subjects only have features that allow them to be used as repositories or personal digital libraries. Here you will find a brief description of one's applications that are the most used by teachers from our schools.



**Curriki** <https://www.curriki.org/> The Curriki community is a repository where members from every country around the world are coming together to share, collaborate, and connect in order to make the best teaching and learning materials universally accessible and useful. On Curriki site, any teacher can upload his/her own content to the Curriki Library or to the private Curriki Library, create and organize collections of content, create and access groups, other public libraries, and contacts.

Acting like a real library, as user of Curriki, according to their presentation, "In your personal resource library you can :

- Discover Curated and Aligned Resources.
- Quickly filter resources by standard and save to your private Curriki Library.
- Quickly and easily pinpoint resources vetted by other teachers and the Curriki review team
- Filter your search results to match your specifications: subject, and subtopic, grade level, type of material, and/or rating.
- Search for resources by the standards you teach.
- Save resources to your own private Curriki library.
- Upload your own resources to My Library and share them with the community.
- Organize and reorganize your resources into units, collections, sequences that work best for you.
- Share a resource right from your My Library overview page.

<sup>9</sup> Wikipedia contributors. (2017, February 23). MERLOT. In Wikipedia, The Free Encyclopedia. Retrieved 03:21, August 11, 2018, from <https://en.wikipedia.org/w/index.php?title=MERLOT&oldid=767002562>

- Request a review by the Curriki Review Team.<sup>10</sup>



Add your own rating and review to any resource." **GeoGebra** <https://www.geogebra.org/> is a dynamic mathematics repository for all levels of education that brings together geometry, algebra, spreadsheets, graphing, statistics and calculus teachers and students can deal with this repository while supporting science, technology, engineering and mathematics (STEM) education and innovations in teaching and learning worldwide.



The **World Digital Library** (WDL) <https://www.wdl.org/> is a qualified digital library which includes books, manuscripts, maps, newspapers, journals, prints and photographs, sound recordings, and films in cooperation with libraries, archives, museums, educational institutions, and international organizations from around the world. Other features include advanced image-viewing, timelines, interactive maps, and in-depth thematic sections on selected topics (in preparation).



**ITU** (Istanbul Technical University) Digital library is a broad source which tutors and students can benefit for free and reach technical documents, books, archives, etc. <http://www.kutuphane.itu.edu.tr/en/home>. Having an English version for the site, can be accessed not only by Turkish users.



Boğaziçi University Library is a digital library academic staff and students can use to reach academic sources, Databases, e-Books, e-Journals, Reference Sources, Trial Databases, etc. <http://www.library.boun.edu.tr/en/index.php>. Has also an English version, along with the Turkish one.



The **World Almanac Online**, provides students and teachers access to essential facts and statistics on hundreds of topics (Economy, Business, Energy, Health, Arts etc.). Can be accessed using the link

<https://www.infobase.com/product/libraries/the-world-almanac-online/>



**SAS Curriculum Pathways**, offers interactive, standards-based tools, resources, and apps in the core disciplines (English language arts, mathematics, science and social studies, Spanish). Having Portfolio feature, can be used as a personal library. As teacher, you can control your students account and work. Can be accessed at <https://www.curriculumpathways.com/portal/>



**PhET**, <https://phet.colorado.edu/>, provides free interactive math and science simulations. Based on simulation given by the site, a teacher can make his/her own activity, which acts like a small library.



**Khan Academy**, offers free videos and interactive exercises with a strong focus on math. Creating classes and activities, you can have an own library at your disposal. Also, you can manage students' progress, as well as their personal development. Accessed by the link <https://www.khanacademy.org>



**NASA Image and Video Library**, collects materials in a wide variety of formats and on a wide variety of subjects (space policy, business / management, and science / technology). You can select images and video for making an own library. The link for the site is <https://images.nasa.gov/>



**ChemVantage**, gives free quizzes, homework assignments and practice exams. Access the site by the link [www.chemvantage.org](http://www.chemvantage.org)

<sup>10</sup> <https://www.curriki.org/features/> section My Library



Erasmus+



**RCAAP**, <https://www.rcaap.pt/>, is the repository most used in our school by students and teachers. RCAAP is a collection of digital documents. The students and teachers have access to scientific and academic literature, from all areas, whose full text is in open access. Students that are on the last year of secondary school usually use RCAAP for their project works.

