TOOLKIT SECTION 2.

Digital /Visual Tools for
IDEATION + VISUALISATION

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2. Digital/Visual Tools for Ideation and Visualisation

Visualisation and Ideation are two key elements in the application of engineering and vocational education. The visualisation process involves the creation of images, diagrams, or animations to communicate abstract and concrete ideas. Ideation is the creative process of generating, developing, and communicating new ideas.

With the assistance of 35 Engineering Educators, we present three of the most practical and useful digital tools that engineering educators can use to help their students visualise and imagine new ideas.

1. Coggle
2. Marvel App
3. Padlet
4. Pinterest

But first…
WHAT IS IDEATION?

Ideation is the process of generating ideas. This ideation process focuses on trying to figure out various solutions to a problem or to meet a desired goals.

Did you know that Ideation is a key step in the increasingly popular DESIGN THINKING process?

The ideation process is all about coming up with solutions that are based on a problem statement.

During ideation, the main concern is not about finding the best solution but about creating several innovative solutions through brainstorming and other techniques
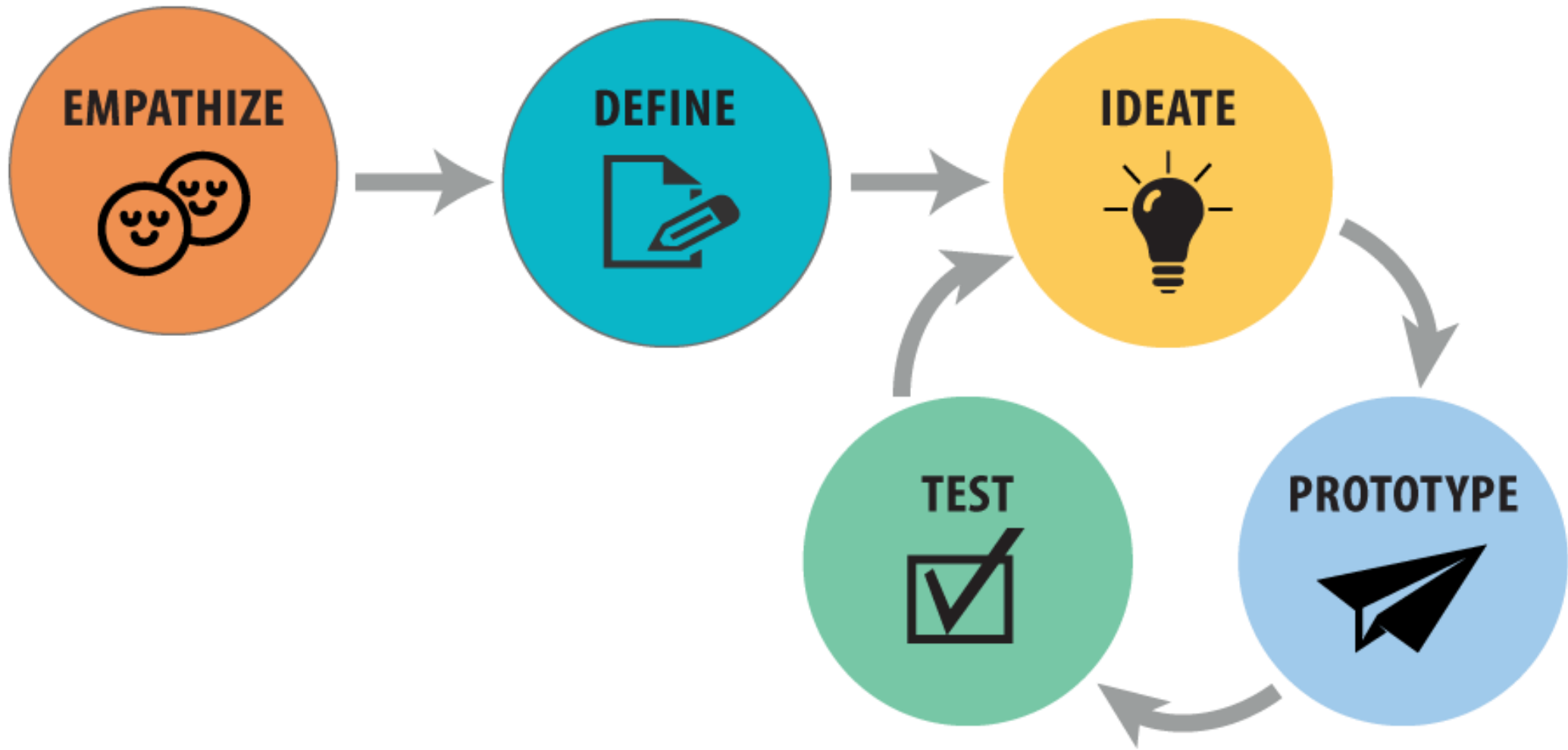
Illustration of The Design Thinking Process (a simple example of visual concept communication in action)

