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FLIPPED CLASSSROOM

What is the Flipped Classroom model, and how to use it?

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ORIGINS OF THE CONCEPT

The 'Flipped Classroom', also known as the Inverted Classroom, is a concept of school work organization associated with the work of J. Wesley Baker presented in the 11th International Conference on College Teaching and Learning, in Florida in 2000. The communication introduced the concept of "flipping the classroom" using learning management tools based on the web. In the same year, Maureen Lage and colleagues (Lage, Platt, & Treglia, 2000) published in "The Journal of Economic Education" an article where they highlighted the negative effects of the likely gap between existing teaching and students' learning styles, taking into account the diversity of the students. Lage and colleagues noticed that the development of technologies and multimedia resources, their easy access and use, and students' enthusiasm for them, created a favorable environment to their integration in teaching and learning processes. The teaching methodology the authors reveal (Lage, et al., 2000, p. 32) is, in their own words, one that "can appeal to all types of learners. This method uses a variety of teaching styles, although multimedia (in the broadest of definitions) is the cornerstone."

Although the concept is more than a decade old, Jonathan Bergmann and Aaron Sams, both North American chemistry teachers, are frequently quoted as the pioneers of the application of the concept of Flipping Learning. As they state in their book "Flip Your Classroom: Reach Every Student in Every Class Every Day" (Bergmann & Sams, 2012), in 2006 these teachers started teaching in Woodland Park High School, in Colorado, where they have faced a school community from different cultural backgrounds and diverse school perspectives. They observed that students skipped classes because of the different activities that allow them travelling to take part in competitions, games and other events. Bergmann and Sams decided to minimize these losses by recording in video live classes, using for this effect screencasting software, employed to record lectures, demonstrations and presentations with annotated slides. The success was such that in 2012 they decided to create the nonprofit Flipped Learning Network (FLN) organization, whose website (http://flippedlearning.org/) is a good archive of literature and resources for those who wish to learn more about Flipped Classroom.

The relation of the concept Flipped Classroom to online availability of resources and educational contents, defines it commonly as a model of blended learning (b-Learning).

WHAT DOES THE FLIPPED CLASSROOM AIM TO DO?

The Flipped Classroom model tries to make a good use of the technological infrastructures, multimedia resources and digital technologies in order to promote learning and school activities organized in such a way that their focus is the everyday life and activities of the students. Both teachers and investigators have found that most students develop skills in information searching, content production and online publication. They are reachable 24 hours a day online, participate in social networks, have access to content that interests them and learn online. The Flipped Classroom aims to direct these practices of daily access and use of digital networks to study activities and self learning, supported by multimedia resources (above all short videos, screencasts or podcasts) created by the teachers, by other students or already existing in the web. In this way, using classroom time for more interactive activities, e.g. projects, themed discussions, practical exercises or lab work.

WHAT DOES THE FLIPPED CLASSROOM MOVEMENT REALLY AIM TO DO?

It aims to engage teachers in the preparation and selection of learning support materials, structured in such a way that they can be used by students whenever and wherever they want. It also aims to support different rhythms and learning styles and allow the teacher to be a 'guide on the side' in the classroom.

WHAT DOES IT CHANGE?

The traditional classroom is frequently organized as a place where the teacher presents and explains content whilst students listen to and note down all the information provided. The class is usually teacher centered, though one can have a more dialogic approach with the students, depending on one's own perspective. Routinely, in the classroom, all students have to do the same activities, based on the resources available in the classroom and following the same pace and the one established by the teacher. Sometimes, the teacher provides some homework tasks, or asks for exercises to be completed outside the classroom, to reinforce knowledge or elicit further questions.

