



# BLIC & CLIC

## Bringing Life Into the Classroom: Use of Mind Maps on the Chemistry Class

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Agrupamento de Escolas da Maia

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*The present article is based on an Erasmus+ project which uses mobile learning pedagogy to promote an effective inclusive education.*

## **BLIC & CLIC**

### **Bringing Life Into the Classroom:**

### **Innovative use of mobile devices in the educational process**

(01/10/2016 - 30/09/2018)

**Goal :** Promote change in pedagogical practices enhanced by the use of mobile devices.





## Partners involved:

1. **Romenia** *Colegiul Tehnic Edmond Nicolau Focsani*
2. **Turkey** *Toki Halkali Anadolu Imam Hatip Lisesi*
3. **Poland** *Zespół Szkół im. por. Józefa Sarny w G.*
4. **Italy** *IIS M. Filético*
5. **Greece** *1st Lyceum of Rhodes Venetokleio*
6. **Portugal** *Agrupamento de Escolas da Maia*
7. **Portugal** *Universidade do Minho*



## BLIC & CLIC

Bringing Life Into the Classroom :  
Innovative use of mobile devices in the educational process



Funded by the  
Erasmus+ Programme  
of the European Union

Home About Partners Mobilities Intellectual Outputs Dissemination Contact

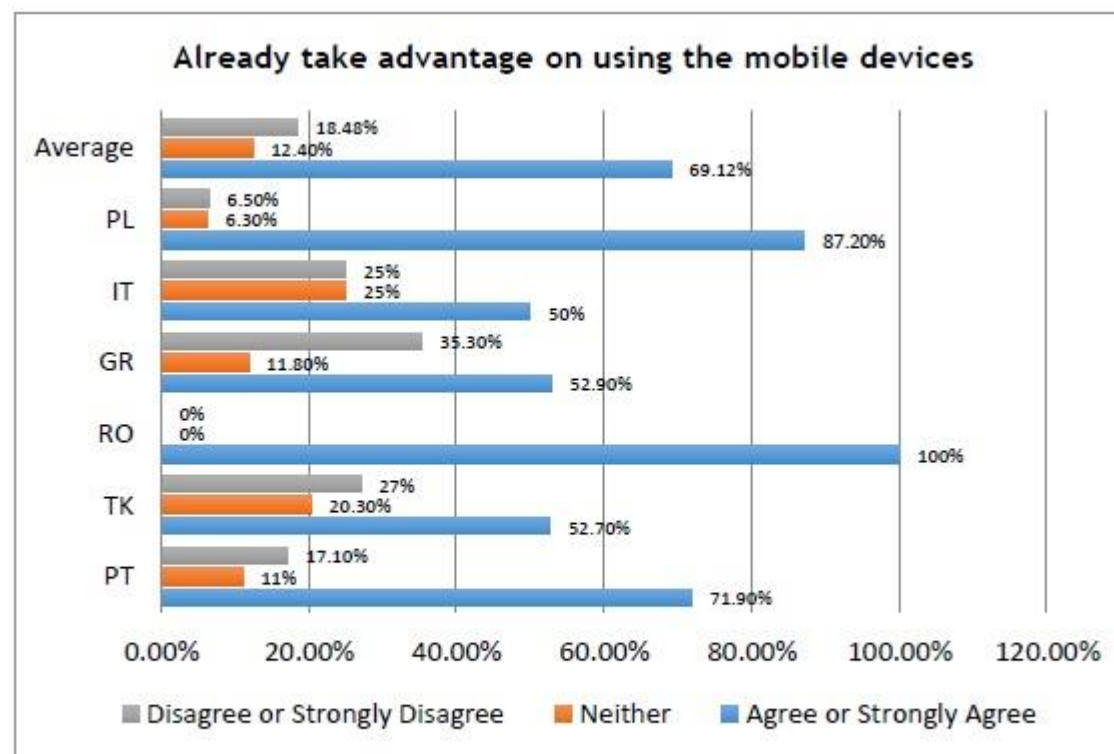
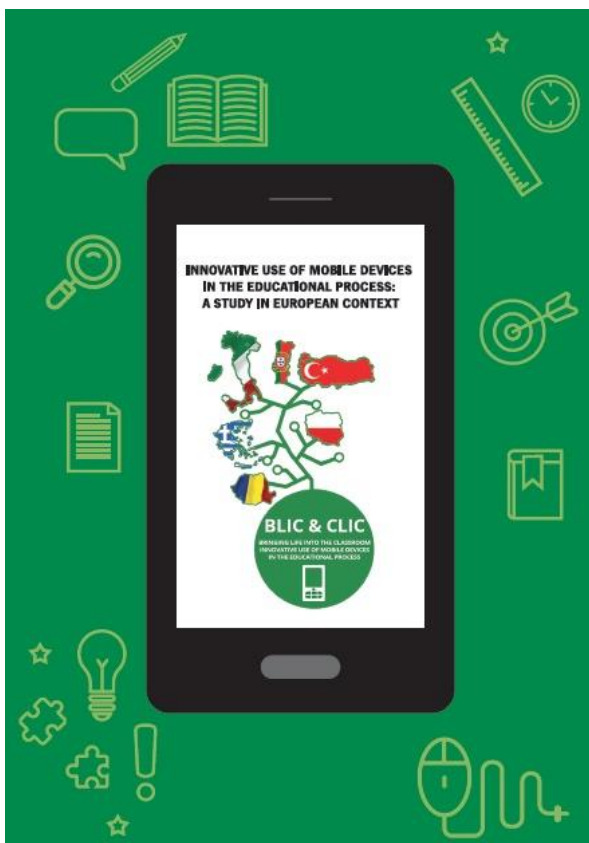