WHAT IS VISUALIATION?

The visualisation process involves the creation of images, diagrams, or animations to communicate abstract and concrete ideas.

Visualisation has a key role to play in engineering graphics and the creation of engineering drawings. These are representations of physical objects/locations on paper (or in 2 dimensional or 3 dimensional electronic format).
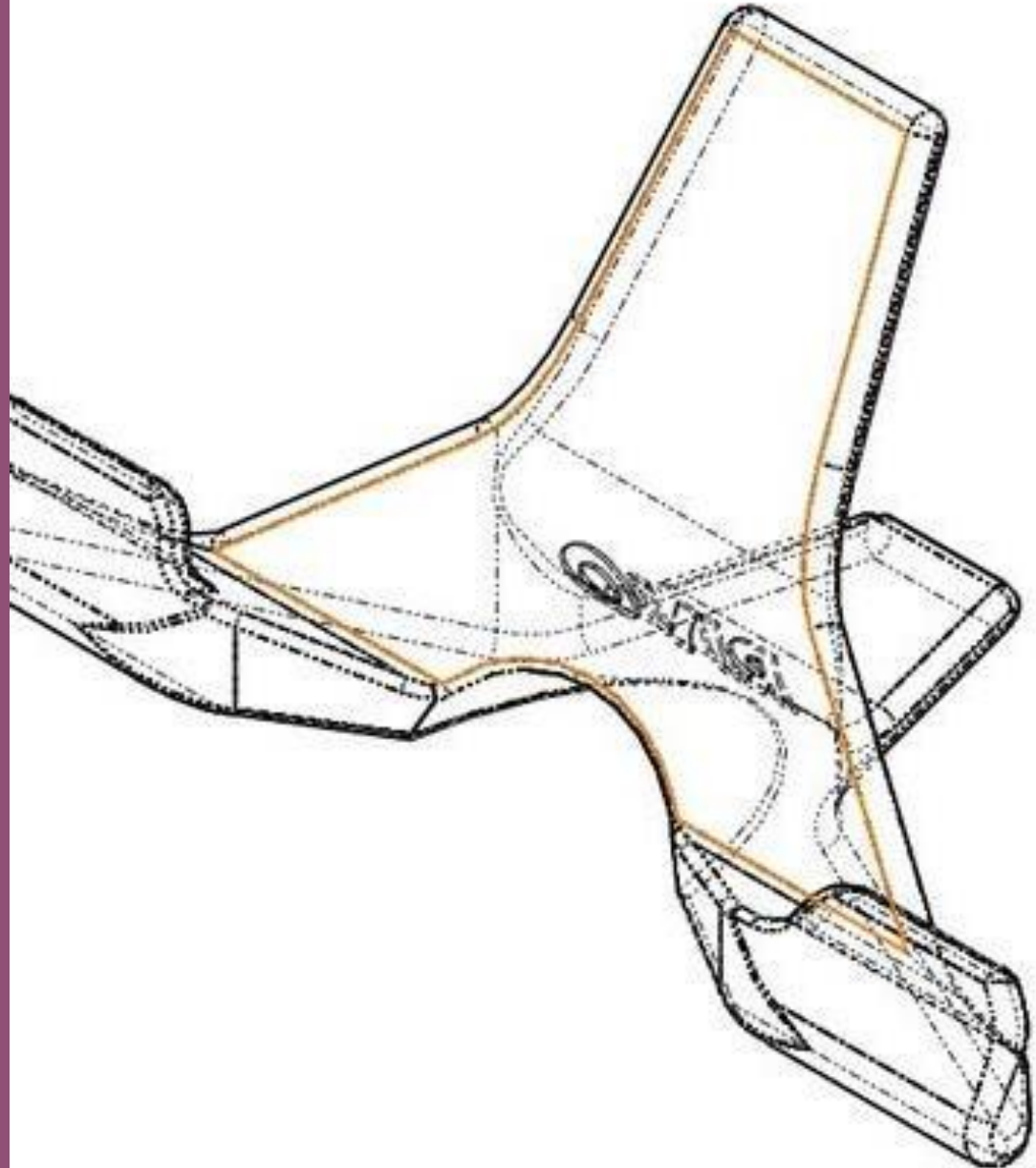
Coggle "In a Nutshell"

