



P4ELECS

Platform for
Electrification Skills
& Competences

Quicksheet for the P4ELECS project

What are the educational quality criteria for Building Blocks?



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About Building Blocks

- A building block (BB) is a container of learning content that covers a well-defined topic.
- BBs are high quality educational material.
- A BB consists of descriptors and elements
 - Descriptors: explaining the main characteristics of a building block, such as the learning outcomes and EQF-level, which serve as the foundations for the learning content (elements)
 - Elements: subcomponents of a building block about the topic of the BB (e.g. a presentation, an instructional text, a video, an exercise, ...). A user can select those elements that are of interest for their own situation or preference.
- The elements of a BB consist of at least
 - One learning content related element (e.g. a presentation, a text, see table different types of elements)
 - A self-assessment with an answer key, covering the whole BB
 - A file with references
- Although a BB is intended to stimulate learning, processing a BB will not result in an official proof of learning. An individual learner who processes a BB will not be granted a certificate. A learner who wants a recognition of learning, can follow a 'course'.

Benefits



- ✓ BBs are high quality and up to date learning material
 - They offer the newest knowhow developed at universities and companies
 - They meet specific educational criteria (see next)
 - They are peer reviewed

- ✓ BB stimulate a fast transition from new developments to education and training and hence the electrification field.

- ✓ BBs are very flexible for
 - Teachers
 - They can use BBs or elements in their courses
 - They can ask students to select relevant BBs for their projects
 - Students in VET/HEI en professional learners
 - They can select to learn from specific BBs or elements geared towards their own interests and needs.
 - They are not bound by time or place restrictions



P4elecs Educational Quality Criteria

All BBs are reviewed before they are incorporated in the Building Block platform. The first check is the compliance with the educational quality criteria. The second check is a peer review for the content.

There are educational quality criteria for

1. **DESCRIPTORS**
2. **ELEMENT OVERALL CRITERIA**
3. **ELEMENT SELF-ASSESSMENT**

DESCRIPTORS

Descriptor	Criterion	Explanation, tips, possible ways to do or check it (among others), examples or rules of thumb
Title	The title captures the essence of the BB. (max 55 characters)	Possible ways to do or check it The words used in the title are also used in the learning outcomes, abstract and hashtags.
Relevance	The relevance of the BB for the learner is made clear (max 150 words, preferably 100)	Possible ways to do or check it - There is an explanation of where the topic of the BB is used - An example of the application of the BB is given
Abstract	The abstract summarises the content, with more detail than the title. (max 150, preferably 100)	
Keywords/ hashtags	The keywords are in line with the abstract. (max 10)	Tip Include the keywords and hashtags in the abstract or formulation of the learning outcomes
	The keywords are in line with the learning outcomes.	
KAI	The indication of Knowledge, Application or Implementation is appropriate.	See <i>quick sheet learning outcomes</i>
CDIO	The indication of Conceive, Design, Implementation or Operation is appropriate.	Tip Often the distinction between conceive versus design and between implementation versus operation is not easy to make. If you cannot choose, indicate only KAI. See <i>quick sheet learning outcomes</i>
Level Basic, intermediate, advanced	The indication if the BB is at basic, intermediate or advanced level is appropriate.	

Descriptor	Criterium	Explanation, tips, possible ways to do or check it (among others), examples or rules of thumb
Learning outcomes	The list of learning outcomes is short enough	Rule of thumb - Max 6 learning outcomes. If you have more, consider - formulating learning outcomes on a higher collective level. E.g. <i>the student is able to install a PV installation and comply with all the requirements</i> instead of listing the different requirements in separate learning outcomes - dividing it into different BBs. See <i>quick sheet learning outcomes</i> and <i>quick sheet Taxonomy of Bloom</i>
	The learning outcomes are formulated according to Subject + Action verb + Object + Context.	Examples - The learner (=subject) can draw (=action verb) a schematic representation of how the different components interact (=object). - The learner (=subject) can predict (=action verb) the possibilities and limitations of a pv trailer(=object) based on design choices (=context). See <i>quick sheet learning outcomes</i> and <i>quick sheet Taxonomy of Bloom</i>
Prior knowlege	The expected prior knowledge (knowledge, skills, ...) that is assumed to be mastered before starting this BB is formulated with sufficient detail.	Example - Learners can explain the difference between AC and DC (That is more detailed than “Learners are familiar with the basic concepts of electricity, learners know enough basic concepts”) Tip - Only include what is really needed. E.g. only include ‘apply Faraday's law’ if it is actually needed. See <i>quick sheet prior knowledge</i>

Descriptor	Criterium	Explanation, tips, possible ways to do or check it (among others), examples or rules of thumb
Prior knowlege	The expected prior knowledge is understandable for the learners and they can assess if they comply with it.	Tips • Avoid abbreviations, • Avoid local references (e.g. not: Learners reached mathematics at level 5c.) • Be precise and avoid vague/general words, like 'learners know enough basics concepts of electricity' See quick sheet prior knowledge
Elements	There is a clear list of the different elements included in the BB.	See <i>quick sheets Designing laboratory essions, instructional text, working model, effective presentation slides, asking questions, knowledge clips</i>
	The relation between the different elements is made clear.	Possible ways to do or check it • A scheme is included to explain the function of each element and the presumed order of processing the different elements (e.g. first the instructional text or the video, then the exercises, then the simulation, ...
	The element 'References' is included	
EQF level	The appropriate EQF level(s) is (are) indicated.	See <i>quick sheet EQF</i>
Estimated average study load in hours	Given the expected prior knowledge, the estimation of the average study load for all the learning outcomes of the BB is reasonable.	Rule of thumb • Think how long it would take to cover the content in class, then multiply that figure by three.