## 8. FINAL CONSIDERATIONS

The challenges that technological developments have brought in recent years, especially digital ones, have not avoided education in general and, in particular, schools.

As part of these challenges, we have to say that the talks on the mobile phone are passionate enough, causing tensions both internally, between teachers and pupils as well as outside the school. Politicians, many times, address the issue of using mobile phones or mobile digital devices in contexts that are not necessarily the most relevant for schools. An example of this is the new education regulations in some European countries that have had as central focus the ban on using these devices in schools. We will exemplify the case of Romania, in which two framework regulations for the organization and functioning of the educational institutions appeared within two years. In the Regulation issued on 31 August 2016<sup>11</sup> there were no stipulations regarding the use of mobile devices in schools, which implicitly suggests that they could be used legally under conditions set by the local school' community. The regulation tacitly approves the student's status issued on August 10, 2016<sup>12</sup>: "...mobile phones may be used during class hours only with the agreement of the teacher, in their use in the educational process or in emergency situations".

Not later than two years in January 2018 there is an amendment to the Framework Regulation<sup>13</sup>, which supplements the previous provision with:

"During the course of the classes mobile phones are kept in specially arranged places in the hall of the class, set so as not to disturb the educational process."

This provision is considered to be restrictive because the lack of space in each classroom specially designed to be used for this purpose leads to the conclusion that mobile phones cannot be brought to school, that condition being not met.

Strong debate has raised by others legislative changes in the European area that limit or ban the access and use of mobile phones in schools.

We have presented this aspect aiming to demonstrate, once again, if necessary, that the use of mobile devices, in particular mobile phones in schools, is subject to rapid changes to which practitioners must urgently find solutions. Together, teachers and students seek to manage access to digital resources through appropriate devices within the limits of school practice. Noteworthy is the student's response during the surveys referred to in this guide: "The Framework Regulation refers to the restriction of mobile phones in schools, but nothing is said about tablets. Do we understand that they can be used without restriction?" (Ana. M, 17 years, Romania).

If we accept the idea that the school is conceived as "sociocultural perspective and views school as a social practice that builds on the installed base of infrastructure compiled from material and social resources and on institutional arrangements assigned or designed to support learning" (Ott, 2017, p.7) then the problem of mobile device management in schools must be subsumed to this assertion.

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<sup>11</sup> ORDER No. 5079/2016 of 31 August 2016 on the approval of the Framework Regulation on the organization and operation of pre-university education establishments) THE ISSUER: MINISTRY OF NATIONAL EDUCATION AND SCIENTIFIC RESEARCH PUBLISHED IN: OFFICIAL MONITOR NO.720 from 19 September 2016

<sup>12</sup> ORDER No. 4742/2016 of August 10, 2016 for the approval of the Student's Statute ISSUER: MINISTRY OF NATIONAL EDUCATION AND SCIENTIFIC RESEARCH PUBLISHED IN: OFFICIAL MONITOR NO. 645 of 23 August 2016, art. 15 lit g)

<sup>13</sup> ORDER No. 3.027 / 2018 of 8 January 2018 amending and supplementing the Framework Regulation on the organization and operation of pre-university education establishments, approved by the Order of the Minister of National Education and Scientific Research No. 5.079 / 2016



Erasmus+

There are three actors who have different roles in this context. On the one hand, students are willing to use mobile phones or, more generally, mobile devices in school-related activities, and want these practices to be consistent, in line with school practice. They often realize the role that these devices should have, the tools for accessing, storing and processing relevant information.

For students, we need to keep in mind that they will continue to learn with their phones outside of schools when they are no longer under the strict supervision of teachers. In the long term, they will continue to use these devices in tertiary education, in future professional activity, in the perspective of lifelong learning. Let's not forget that using mobile applications to access, process and store information as well as collaborating with other colleagues or instructors in a non-formal space outside the school is ideal.