In the Flipped Classroom model, the teacher provides in advance materials created or selected by him/herself (short videos, screencasts or podcasts), for the students self learning activities, out of the classroom. These activities can be performed when and where the student feels most comfortable, taking into account his/her own learning rhythm. In this model, the student studies the materials and the resources pointed out by the teacher, he/she also identifies his/her difficulties and topics he/she wishes to be cleared. Students also look for extra information and follow their own learning rhythm and can review the learning materials whenever they need to. Classroom time is used for questioning and to deepen the knowledge, in a more personalized learning environment where students can learn side-by-side, in small groups, and the teacher helps them to clear misunderstanding.

In this model the teacher provides resources and plans learning opportunities for the students, proposes specific questions that can direct the learning process. The teacher can anticipate where students need the most help and as a consequence offer activities and experiences in the classroom that adapt to their difficulties and doubts, establishing a logic of questioning and learning valued by several researchers e.g. Rupert Wegerif (Wegerif, 2013; Wegerif& Yang, 2011).

Instead of using classroom time to present information, the teacher has time to clarify doubts, provide extra resources, create activities in the classroom that might be felt as necessary and evaluate immediately the students' performance within the classroom. This way, it promotes the improvement of the quality of learning. This classroom organization model inverts the traditional lecturing classroom concept, creating classes where students are highly engaged in an active and participatory learning.

WHAT IS SIGNIFICANT?

The Flipped Classroom model does not have a true script, however the FLN network (Hamdan, McKnight, McKnight, & Arfstrom, 2013) has defined four main pillars associated to the acronym FLIP (Flexible Environment, Learning Culture, Intentional Content, and Professional Educator).

Flexible Environment: Teachers often need to reorganize physically the learning space in order to make it easier for group work, independent study, search, and student evaluation. They may even need to fall back on other physical spaces that are different from the usual classroom: the playground, the canteen, the library or even outside school places (museums, botanic gardens, etc.). Teachers also need to accept that the classroom might be noisier and have more student movement opposed to simple lecturing classes. On the other hand, the flexibility of the classroom should include learning times and evaluation methods. Therefore, teachers are expected to build suitable evaluation methods, establishing objective criteria that are clear, and can be well understood by both the teachers and the students.

Learning Culture: In the traditional model the teacher is the main source of information, the possessor of the wisdom and responsible for "knowledge transfer" to students often using a directive model. In the inverted classroom model, the teacher consciously frees him/herself to the student. The classroom is taken to explore themes in a deeper way, giving rise to richer learning opportunities, more diverse and adjusted to the students' difficulties and needs. The students are actively involved in processing the information, shaping the knowledge through participation opportunities and self evaluation in a significant way. Students can take part or develop pair or larger groups learning activities, like for instance, taking part in learning activities out of the classroom. This learning culture is highly studied and highlighted by Eric Mazur (1996).

The inverted classroom model prioritizes learning activities inspired in Vygotsky's (1978) proximal development zone, challenging students to leave their comfort zone, without discouragement or criticism. In the classroom students will be supported by the teacher, who will orient and support them

in the conceptual understanding and orientation, favoring 1:1 interaction, and will assure the legitimacy of the learning.

Intentional Content: The teacher has to evaluate carefully which content he/she needs to explore in direct teaching and which contents he/she needs to hand out or suggest to students for the self or group study. The teacher needs to know or identify the main competences and difficulties of the students in the subject the contents belong to. He/She also needs to know and identify the access and use conditions of resources and digital technologies by all the students.

The goal is to undertake active strategies, draw activities based on problems, done in pairs, for example, and clearly associated with the content to be learnt. It is not meaningless the deep knowledge of what students are able to understand and how they can integrate new concepts with preexisting knowledge.

Professional Educator: In order to use successfully the inverted classroom model, teachers have to be highly professional and qualified, as this model is likely more demanding than the traditional. It is imperative that the teacher understands the optimal moment to use directive teaching or self learning resources. This way the teacher has more time in the classroom to take an individual teaching process and amplifies face-to-face interactions (1:1) between teacher and student and interactions among students.