Coggle is an online tool for creating and sharing mindmaps and flow charts, by producing hierarchically branched structured documents. Is an interesting tool to help creative activities, such as brainstorming sessions. Engineering educators and students can find in this app a resource to visualize ideas and sharing in distance classroom sessions.

As a visual literacy tool, Coggle can be used to share ideas by visual media and to help solving problems, developing the communication and creation competences also helps understanding complex information, so it supports visual analysis. Coggle main features are Real-time collaboration, Unlimited diagrams, unlimited image uploads, full change history, markdown support, download as PDF & Image, export as .mm and text. It is also integrated with Google Drive.
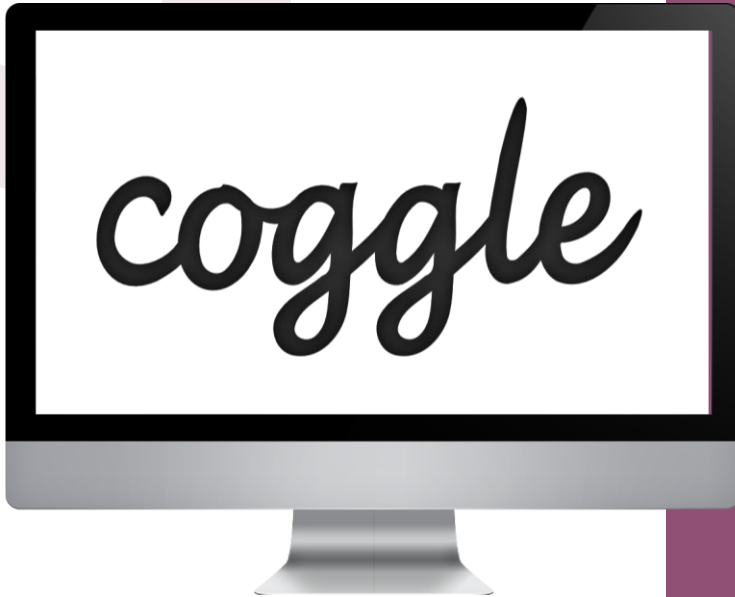
Coggle Advantages

- Simple and easy to use
- Applicable to all fields of engineering as any image or video can be made interactive
- Multiple uses – Coggle can be used for mind mapping, as well as for diagramming
- Easy to create colorful and professional presentations to share
- Students and educators can work on assignments together
- Allows real-time collaboration