Fig. 1: <https://www.blicclic.com>



## Outputs of the Project

### Comparative Study about the use of mobile devices in six schools



Graphic 11 - Teachers who have already taken advantages of using mobile devices in the classroom (second survey 2018) by country; n=220

Fig. 2: Intellectual Output - Innovative use of mobile devices in the educational process: a study in European context





## Guideline – “Tips and tricks for effective use of mobile devices in education”



**PorToon** <https://www.poratoon.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 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.



Request a review by the Curriki Review Team™  
Add your own rating and review to any resource. **OpenStax** <https://www.openstax.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 (İstanbul 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.kutuphan.itu.edu.tr/en/home>. Having an English version for the site, can be accessed not only by Turkish users.

**Bogaziçi 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.librari.bogazici.edu.tr/en/abn>. 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/what/hit/railes/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 <http://www.chemvantage.com>



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.

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

Padlet is like a wall paper on line 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, 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 to discuss the kind of water, the dominant 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 labels and the geological maps, and the results in a padlet. Send it to the teacher.
  7. At the end the teacher show 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 inter personal 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 in other 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** <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/>

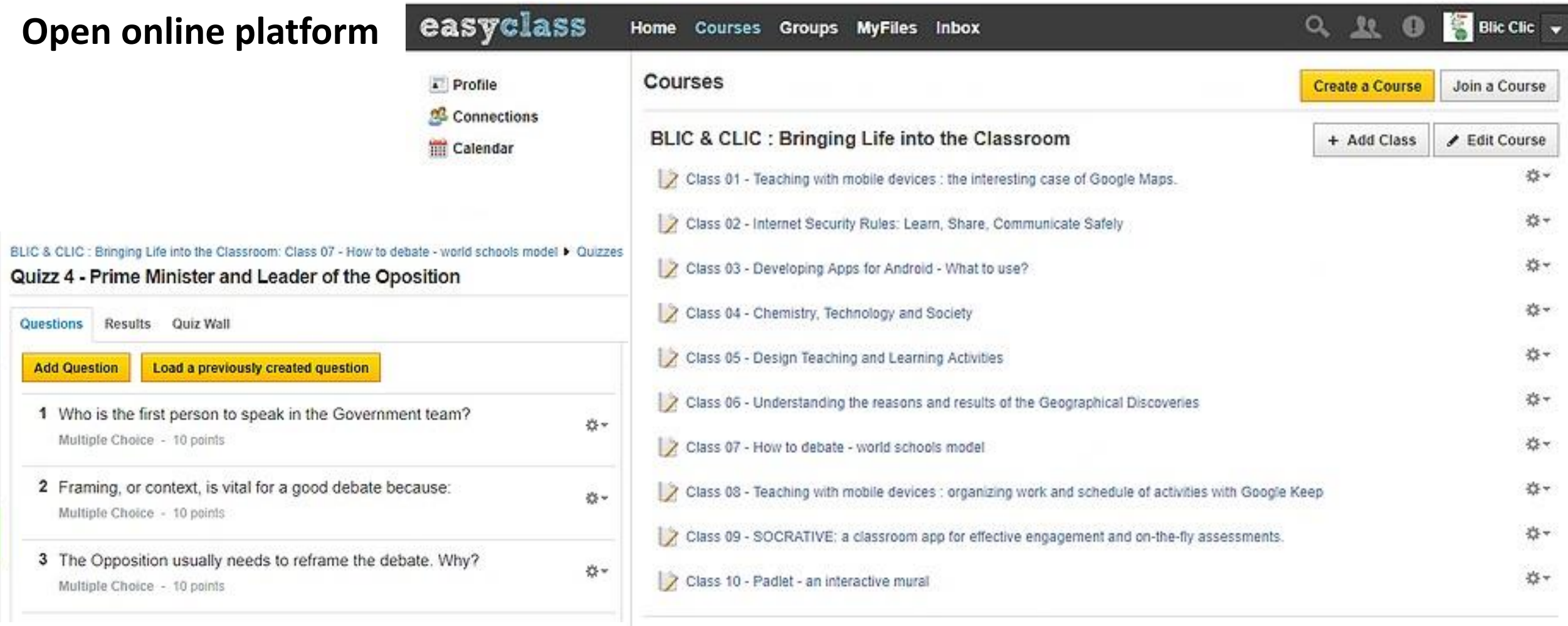