On the other hand, the teacher has to be able to anticipate difficulties the students might face, encouraging questions, motivating and generating learning dynamics both in group or individual and produce or select carefully quality resources that lead to the students' self learning. Also, the teacher has to follow up constantly their students and offer them any immediate and relevant feedback, evaluating continuously their work. The "Flipped" teacher is a reflexive professional in his/her practices, a teacher who can manage his/her lesson plan in a flexible way, and is able to deal with any unforeseeable dynamics in the classroom, taking into account different learning rhythms, contributions, interests and problems the students might arise with.

Before adopting the Flipped Classroom model the teacher has to make sure that the students with whom he/she is going to work have the necessary access conditions and adequate knowledge in what technologies are concerned and the necessary digital services to develop the activities. The teacher also needs to check if there are any special needs students in such a way that he/she can promote adequate access conditions and digital access of the educational resources as well as the need of supportive devices to the use of technology (hardware and software).

WHY CHANGE?

The model encourages students with lower learning rhythms, higher concentration difficulty or difficulty in following lectures, but also those students who learn fast and get impatient when teachers are constantly repeating explanations and demonstrations. It is also useful for students who have little time to study, because they are enrolled in other activities or because they lack in time to attend classes. This way, the Flipped Classroom model creates conditions for the range of students in classes.

Reversing the logic of the classroom, transforming it in a space centered in the students' activities, increases the involvement of students in group activities, collaboration and cooperation in solving problems, makes learning easier and offers good opportunities to practice communication skills and team work.

Once the teachers are closer to students and interact with them more frequently, they naturally know them better and this can reinforce the relationship between them. Being closer to students and knowing them better allows the teacher to build the most accurate, fair and correct idea about the students' skills, problems and difficulties, not only as intellectual beings but also as social beings. It can also contribute to adequate the quantity of work given to some students or groups matching it to their performances and capacities. In short, the flipped classroom model can improve socialization and reduce the unfairness and inequity that arise from differences between learning rhythms, allowing the students to receive more individual help in the classroom.

HOW TO USE THE FLIPPED CLASSROOM MODEL?

Flipped Classroom (FC) learning stories are intended to be used as if the classroom was inverted. The Flipped Classroom aims to engage students in the preparation of a prototype class or workshop on a topic related to the curriculum, rather than the teacher being responsible for organizing all the resources for students to work on. Students organize themselves in teams in order to present the content, according to their own technical, aesthetic, and organizational preferences. Therefore, most study will occur outside the classroom, at home, at their own pace and according to their preferences. In order for this to happen, teachers need to prepare resources that can be used as initiators of the study, contextualizing the new learning activities intended to promote new knowledge regarding students' previous learning. Video can be used to present the new topic students must study and explore, as it can be easily distributed online and is accessible from anywhere. In addition, video can be reviewed as often as necessary, at different speeds or in excerpts. The key idea is to enable students to engage with the new content in a natural way, appealing and motivating their interest.

At school, the teacher needs to develop strategies of inquiry and explanation to clarify the most important aspects of the whole process. Given this goal, videos prepared should include questions which make students reflect upon and question themselves as well as bring out topics and ideas for

further discussion. Among the learning objectives of the FC model, the key ones are the development of individual skills, collaboration and self-study, self-learning organization, research, development of critical thinking and learning how to learn.