Coggle Disadvantages

- The limited number of colors available becomes a limitation whenever trying to map complex processes
- There seems to be no way to auto-arrange the branches
- There are no other ways to customize the look of the mindmap e.g. via themes
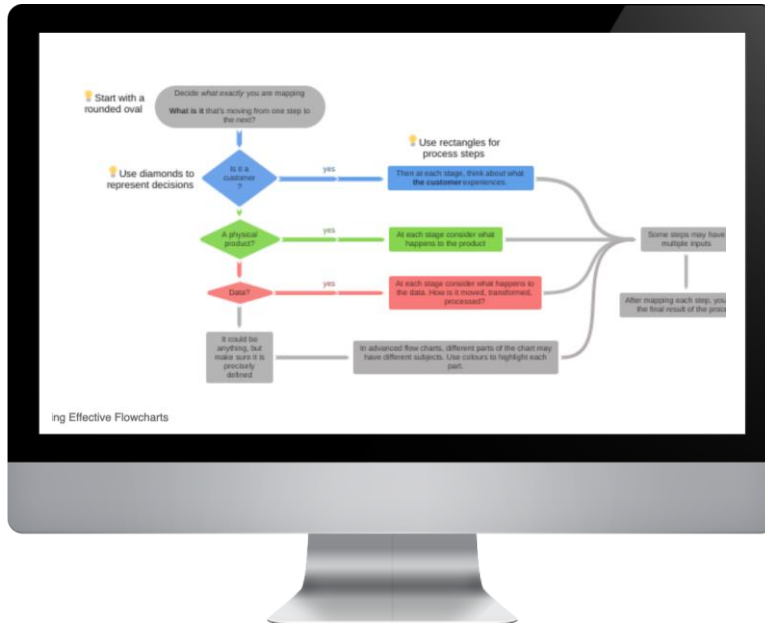- The free version is quite limited

Coggle Feedback/Insights

" Coggle challenges students to organize their ideas visually while also promoting collaboration among students and teachers. These features help students discover important connections that can lead to a better understanding of content "
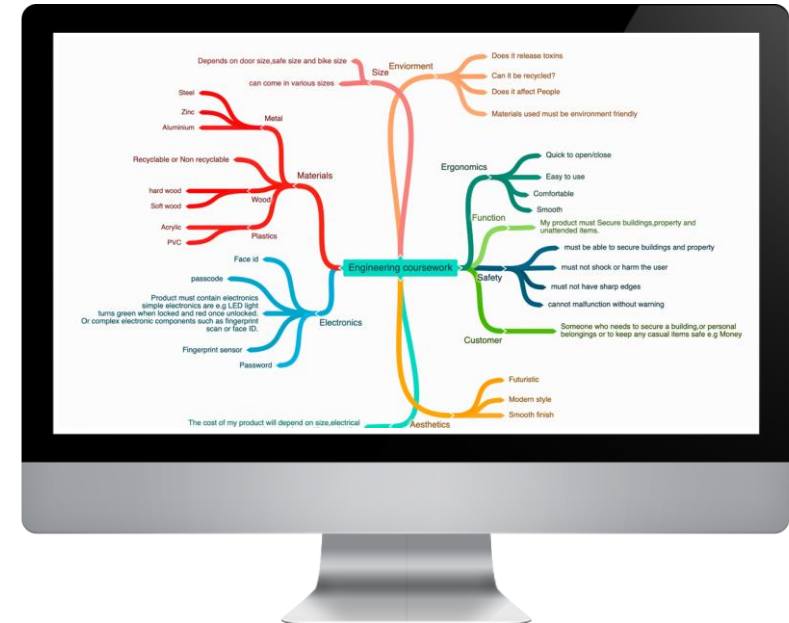
Coggle Engineering Educator User

Coggle - In Action

Second example illustrates how to use concept maps in engineering classroom

PBL (project based learning) approaches can be supported by using a coggle planning scheme

Marvel App "In a Nutshell"

Marvel allows you to transform sketches or photoshop files into interactive application prototypes. It takes a few moments and is powered by Dropbox. The intuitive interface is designed to simplify, speed up and make the process of creating a prototype as easy as possible. How does it working? Just upload any images (.psd, .jpg, .gif or .png) from Dropbox and start combining them with each other.

Prototypes can be played on iPhones, iPads, Android smartphones, online or even on handheld game consoles. Marvel can prove to be a helpful tool for many application designers, UX experts, startups, interactive agencies, businessmen and even students. Application developers will no longer have to bother with "dry" translation, which they basically mean - they can quickly sketch it and present it as a prototype.

➕ Marvel App Advantages

- Design and wireframe is made easy, no coding experience is required
- Automatic sync - Marvel syncs to Google Drive and Dropbox
- Add Transitions and Gestures that deliver the powerful user experiences
- Sharing prototypes is easy on devices such as desktop or Apple watch
- Collaborate with Ease it is easy to add messages directly to the prototype and annotate any specific areas

➖ Marvel App Disadvantages

- The trial version has limited options to add new users and more projects
- Navigating around different screens can becoming confusing
- Mobile prototyping can be easily done, but there is lack of few mobile elements which is available in the competitor apps. Plugins for other apps are a bit slow.
- It doesn't support more advanced features like animation.