ELEMENTS OVERALL CRITERIA

Criterium	Explanations, tips, possible ways to do or check it (among others), examples or rules of thumb
(always under the assumption that the learners comply with the prior knowledge)	
Everything addressed in the element is focused on the learning outcomes (1-5), taking the prior knowledge into account and the learners know why every part is relevant in achieving these learning outcomes (1,2,4)	
1. The element is relevant and sufficient for achieving (part of) the learning outcomes.	Possible ways to do or check it (among others) • The content is focused on the topic at stake. • The information provided is enough to attain the learning outcomes. • The exercises are helpful in grasping the content, in attaining the learning outcomes. See <i>quick sheet learning outcomes</i>
2. The element is concise.	Possible ways to do or check it (among others) • All the information included is needed. • Every part has its function in relation to the learning outcomes
3. The relevance of the overall topic/content and the subtopics is made clear for the learner.	Possible ways to do or check it (among others) • There is a short explanation of what will be learned and why it is important, e.g in a professional context. • The relevance is made clear with a concrete, real world example. • A picture is included of the application at stake. • The learners understand the examples or cases included. If needed, a case or example is situated, for the learner to understand its function in the text. • Each module/section clearly indicates why this content is important for professional practice. • The connection with real vocational situations is made explicit. • There are answers to questions like: “Why do I need to know this?” and “How can I use this in practice?”. • The content is linked to tangible, real-world projects. • Exercises result in something students can be proud of. • Examples show how the knowledge is applied in professional contexts that the learners know. • Content explains how the skills will be used in the workplace. Example • ‘Now we will focus on X because ...’. • ‘In the previous chapter, we saw that W is important. In this chapter we investigate the characteristics of W, ...’

4. (If applicable) If the element is focussing on specific learning outcomes of the BB, those learning outcomes are made clear.	Possible ways to do or check it (among others) • There is a list of the relevant learning outcomes. • At the end of each chapter there is a box titled ‘What should you be able to answer after processing this chapter?’
5. The content is adapted to the expected prior knowledge.	Possible ways to do or check it (among others) • Concepts/formulas/ ... that are assumed to be prior knowledge are not explained again. • New concepts are explained, including their relationships with other known concepts (ie prior knowledge), with examples provided where appropriate. • If learners have to use a new tool (e.g. simulation tool), the way to work with it is explained. The first exercise, for example, is designed to familiarise the learner with the tool. The next exercises become progressively more difficult. <i>See quick sheet prior knowledge</i>
The learners are guided in navigating through the learning material by using structuring (6), supporting (7,8,9,10) and directing aspects (11,12)	
6. The structuring aspects are relevant and sufficient for the learner. (e.g introduction, table of contents, ...)	Tip • <u>Instructional text</u>: A table of content is not necessary for a short text of two pages. In a long text, with different sublevels, a detailed table of contents becomes important (e.g., not only the titles at level 1 are listed, but also the levels below). <i>See quick instructional text, intellectual property & powerful visuals</i>
7. The supporting aspects are relevant and sufficient for the learner. (e.g. videos, graphs, schemes, examples)	Possible ways to do or check it (among others) • The graphs/examples/... included add to the understanding of the topic at stake. • For more difficult relationships, a scheme is provided, while this is not the case for easier relationships. • In a video a process is demonstrated live (e.g. a shot of a working wind turbine) or with a schematic representation. Rule of thumb • A <u>knowledge clip</u> is not longer than 6 minutes. Longer videos (+6 min) are hard for learners to stay focussed. They need additional educational interventions for the learner to stay focussed (e.g. questions, ...) Tip • <u>Video</u>: Reconsider splitting up a longer video into different smaller videos to facilitate learning. Different short videos are easier to process and to learn from than a long video. • Make chapters in your video <i>See quick sheet multimedia principles, instructional text</i>