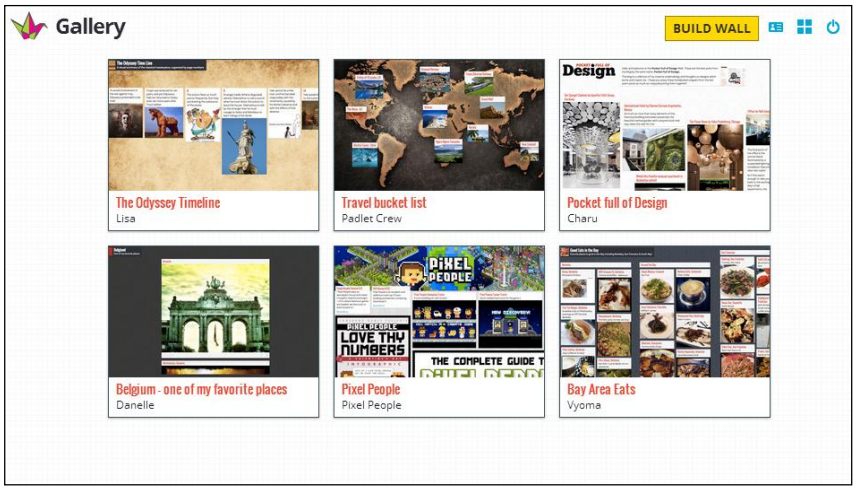
When planning Learning Activities (LA), teachers must take into account the physical and virtual environments where learning activities take place, what technologies required are available, and what their own roles are and those performed by students and family members/parents or others, e.g. experts, students' friends, classmates, etc., allowing students the possibility of developing teamwork outside school. Even so, the teacher needs to allow students some time to perform individual and collaborative tasks in teams, in the classroom or in the laboratory, depending on students' needs and styles. The teacher also needs to plan and design moments of reflection and building assessment tools for students and for the teacher him/herself.

Dream

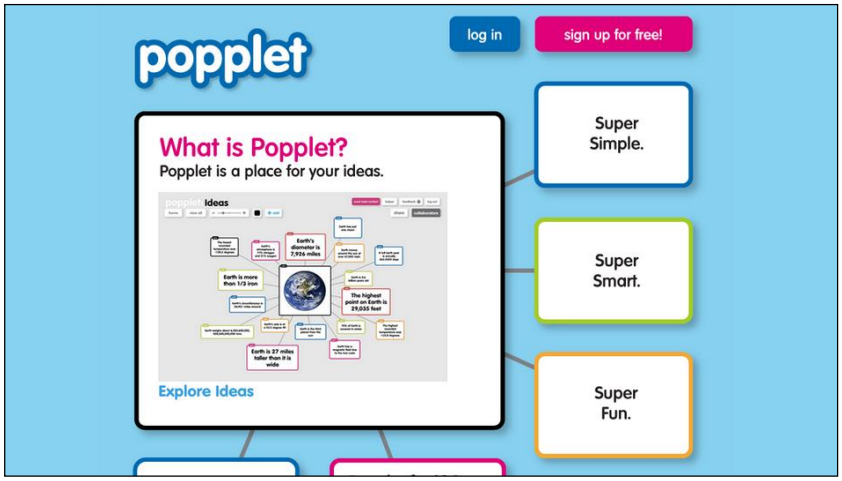
Preparing a Dream activity in the inverted classroom (Flipped Classroom) should begin with the teacher summarizing the topic to study and briefly presents the design of the activity, by giving examples, illustrating the working model he/she proposes. The teacher proposes the tasks and negotiates with students the evaluation criteria, using an inquisitive approach, by questioning, in order to provide the best possible understanding of the objectives, strategies and expected outcomes, always leaving room for students' suggestions and for change. Students should be committed in the discussion of the task project, team organization and should lead the process under the teacher’s supervision. Students should start by brainstorming about the Flipped Classroom activities, deciding which functions for each element in the group, reflecting and recording decisions. The classroom is reversed in comparison with traditional organization, as it focuses on learning activities that students develop. On the one hand, the teacher takes the role of an advisor, and on the other hand as time manager, organizational strategy and learning spaces manager.