Marvel App Feedback/Insights

"_Marvel is one of the most used tools during my classes. It allows students to easily transform ideas into real projects. It is a very easy-to-use tool, thus encouraging students to create own prototypes of applications. Thanks to the feedback function, students can improve and modify their applications at any time_ **"**

Katarzyna Łobacz, Engineering Lecturer, Poland

Marvel App - In Action
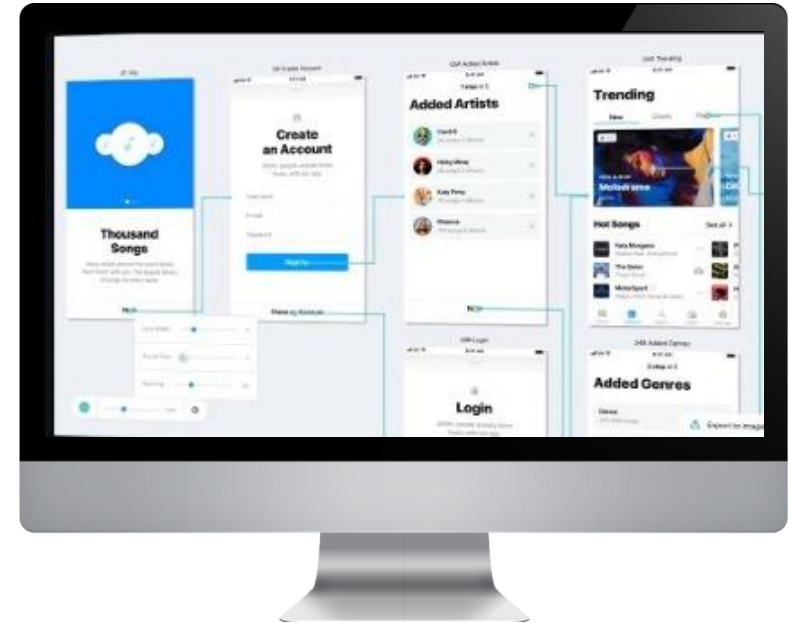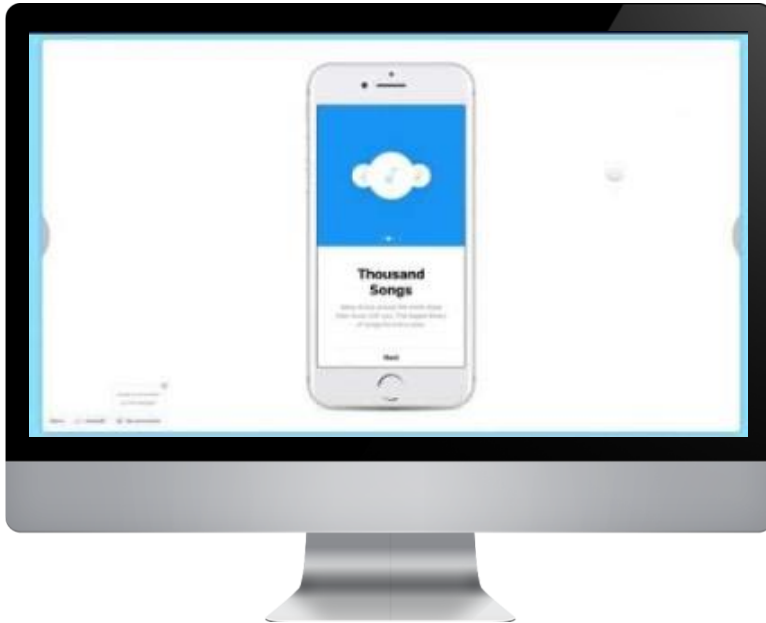
Marvel App helps to create prototypes of applications in an easy way. Here are some examples how Marvel App works. All examples are also presented on Marvel official website https://marvelapp.com/examples

https://www.youtube.com/channel/UCPyHK9eJgCs-fkq4yxc1EXw

Padlet "In a Nutshell"

Padlet is a web application that allows users to create simple online interactive spaces or walls with 'sticky notes' by double-clicking anywhere, and uploading - or linking to - images, files, videos and sound recordings. Web pages and media will appear and play directly on the Padlet wall, providing a very appealing user experience.