Sometimes we need to work on one document together at the same time. With Google Docs we do that very easily. This tool allows our teachers and students to create online

Fig. 3: GUIDELINE: Tips and tricks for effective use of mobile devices in education





## Open online platform



The screenshot displays the 'easyclass' web interface. At the top, a navigation bar includes 'Home', 'Courses', 'Groups', 'MyFiles', and 'Inbox'. On the right, there are search, user profile, and notification icons, along with a 'Blic Clic' dropdown menu. A left sidebar contains 'Profile', 'Connections', and 'Calendar' links. The main content area is titled 'Courses' and features a 'BLIC & CLIC : Bringing Life into the Classroom' course. This course has a list of 10 classes, each with a gear icon for settings. The 'Class 07 - How to debate - world schools model' is selected, leading to a 'Quizzes' section for 'Quiz 4 - Prime Minister and Leader of the Oposition'. This quiz has three questions, each worth 10 points, with 'Add Question' and 'Load a previously created question' buttons at the top.

**easyclass** Home Courses Groups MyFiles Inbox

Profile  
Connections  
Calendar

**Courses** Create a Course Join a Course

**BLIC & CLIC : Bringing Life into the Classroom** + Add Class Edit Course

- Class 01 - Teaching with mobile devices : the interesting case of Google Maps.
- Class 02 - Internet Security Rules: Learn, Share, Communicate Safely
- Class 03 - Developing Apps for Android - What to use?
- Class 04 - Chemistry, Technology and Society
- Class 05 - Design Teaching and Learning Activities
- Class 06 - Understanding the reasons and results of the Geographical Discoveries
- Class 07 - How to debate - world schools model
- Class 08 - Teaching with mobile devices : organizing work and schedule of activities with Google Keep
- Class 09 - SOCRATIVE: a classroom app for effective engagement and on-the-fly assessments.
- Class 10 - Padlet - an interactive mural

BLIC & CLIC : Bringing Life into the Classroom: Class 07 - How to debate - world schools model ▶ Quizzes