8. The supporting aspects are linked clearly to the text/ explanation.	Possible ways to do or check it (among others) • In an instructional text the graphs are close to the relevant paragraph and in the text, reference is made to each graph. • In presentation slides the relation with the explanation and the scheme is clear. <i>See quick sheet multimedia principles, instructional text</i>
9. The learner is guided in focusing on the relevant aspects of visual material.	Possible ways to do or check it (among others) • In an <u>instructional text</u>, the important elements in the graph are indicated (e.g. 'This is shown in part B of Figure 1') • In a <u>video</u> or <u>presentation slides</u> ◦ The aspect of the graph being discussed is lighted or circled, ... ◦ When explaining a process, the consecutive elements are highlighted, ... • In <u>presentation slides</u> without video, the explanation of a process is spread over different slides, where the learner can see the different steps in the process.
10. The layout is supportive for the learner	Explanation • The layout helps the learner to understand the structure of the material and the relationships between the different parts. Possible ways to do or check it (among others) • The layout is self-explanatory (e.g. Title 1.2.1 is a subtopic of Title 1.2) • The logic of the layout is explained. E.g. examples are in grey boxes, exercises are in frames, and the answers are at the end of the presentation slides/instructional text, ...
11. The directing aspects are relevant and sufficient for the learner. (E.g. learning outcomes, questions, exercises...	Explanation • The directing aspects help the learner process the information without taking over that they are capable of doing independently. • The directing aspects help to maintain the motivation of the learner.

	Possible ways to do or check it (among others) - Exercises are chosen to draw attention to topics that learners often find difficult (misconceptions/challenging topics). - New procedures and rules are explained and contextualised (when to use them and when not to). - Exercises are at the right level of difficulty. - For VET students: - Exercises produce a tangible result. - Assignments demonstrate direct applicability in professional practice. Learners can translate what they've done in the exercise into concrete actions in their future work environment. - Exercises are connected to the local environment (e.g. learners have to repair something in their own home, create something in the public domain, ...) <i>See quick sheet multimedia principles, instructional text, asking questions</i>
12. (If applicable) The directing aspects are linked to the other elements of the BB	Possible ways to do or check it (among others) - In an <u>instructional text</u> reference is made to additional exercises in the element 'exercises' of the BB, or to a video explaining how to apply certain principles. - In <u>presentation slides</u> the relevant knowledge clips are mentioned.
The used language supports understanding (13)	
13. The used language is adequate .	Possible ways to do or check it (among others) - The level of complexity of the language is adapted (the vocabulary used is not too difficult for the learner). - The tone of voice is appealing (the learner is addressed directly, E.g. 'you will, ...', passive voice is avoided). - Abbreviations are explained. - Synonyms are explained explicitly or avoided. - In a video a story is told (rather than written text being spoken aloud), with for example: - There is a clear voice-over that guides the learner through the content. - There is a presenter who talks directly into the camera. Rules of thumb for a <u>video</u> - The use of written text is limited to the essentials. - The written text is consistent with the spoken language, with the written words (mostly main concepts and key words) also included in the spoken text (e.g. avoid writing 'vehicle' and saying 'car'). <i>See quick sheet multimedia principles</i>

ELEMENT SELF ASSESSMENT

Criterion	Explanations, tips, possible ways to do or check it (among others), examples or rules of thumb
1. The self-assessment covers all the learning outcomes of the BB	Explanation - The self-assessment is intended to provide learners with an accurate understanding of their level of mastery of the BB. There-fore the self-assessment should cover all the learning outcomes. Tip - If the learner is required to apply something, include only new exercises (and not exercises used in the BB) as it is only through an unfamiliar exercise that you can ascertain whether the learner can able it with apply. An 'old' exercise could have be memorised. <i>See quick sheet self-assessments</i>
2. The learners can do the self-assessment based on the topics covered in the different elements of the BB and the information provided in the assessment	Possible ways to do or check it (among others) There is no need for the learner to look up additional information(unless that is the learning outcome) <i>See quick sheet self-assessments</i>
3. All questions are formulated clearly .	Possible ways to do or check it (among others) - The tasks that the learner has to complete, are clear (e.g. What is the velocity of X?). - The subdivisions of the questions are clear (e.g. 'a. list 3 advantages, b. list 2 possible problems). - Vague descriptions are avoided (e.g. What can you tell about X and Y?-> Explain how X affects Y?). <i>See quick sheet self-assessment</i>
4. The conditions under which the learner should answer the self-assessment are clearly described.	Examples "The learner is (not) allowed to use the material provided." "The time to finish the assignment is 30 min." (to assess if the learner is fast enough) <i>See quick sheet self-assessments</i>
5. It is possible for the learner to self-assess the correctness of the answer, with the information provided.	Possible ways to do or check it (among others) - There is an answer key - There is automated feedback <i>See quick sheet self-assessments</i>
6. It is possible for the learner to self-assess the overall quality of the answers	Example "In order to pass, this and that should be included in the answer." "The first 4 questions are fundamental. If you made a mistake there, you should look at X again." <i>See quick sheet self-assessments</i>

TOOLS & RESOURCES



- **Quality guidelines:** <https://p4elecs.com/deliverables?category=reports>
- **Quicksheets**, short texts explaining key concepts
<https://p4elecs.com/>, under ‘insights’
- **GenAI assistant**, a tool developed to assist in developing BBs. It can be found on xdemia, community onboarding new authors