As a visual literacy tool, Padlet can be used by engineering educators to provide educators and student learners with a space to collaborate and curate web-based resources or generate ideas together. The classic version of the tool is free, but there are premium versions that offer more privacy, security, branding, user management and monitoring. You can use brainstorm ideas with a class, to collect and share website links, to share assignments and announcements, to facilitate class discussions and to collect/display student work.

padlet

Padlet Advantages

- Easy to use tool for educators and students alike

- Interactive wall is easy to engage with and learn from

- Padlet can be linked to or embedded within a VLE such as Moodle, and learners can view or share multimedia resources with each other easily

- Free version has great functionality

Padlet Disadvantages

- Free version has limitations such as 3 walls/account active at any time

- Limit of 25MB upload on direct videos

Padlet Feedback/Insights

" *Padlet is a flexible and really easy to use tool that my colleagues and I enjoy using to provide visual design and literacy in our engineering courses and programmes. Our students love it too!* "
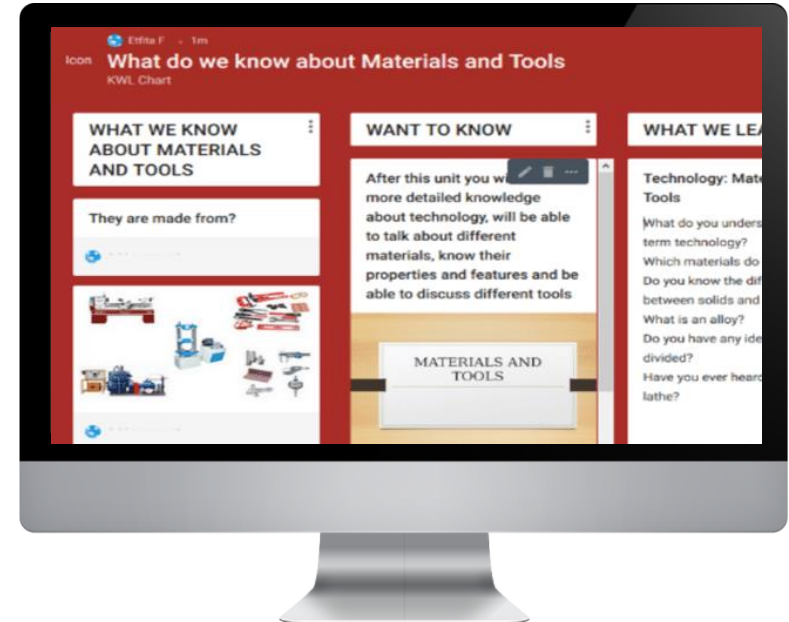
Engineering Educator, Ireland

Padlet - In Action

In this video, Matt Lambert describes expectations for engineering social padlet and shows how to use padlet.

Developing English Learning Materials for Mechanical Engineering Students Using Padlet Source

Pinterest "In a Nutshell"

Pinterest is a visual discovery engine for finding ideas like recipes, home and style inspiration, and more. Is a tool that engineering educators can use as a visual information source as well as to distance learning courses. Pinterest allows engineering educators to create inspiration or content-curated boards for topics related on a specific subject, e.g. design. Projects, and then "pin" images, graphics and tutorial videos.

Pinterest is an excellent tool for sharing visual content. You can share your ideas and classroom hacks with other teachers or show students examples of what their projects should look like once completed. As a visual literacy tool, Pinterest can serve as a visual information channel for sharing ideas among teacher and learners, as well as to practice interpretation of visual messages from its source images.