**Quiz 4 - Prime Minister and Leader of the Oposition**

Questions Results Quiz Wall

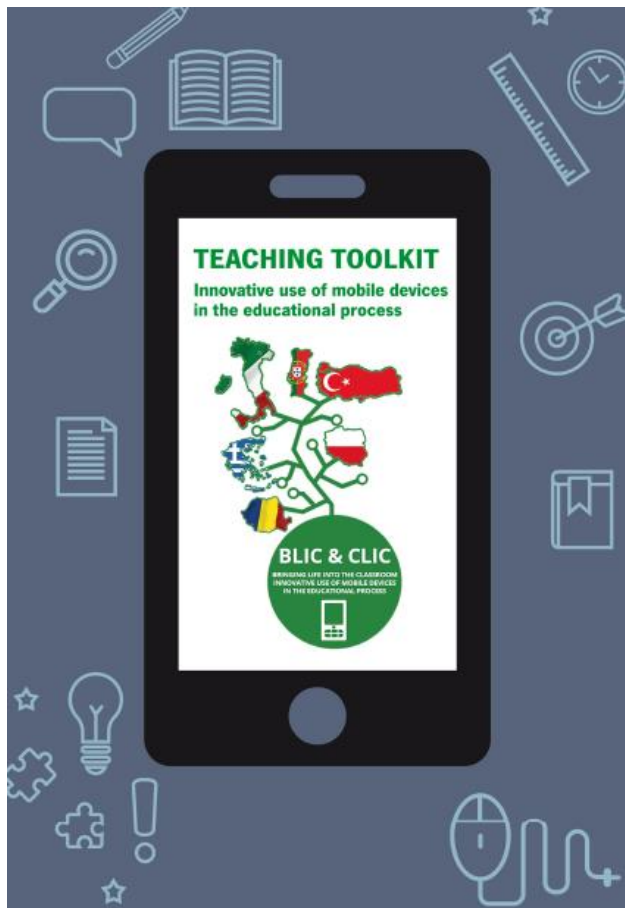
Add Question Load a previously created question

- Who is the first person to speak in the Government team?  
Multiple Choice - 10 points
- Framing, or context, is vital for a good debate because:  
Multiple Choice - 10 points
- The Opposition usually needs to reframe the debate. Why?  
Multiple Choice - 10 points

Fig 4: Open online learning platform – www.bliclic.com



## Teaching Toolkit – Innovative use of mobile devices in Education process.



**EBA**

**What is EBA?**  
Educational Informatics Network is an online social educational platform led by The General Directorate of Innovation and Educational Technologies in Turkey.

The goal of the platform is to allow the integration of technology into education by using information technology tools and supporting efficient use of the material. EBA has been created to offer suitable, reliable and right content and is still being developed.

**What is it for?**  
It is specially designed for teachers to collaborate with their colleagues and share educational materials with students. Teachers can participate in discussions created by them or other teachers, share educational materials, assign tasks to students and follow tasks individually or oncoming events. They can also contribute to the content pool with the contents they have created with content creation tools provided by EBA.

**Target Audience**  
**For Teachers,**

### EasyClass



FIGURE 5 - [HTTPS://WWW.EASYCLASS.COM/](https://www.easyclass.com/)

There are many instruments that a teacher can use in class or outside the class, for educational purpose. One of the big problems of these instruments is they must be integrated, permitting a facile use. An educational platform has the role of organizing the main instruments used by a teacher, to prevent wasting of time and resources. EasyClass platform can be a good choice if you need a space where to control your own educational environment.





## E-book – Lesson Plans with mobile devices


### Mobile learning



**Lesson Plan:**  
Using Mobile devices in learning activities (Mobile Learning)  
Friction in nature and technique

Identification	
Teacher name Petronia Moraru	study area / Discipline Physics
Grade 9th	Time duration 4 x 50 minutes

Learning with the Mobile Devices- Mobile Learning in Flipped Learnig and Gamification Scenario