Online tools you might use:

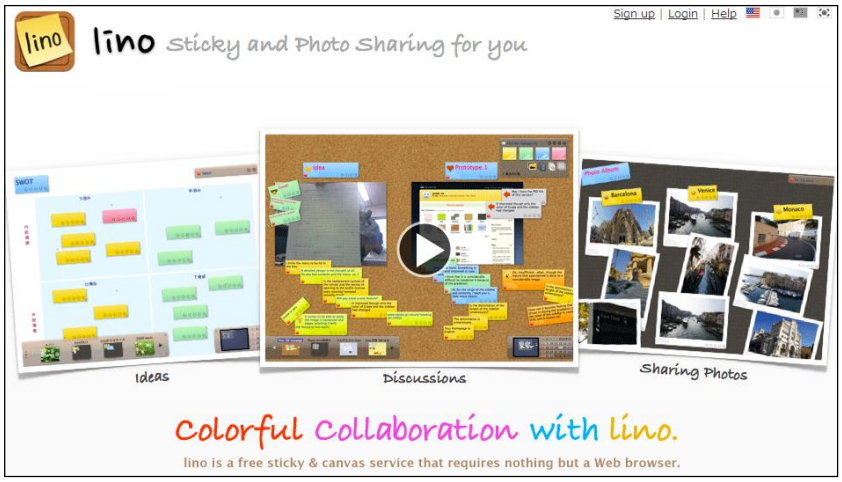
Padlet (http://padlet.com/) is a web application which enables ideas to be expressed on a topic and to be easily organized. It could be useful to present a proposal for a work project, to design a project or learning scenario. Padlet allows embedding online documents (e.g. images, video, pdf, etc.), and documents that can be uploaded from a computer.



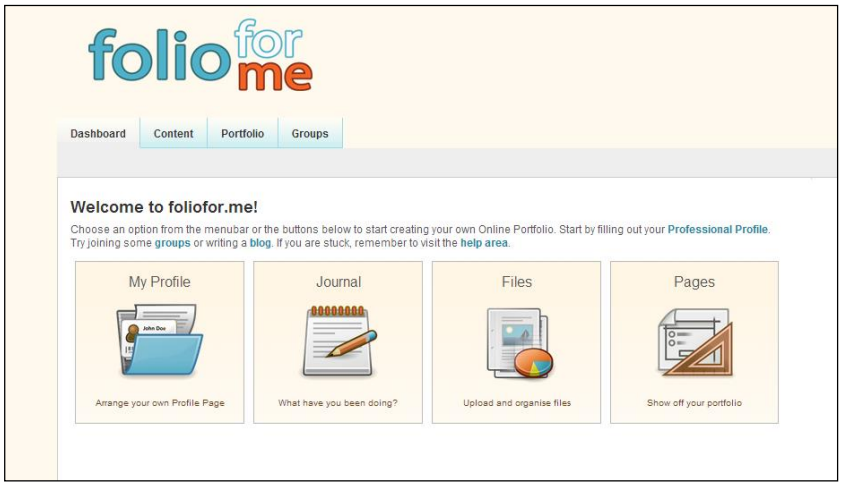
Popplet (http://popplet.com/) is an internet application that can be used to record a brainstorming session, allowing people to express their thoughts about a certain topic in an easy and visual way, organizing ideas and concepts and their relations by linking them, creating a mapped structure of concepts, ideas or flow options. The application allows collaborative use by different users, from any kind of device. It is a kind of multimedia friendly tool, free-form or a real-time wiki.



Lino-it (http://en.linoit.com/) is a web application similar to a corkboard where you can post sticky notes, create a structure of information that you collect. One can express him/herself by the means of text or graphics, video or files existing online or uploaded from computers.



