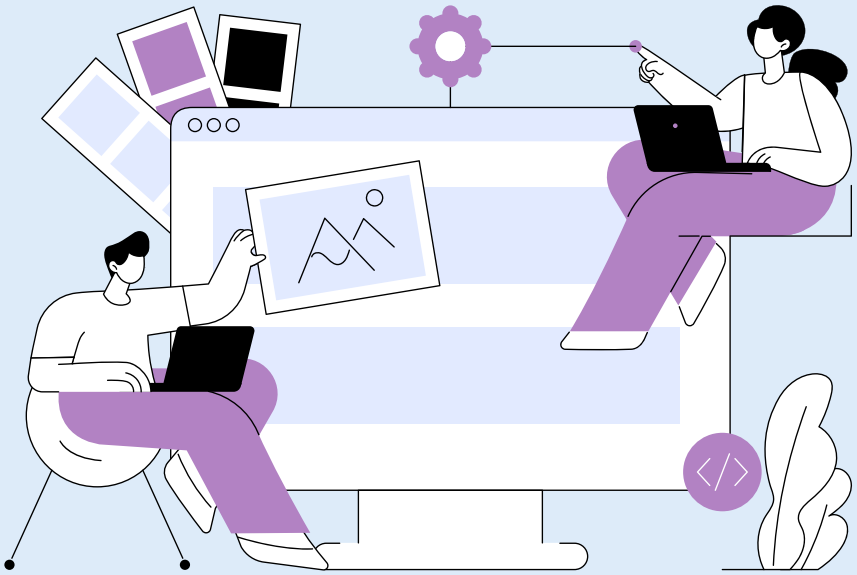
P4ELECS
Platform for Electrification Skills & Competences

Quicksheet

Powerful visuals for (technical) learning



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About

In engineering and technical education, visual elements are essential. They **clarify complex systems, illustrate abstract processes, and enhance learner engagement**.
However, not all visuals are equally effective. This quicksheet provides practical guidance on **selecting, creating, and integrating high-quality visuals** that are both **technically accurate** and **pedagogically meaningful.**

Related quicksheets:

- ***Multimedia principles for effective learning*** for more on combining vidsuals with audio and text
- ***Creating knowlegde clips*** for how to combine visuals with spoken explanations in short videos.

About

Intellectual property (IP) refers to creations of the mind, such as inventions, designs, videos, images, software and brand elements, that are protected by law. As a content creator working on a building block, you often create and reuse materials. This brings you into direct contact with IP issues.

Understanding IP is crucial for:

- Avoiding unintended copyright violations
- Sharing your work in a legally safe and open way
- Making agreements when collaborating with colleagues or students
- Building a reusable, open library of high-quality educational content

When working on a building block, ask yourself:

- Who owns the material I am using?
- Am I allowed to reuse, modify or distribute it?
- What license should I apply to my own material?
- Who owns co-created content and how do we agree on usage rights?

IP is divided into two main categories:

Category	It covers...	Example
Industrial property	Patents, trademarks, inustrial designs, origin labels	• Logos or product design (! rarely relevant in educational settings!).
Copyright	Text, videos, slides, audio, graphics, software code	• Lecture videos, diagrams, PowerPoints, educational tools.

There are four primary types of intellectual property protection:

Type	What it protects	Example
Copyright	Original work (not ideas)	• A lesson video or worksheet
Creative commons	A way to license your copyright for open use	• Publishing slides under CC BY-NC-SA
Trademark	Brand names, logos, slogans	• Your institution's name and logo
Trade secret	Confidential business or technical info	• Internal rubrics or unpublished software tools