#### Learning Zones – Identify the planned tasks in which learning zone belong

<p><b>A - Create</b></p> <p>Each students group will conduct a short documentation and will elaborate a presentation about one of the next items: friction, its application in nature, technique and not only; phenomena that can be explained based on Friction.</p>	<p><b>B - Interact</b></p> <p>Conduct a study about friction, as a general phenomenon.</p> <ul style="list-style-type: none"> <li>- What is the general meaning of the term "friction"?</li> <li>- Where do you believe that is no friction?</li> <li>- Is friction useful or no useful?</li> <li>- Can we modify the friction between different objects? How and Why?</li> </ul>
<p><b>C - Present</b></p> <p>The mind map used for the task research, the final product elaborated and the proposed item for the Friction' infographic will be uploaded to the web. Each team will formulate a short questionnaire based on their presentation, also uploaded on the web, with correct answers and possible evaluation.</p>	<p><b>D - Investigate</b></p> <p>Students will be encouraged to conduct an own research about Friction, using InstaGrok or other search engine, and the manual too.</p> <p>Teacher will provide a list of websites where students can search and a list of videos. Each group must complete the list with at least one other link</p>
<p><b>E - Share</b></p> <p>Students will establish the most relevant aspects for the item they must to cover, using a poll tool, and published them into the Popplet, created for the main theme.</p>	<p><b>F - Develop</b></p> <p>Each student will post his/her own doubts on the Popplet / Weebly created for the group. The others will give answers. The questions without any answers will be uploaded on the Inquiry zone of the theme.</p>

#### Description of lesson plan

Description	Time Duration of each task	Used APP
<p><b>Description</b></p> <p>Chronological description of the execution of the proposed activities.</p> <p>Monitoring the attitudes and commitment of the students throughout the classes.</p> <p>1<sup>st</sup> class</p> <ol style="list-style-type: none"> <li>1. Announcement: the next activities will be conducted as a research project. Besides the products, the attitudes and commitment of the students throughout and outside the classes will also be evaluated.</li> <li>2. Teacher will announce the checklist for devices and pre-installed apps needed for the first phase of the project. Each device must be charged or plugged during the class, and connected to the Wi-Fi network of the lab.</li> <li>3. Presentation of two videos: <a href="#">Friction - 3m 11s</a> and <a href="#">A World Without Friction</a></li> <li>4. Oral interaction – comments about the two videos.</li> <li>5. Students will access short survey to assess what they know about friction.</li> <li>6. Uploading the main issues related to friction on the first Popplet.</li> </ol> <p>2<sup>nd</sup> class</p> <ol style="list-style-type: none"> <li>7. solving problems based on the laws of friction.</li> <li>8. Guidelines from the teacher, for the work they will be doing and the apps to be used.</li> <li>9. Teacher establishes heterogeneous working group. Each group will have a RealTimeBoard allotted.</li> <li>10. Each group receives a code to access a specific Padlet, according the issue they must resolve (different significance of the term "Friction", laws of friction, scientific interpretation, colloquial significance, friction in nature, friction in technical). At least one student in each group will access the received code.</li> <li>11. Completion of the proposed tasks.</li> <li>12. Uploading the work on the Padlet and Google Docs.</li> <li>13. Teacher gives individual tasks, that will be done outside the class.</li> </ol> <p>3<sup>rd</sup> class</p> <ol style="list-style-type: none"> <li>14. Work on proposed survey's questions.</li> <li>15. Presentation of audio/video/photos taken during the work in class and outside.</li> <li>16. Each group establishes an item for the infographics of the project and uploads it on the web.</li> <li>17. Work on the infographic.</li> <li>18. Work on the presentation – first design.</li> <li>19. Teacher gives individual tasks, that will be done outside the class.</li> </ol> <p>4<sup>th</sup> class</p> <ol style="list-style-type: none"> <li>19. Presentation of the work to the class</li> <li>20. Students access the Mentimeter code, to vote the best presentation and the best item proposed for the infographic.</li> <li>21. Completing the questionnaires made by the others teams.</li> <li>22. Completing the self-assessment questionnaire of learning</li> </ol>	<p>1'</p> <p>5'</p> <p>10'</p> <p>10'</p> <p>5'</p> <p>15'</p> <p>10'</p> <p>5'</p> <p>2'</p> <p>3'</p> <p>10'</p> <p>5'</p> <p>5'</p> <p>5'</p> <p>10'</p> <p>5'</p> <p>10'</p> <p>5'</p> <p>10'</p> <p>5'</p> <p>80'</p> <p>5'</p> <p>10'</p> <p>5'</p>	<p>ClassDojo</p> <p>Google Docs</p> <p>Youtube, Vevo</p> <p>Kahoot</p> <p>Popplet</p> <p>Geogebra</p> <p>Google Docs, email</p> <p>RealTimeBoard</p> <p>Padlet</p> <p>InstaGrok</p> <p>Padlet</p> <p>Google Docs</p> <p>Mentimeter</p> <p>Youtube channels</p> <p>PaolDaddy</p> <p><a href="http://www.vottery.co">www.vottery.co</a></p> <p>Popplet</p> <p>Google Docs, email</p> <p>Weebly</p> <p>Mentimeter</p> <p>Google Forms</p> <p>SurveyMonkey</p>
<p><b>Evaluation/ Assessment of knowledge</b></p> <p>How will students be evaluated?</p> <p>A. Direct observation:</p> <ul style="list-style-type: none"> <li>- Work in the classroom (the attitudes and commitment)</li> <li>- Oral interaction</li> <li>- Behavior</li> <li>- Virtual portfolio</li> </ul> <p>B. Formative</p> <ul style="list-style-type: none"> <li>- Surveys</li> <li>- Multiple choice test or short answers</li> </ul>		