Pinterest Advantages

- Simple and easy to use
- Applicable to all fields of engineering as any image or video can be made interactive
- Multiple uses – can be used for sharing ideas, as a visual library of ideas, collaborative tasks, online courses and more
- Pinterest provides opportunity for personalized feedback, as the teacher can leave comments on pins.
- Pinterest allows peer review, so students can review and critique other students' work

Pinterest Disadvantages

- There is no evaluation feature on Pinterest.
- The related images feature may be disruptive.
- Images are copyrighted, so you cannot use it for other purposes than being a learning source.
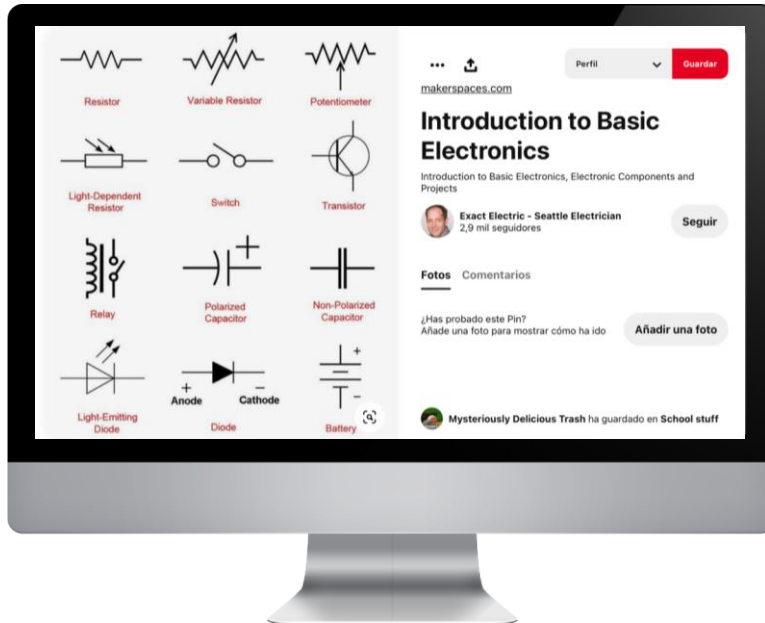
Pinterest Feedback/Insights

" It's not only that Pinterest is a great source for inspiration - Pinterest boards are also great for all kinds of collaborative and personal projects on the platform itself "
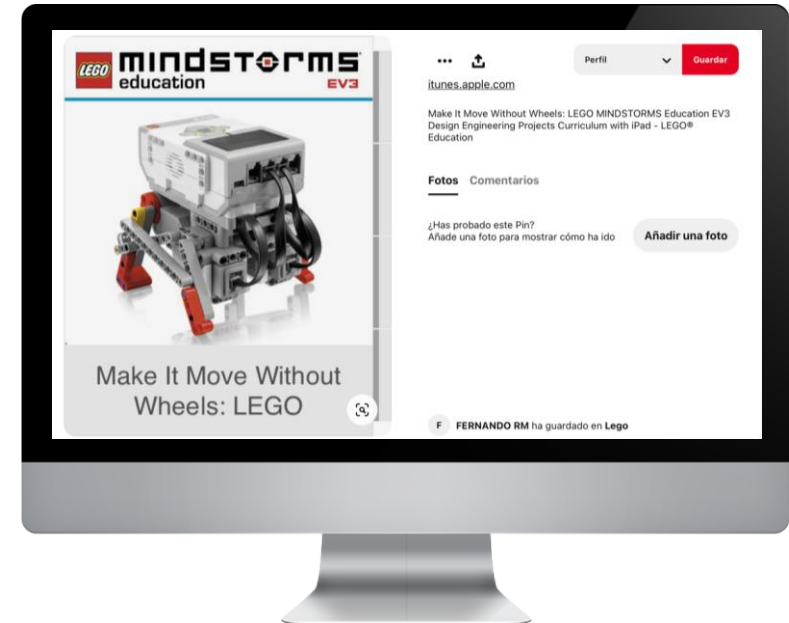
Engineering Graphics Educator

Pinterest - In Action

We show some examples to how to use Pinterest for engineering classes, as a powerful visual resource.
First, we can see a basic course on electronic

Monographic robotic courses such as shown for LEGO © MINDSTORMS are another interesting example to how to use Pinterest for technical learning

Next up...

Section 3 - Digital/Visual Tools for Research + Planning