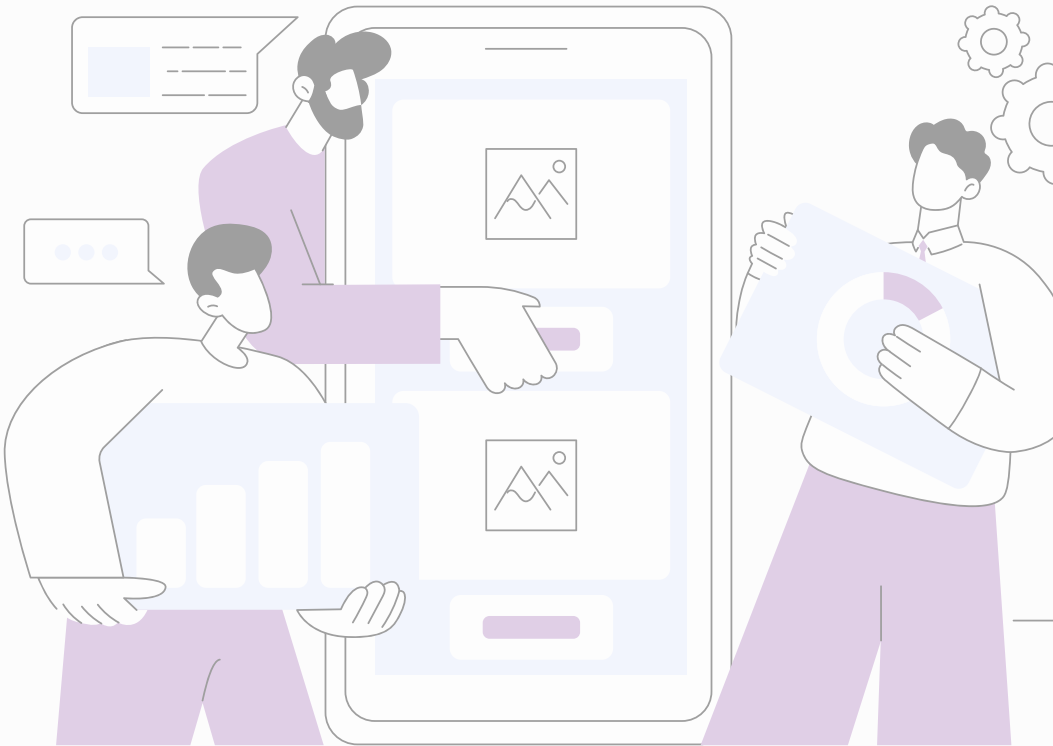
Benefits

For educators and content creators:

- Easier to explain complex topics
- Save time by reducing long text explanations
- Visuals can be reused across different formats (slides, videos, knowledgeclips)

For learners:

- Easier to understand difficult concepts
- Can help to remember information
- Can help to stay maintain focused during learning



Step by step: Using high quality visuals

Step 1: Select the appropriate visual format

Figure 1: photo of the Machu Pichu

- **Photographs or realistic images**: useful for contextualization or showcasing real-life equipment.

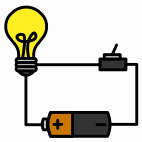


Figure 2: Electrical scheme

- **Diagrams or schematics**: ideal for illustrating processes or components that can not be shown on a photo.

Figure 3: Icon for High Voltage

- **Icons and symbols**: effective for abstract concepts, interface design, or instructional steps.

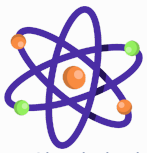


Figure 4: Chemical animation

- **Animations or GIFs**: visualize dynamic systems, movement, or change over time.

Figure 5: Infographic about money

- **Infographics**: combine data, text, and imagery into a concise, accessible format

Step 2: Ensure technical and visual quality

Aspect	Guideline
Resolution	Minimum 150 dpi for clarity on screen and in print
File formats	Photos: JPG, PNG Vector graphics: SVG (scales without quality loss) Animations: MP4 or GIF
File size	Keep images under 1MB when possible for quick loading TinyPNG or Squoosh can help compress images
Background	Use transparent backgrounds (PNG, SVG) or consistent color themes for visual cohesion

Step 3: Use licensed and properly attributed sources

Always use visuals that are:

- Copyright-free (e.g., CC0 or CC-BY licenses)
- From reputable image libraries
- Not extracted from copyrighted books, websites, or publications without permission
- Read the quicksheet on Intellectual Property in education to ensure legal and ethical use of visuals.

Recommended libraries:

- Photos: Unsplash, Pexels, Pixabay
- Icons and vectors: Flaticon, The Noun Project, Iconmonstr
- Technical/scientific visuals: Wikimedia Commons, OpenClipart

Step 4 (optional): Generate visuals using AI tools

- Tools such as DALL·E, Microsoft Copilot Designer, and Leonardo.ai allow for quick creation of custom visuals based on text prompts
    - Tip: Search open image databases for reusable visuals first. Use AI generation only if you can't find a suitable image. This reduces unnecessary energy consumption and contributes to sustainable content creation.

- Ensure that visuals are:
    - Technically accurate and relevant
    - Ethically sound and appropriate
    - Free from bias, stereotypes, or misleading elements

For practical guidance on prompt writing, see the quicksheet on Using AI as a Teaching Assistant.

Tips

- Pair visuals with concise explanations or captions
- Maintain consistent colors, fonts, and graphic styles
- Avoid decorative visuals with no instructional value
- Add ALT text for accessibility and screen reader compatibility
- Establish a visual style guide for each course/module
- Collaborate with instructional designers or graphic experts when in doubt
- Be aware of diversity in representing researchers, students, technicians and go beyond stereotypical representations.

Sources

- Mayer, R. E. (2009). Multimedia Learning. Cambridge University Press
- Creative Commons Search: https://search.creativecommons.org
- Visual libraries: unsplash.com, flaticon.com, thenounproject.com
- AI-based visual generation: openai.com/dall-e, copilot.microsoft.com
- Huigen, S. (2013, 13 maart). *6 vuistregels voor effectief beeldgebruik in leermateriaal*. Tumult. https://www.tumult.nl/6-vuistregels-voor-effectief-beeldgebruik-in-leermateriaal/

→ **Good luck!**