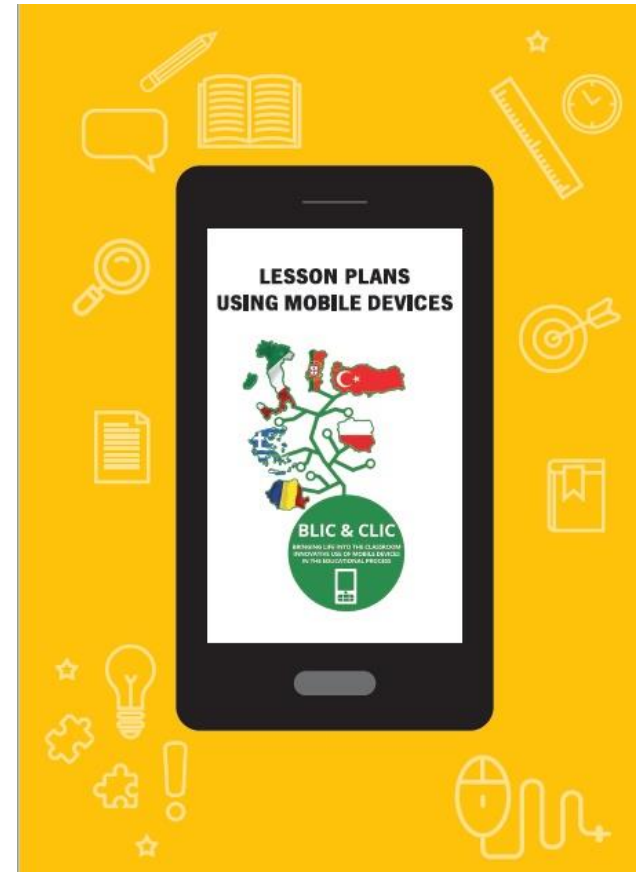


Fig. 6: E-book – Lessons Plans using mobile devices





*This research study uses Flipped Learning, as pedagogical methodology.*

*Was developed in a Chemistry class of the 12th grade. A student with motor cerebral palsy worked with non-disabled peers.*

*APP Animoto and APP-Popplet - report of the laboratory activity "A Copper Cycle".*

*In a 10th grade class, students with cognitive difficulties and Asperger syndrome prepare aqueous solutions used by their 12th graders colleagues.*