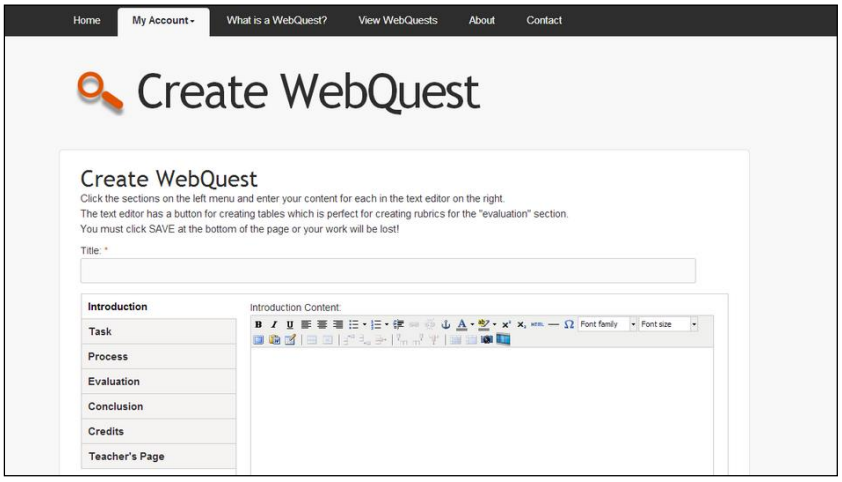
FolioFor.me (http://foliofor.me/) is an online system to create e-portfolios based on Mahara. It allows uploading documents from a computer or an already published online.



Explore

The "Explore" learning activities, are intended for students to do research on topics of their choice. These tasks should be achieved in groups and individually and monitored by the teacher, who plans online activities in order to guide exploratory learning. Students should investigate, find and collect resources that the teacher suggests. The range of tools teachers have available is of the WebQuest and blog type.

Online tools you might use: WebQuest (http://createwebquest.com/) is a system that allows creating and sharing online learning-oriented activities following the model developed by Bernie Dodge at the San Diego State University. Usually a WebQuest has 6 sections: Introduction, Task, Process, Evaluation, Conclusion and References or Credits. You can learn more about the different WebQuest sections or components (in Portuguese: http://webs.ie.uminho.pt/aac/webquest/, in English: http://webquest.org/). See examples in QuestGarden http://questgarden.com/

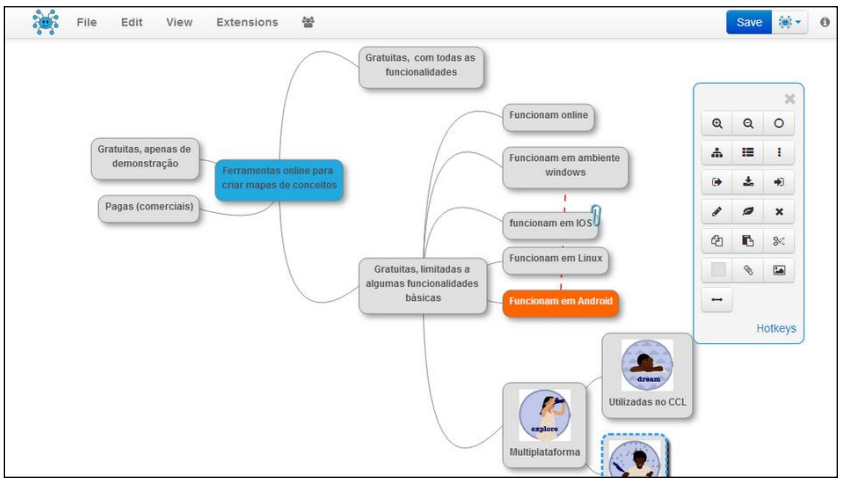


Map

This activity aims to help students organize their learning tasks in a logical way, and share them later with peers. Working in small groups, students can use existing tools in Virtual Learning Environments like Edmodo or Moodle or can take advantage of tools like Padlet, Popplet and Lino-it, as shown above, or make use of other tools to build concept maps as MindMup.

Online tools you might use:

MindMup (http://www.mindmup.com) is an Internet application that helps to construct concept maps, which easily integrates with Google Drive. Concept maps can be collaboratively edited, shared and exported in different formats (e.g. PNG, HTML, FreeMind).