We must keep in mind that our children live in a period defined by increasing access to digitization in everyday life. To prepare them for this life naturally includes knowledge of the use of technology to learn, communicate and work with ideas. It is a way we can help develop the skills needed for their career. We must find solutions adapted for technological changes in recent years have led to changes in the demands of employers, who have other expectations from their future employees. Digital skills have become more and more required, to the detriment of traditional ones until a few years ago.

To forbid students using smart phones and smart devices is an inappropriate response to the time we live. Appropriate use of a mobile phone is a complex social activity that needs to be taught in order to be properly deployed. Like any ban, in this case it will also lead to the finding of alternative solutions by the students, which will probably allow them to use their underground and hidden ones, a probable cause for other deficient behavioural problems, such as cyberbullying.

From the point of view of European policies, digital education is a critical aspect of schooling young people who can play a role in supporting learning. At the same time, the terrorist threats we are facing lately lead to a different approach to real-time parent-student communication, which plays an important role in ensuring the physical and emotional safety of the latter.

If we take our role seriously, to teach students to be safe online, exploit adequate digital resources for their own education, then instead of suggesting bans, we should discuss ways to help students use them rationally.

As the guide addresses teachers, we have found it useful to outline aspects of student implications, how they perceive the use of mobile devices in schools. The implications for teachers we consider that have been highlighted by the approaches outlined in this Guidebook.

However, some additional considerations are considered necessary. For teachers, mobile devices, when not only perceived as a disruptive factor in class hours, are a useful tool for curriculum implementation, classroom control, students' contact, and personal professional networks contact.

Together, the two actors we can say that they are largely intuitive about the role of mobile devices in redesigning basic educational concepts, being a factor of progress by connecting to the economic and social realities they are in.

The third actor in the equation for access to and use of mobile devices in schools is represented by the stakeholders. If as for students and teachers there are quite a number of studies in the literature that reveal their views and their influences on their activity and personal training both in classrooms and outside schools for educational purposes, for the stakeholders we cannot say the same thing.

As stakeholders, there are the parents, who mostly state that these devices are disturbing, so their use should be restricted or even banned in schools. It is often necessary for teachers to try to mitigate this opinion in an attempt to attract them as pressure factors for changing restrictive regulations.



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The economic environment is emphasizing the efforts to a high-level' use of mobile devices, its representatives being another component of the stakeholders in how digital technologies are integrated into schools. IT companies that create educational platforms, dedicated software, are becoming more and more numerous, offering more and more generous, numerical and qualitative results, which leads us to consider these companies as real support for change in the perception of officials.

National or local authorities have an important role in how schools manage their resources, influencing both positively and negatively the ability of schools to use existing digital resources in the educational field. It is noted that intensified efforts of educators, education practitioners, are needed to demonstrate the capacity of these resources and, implicitly, the devices through which they can be accessed and used, to contribute to the formation of the skills required for a 21st century graduate, which will contribute ultimately increasing the quality of life in areas of responsibility.

The situation in the schools involved in the project "BRINGING LIFE INTO THE CLASSROOM: the innovative use of mobile devices in the educational process (Blic & Clic)" is not much different from what is found at the global level. That is why we wanted to contribute to changing the negative perception of this problem, to support those who want to find rational and efficient ways of using the resources we have, to contribute to the formation of the skills necessary for our graduates for their future career and good quality lives, as well as our colleagues, teachers, by providing them with tools to support their work in a digital and technological context.

At the same time, we wanted our guide to be a plea for accepting an obvious reality, including it in school practice, in the light of the positive experience we have gained in our professional work in the classroom and within the project. The chapters of this paper are structured on the most important issues we have identified about digital resources and the use of mobile devices for their exploitation for educational purposes. The questions we wanted to answer are not the only ones that might exist in the current society debate about their integration into schools.

No matter if we agree or not that mobile devices and digital resources can be used in schools, both have an impact on the pedagogical practice of teachers and students. We must talk about it, listen to different arguments, and search solutions to transform this problem into a big advantage both for students and teachers, and, through them, to the society.

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