## The Copper Cycle Experiment – 12th grade students

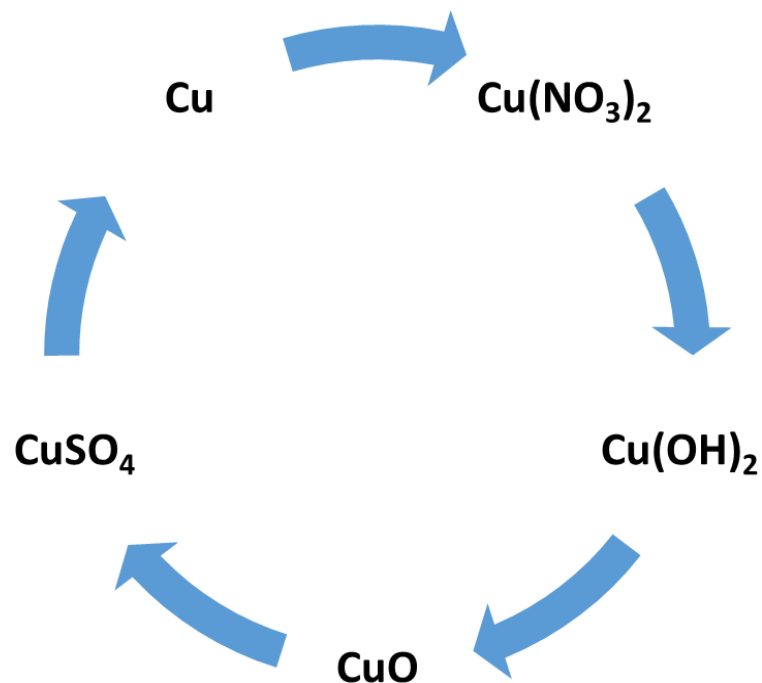


Fig. 7: Copper Cycle

### Goals

1. To characterize the reactivity of metallic elements, taking as an example the Copper reactivity;
2. To recognize the importance of recycling copper and the potential of recycling of metals in general and to identify some pollution problems related to the recycling of copper. [7]





## Methods

- Flipped learning as pedagogical methodology.
- Students answered a quiz individually.
- Students read a text / watch a video about the “Copper Cycle” (reading and research scenario).

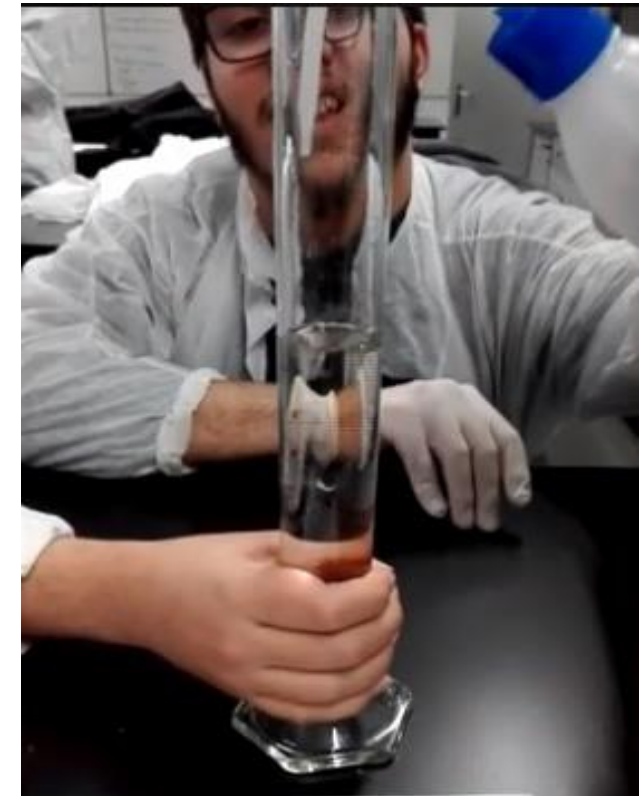
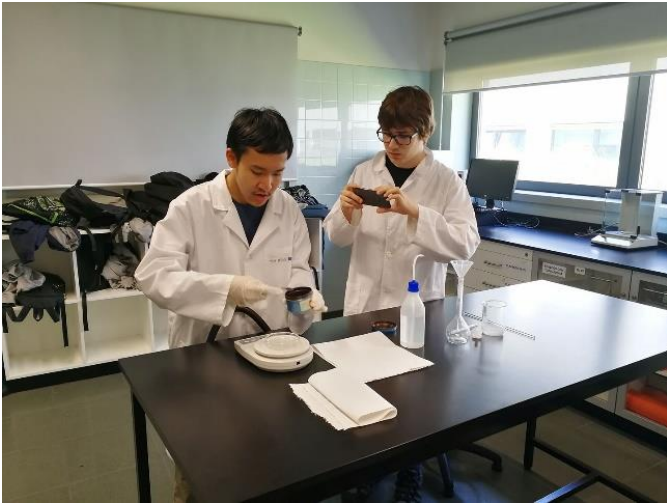