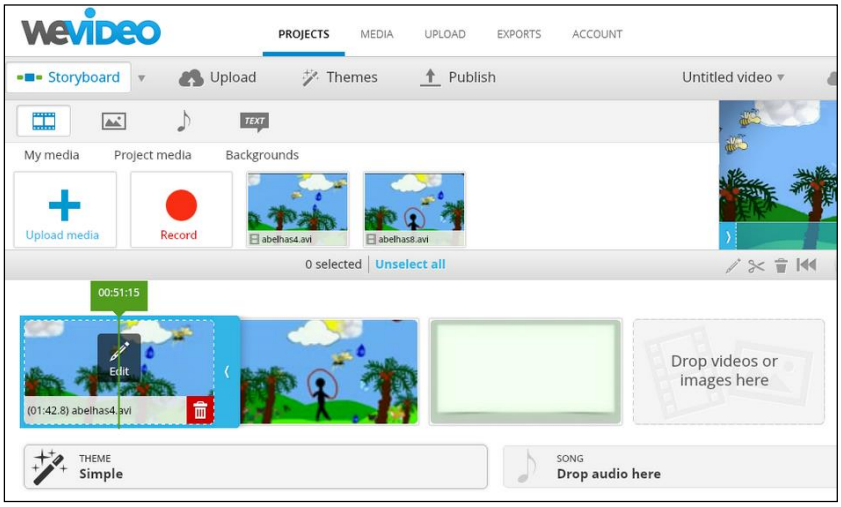
Make

Once students have understood the objectives of their work they will be able to organize and record their investigations and share their conclusions in the discussions. Students need to take notes and record facts and information that will help them to deepen the knowledge on the topics under study and in order to prepare its prototype classroom or workshop. Teacher should encourage the use of digital tools to record data and activities. The use of tablets, photo and video cameras, as well as editing software for audio and video annotation, becomes very relevant now. In class, while monitoring progress and inquiring teams, the teacher can encourage discussions between groups. By supporting

their learning, evaluating and suggesting alternative strategies or tools, teacher reaches an advisory, specialist and manager role, crucial to the success of the project.

Online tools you might use:

WeVideo (https://www.wevideo.com/) is an online video editing enabling the use of our own resources (sources of video, images and audio). The interface is simple and intuitive. Once the video is rendered the publication can be made directly in some video distributors like YouTube or Vimeo or shared online through Google Drive or DropBox for instance.



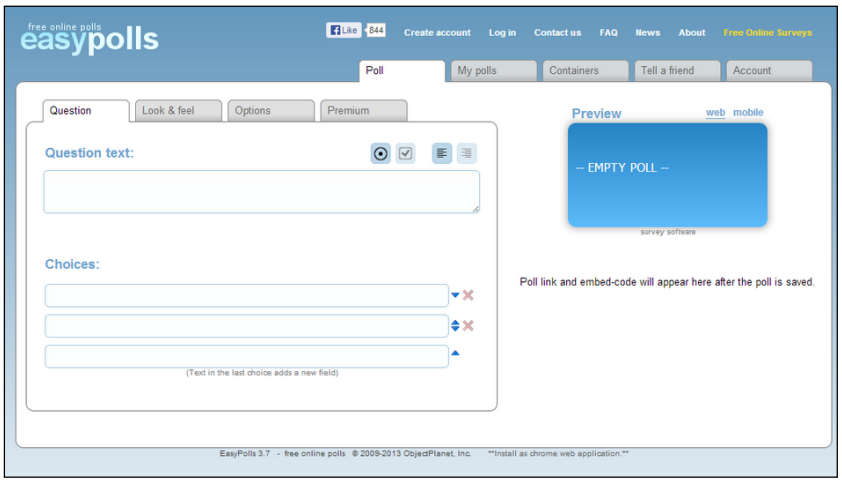
Loopster (http://www.loopster.com) is an online application for nonlinear video editing, using a traditional interface. Resources like audio, video and images can be transferred from the user's computer. The storage capacity is 2.5 GB and the lifetime of the resources is 1 month only. After editing, the system renders the video and sends an email message with a link to the video. Users can decide if the publication is public, personal, or restricted.

Ask

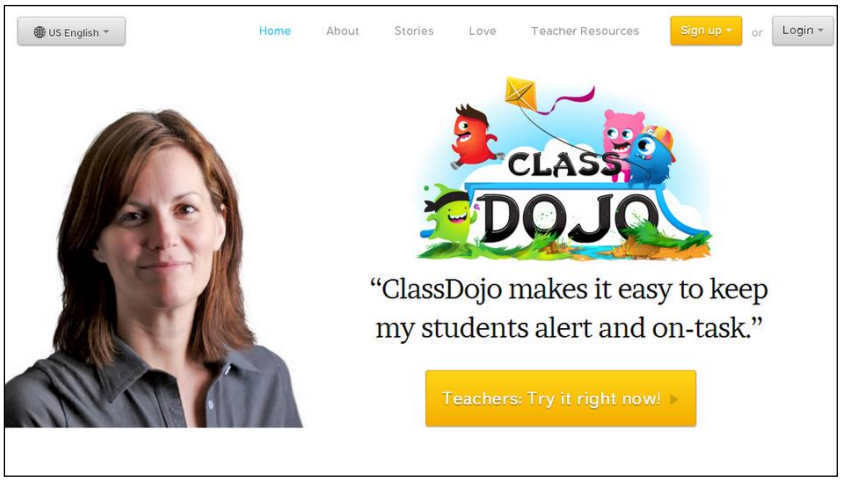
The Ask activity is intended to analyze the work of the Flipped Classroom model students are planning. They need to ask experts' or teachers' or even their parents' opinion about the project they are preparing. Tasks involve online discussion, where students' families can take part as well as external experts. Students must lead the process, while teacher and/or family members or experts should support, monitor and evaluate their tasks. This activity is intended for teams to present their project lecture or workshop on the topic they had been proposed, in order to validate their ideas and proposals and to improve it. Virtual Learning Environments such as Moodle can be used to enable distance collaboration between the different stakeholders. Other tools for online voting and organizing ideas, comments and reflections can also be useful. In the classroom or in a small lab, interactive devices can be used to facilitate students the presentation of their project.

Online tools you might use:

EasyPolls (http://www.easypolls.net/) is a very effective and comprehensive system to conduct online polls. Students can use this feature to decide on various options or to choose the subjects of their discussions.



ClassDojo (http://www.classdojo.com/) is a fully online class manager that can track students' progress. Teachers can use it to record student learning and share it with them and with their families, while maintaining a level of assessment and information updated and accessible. Students can access a set of reviews and information about their performance which contributes to self-regulation of their attitudes and behaviors. Family members can also track the progress of students, accessing information and records that the teacher registers on the platform.



Re-make

In the Re-make learning activity, students redesign the project outputs, taking into account the validation results collected in previous activities. The teacher should monitor the activities, ensuring that all students are involved in the redesign of tasks, assessing their redesign suggestions and motivating them to improve their proposals.

Show

This activity corresponds to project completion, and is set out to present the process and the results to the class and eventually to classmates, family and community. The use of multimedia materials, video and other documents constitutes an appealing strategy that works well. In addition, it improves students' self-esteem as they are the authors of the project. Moreover, public performance might inspire other students, by creating opportunities to enfold others and contributes to find out different and valuable uses of the product. The publication of the resulting products and projects can be carried through blogs, delivery video channels and learning platforms such as Moodle, Edmodo, etc. We should not forget the need to reflect upon the process and outcomes and seek future developments. The teacher has a prominent role in the dissemination, evaluation of student work and encouragement to improve future projects. The feedback he/she gives is also very important for other elements of the school community and family or experts who have been involved, because it shows the institutional recognition of the importance of the learning model.

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