Fig. 8,9,10. Students read a text or watched a video. Authors` collection





- Students performed the experimental activity, took photos or recorded videos (collaborative and practice scenario).



*Fig. 11,12,13,14. Special needs students working (cognitive difficulties, Asperger syndrome and motor cerebral palsy). Author`s collection*





- Students produced a video (APP Animoto).
- Students divided the different tasks of the report among them deciding who was doing what.
- Students wrote a lab report (APP Popplet - collaborative and production scenario).
- Students exported it as a .jpg file and sending it to the teacher.
- Students answered a quiz individually (evaluation scenario).



## Results



Fig 15: Example of a video produced by the students





**popplet: AL 1.0 Ciclo do Cobre**

home view all zoom - + what's popplet?

go fullscreen log in share

**Índice**

1. Introdução
2. Contextualização teórica
3. Objetivos
4. Material
5. Reagentes e produtos
6. Procedimentos
7. Registro de observações
8. Equações químicas
9. Cálculos
10. Conclusões
11. Bibliografia

**Introdução**

Nesta atividade pretende-se realizar uma série de reações químicas que envolvem o elemento cobre e que, por terem o cobre metálico como reagente inicial e produto final da reação, podem ser designadas por "Ciclo do Cobre". Este conjunto de reações mostra que o cobre, tal como outros metais, pode ser reciclado por processos químicos, várias vezes.

**Contextualização teórica**

Os desperdícios provenientes de todo o processo de transformação do cobre e das suas ligas metálicas são recolhidos e vendidos para reciclagem, permitindo diminuir os custos do produto final. Cerca de 40% da produção de cobre e suas ligas metálicas é feita a partir de materiais reciclados, chegando por vezes, este valor a atingir 90% da produção.

A reciclagem do cobre pode realizar-se por processos físicos, como a fusão, ou por processos químicos envolvendo a transformação das espécies químicas em que o metal participa, ou seja, na realização e observação de uma sequência de reações envolvendo este elemento, simulando a sua reciclagem.

O cobre e as ligas metálicas podem ser reciclados por processos baratos, com baixo consumo energético e perdas mínimas de material durante o processo. A viabilidade da indústria do cobre e das suas ligas metálicas está economicamente dependente da reciclagem de todos os seus desperdícios.

**Objetivos**

- Caracterizar a reatividade de elementos metálicos, tendo como exemplo a reatividade do cobre.
- Reconhecer a importância da reciclagem do cobre e as potencialidades da reciclagem dos metais, em geral.
- Identificar alguns problemas de poluição relacionados com a reciclagem do cobre.

**Material**

- 3 copos de precipitação de 250 mL
- proveta de 5 mL
- proveta de 10mL
- proveta de 25 mL
- proveta de 50 mL
- proveta de 100 mL
- Placa de aquecimento
- Balança
- Luvas
- Vidro de relógio

1º ponto de partida:

- Cortar um pedaço de cobre de modo a obter perto de 0,3g
- Pesá-lo e colocá-lo num copo de precipitação de 250 mL.

Fig 16. Lab Report using the Mind Map Popplet [2]



## Conclusions

The activities proposed allowed all the students to have new opportunities to deepen and apply their previous and new learning.

There were intentional contents somehow explored by the different students according to their competences.

There was the promotion of autonomy, organizational management of work and interpersonal relations.

Special needs students brought new strengths into the *classroom and helped to enhance a climate of giving.*

The teacher had a more tutorial role, intervening with those who needed it most and whenever requested. Throughout this process, the students had to reflect on their learning, had to question more, had to reread or revise concepts.





## Acknowledgments

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Thank you.

