FRoLLM – Framework for the Reflection of Living Learning Materials.

Teaching and learning materials – e.g. textbooks, worksheets, learning apps, educational videos etc. – are an important core element of your everyday teaching and learning experiences. However, we rarely discuss the materials critically. The Framework for the Reflection on Living Learning Materials helps you think more deeply about the teaching and learning material you use on a daily basis. It was designed within the **digiLLM project** to support the inclusion-sensitivity of educational materials, taking into consideration various learners' needs.
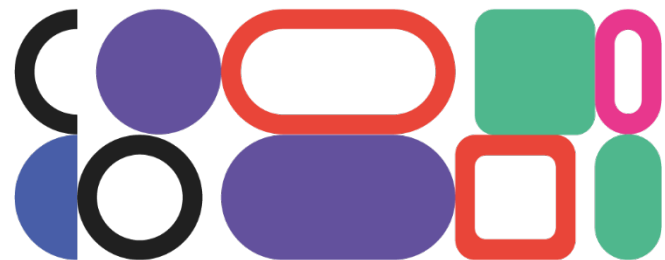
There are six "areas" guiding your reflections.

- Learners' needs
- Learners' environment(s)
- Learning feedback for learners
- Learners' reflections on learning
- Learners' agency
- Philosophy

visit the digiLLM website to learn more about FRoLLM and the digiLLM project!

Learners' needs

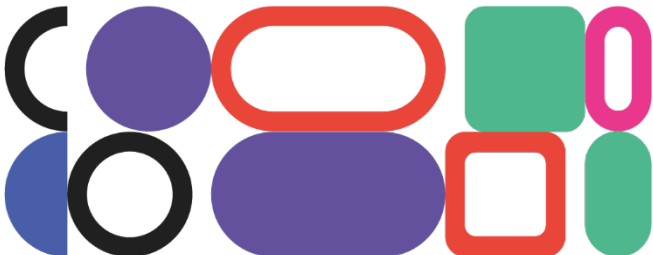| Area	Introduction	Reflection Questions	Indicators
Learners' needs	The material should be **sensitive to various learners' needs** (different learning levels, interests, backgrounds, potentials and limitations). Hence**, it should offer various ways of how learners can learn** about the same subject matter on different levels of complexity. The material should rely on **different kinds of medial representation** and should be adaptable to certain needs of the individual (accessibility, cultural representation). The material **should help the learner to actively shape their learning paths themselves**, enabled by providing choices between different options on how to work/proceed with the learning material.	Does the material offer **various learning paths/ tasks** for the same subject matter in a **differing complexity level**?	According to the learner's needs, the material allows learners to work on different learning levels. For example, - *it provides a framing of the content (e.g. statics in bridge building) and* - *an overarching question (e.g. how can you stabilize your bridge so that it can carry cars?)* Even though all learners work on the same question, the level of complexity on how to approach the question can be chosen by the learners themselves. For example, - *a learner can build a bridge with prefabricated components while another constructs a bridge without pre-given information. A third learner might use "info cards" that provide information about static elements such as the stable triangle.*
		Does the learning material offer different levels of **scaffolding (support for learning)** according to the degree	The material offers scaffolding to problem-solving. For example: - *by indicating the sequential steps of the solution,* - *showing what to start with* - *giving hints*

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		of learners' learning difficulties?	- *modelling* - *asking guiding questions* When a task requires writing an essay, graded scaffolding can be offered, for example - *by providing an outline/structure* - *by providing guiding questions for each paragraph* - *by providing a model text to imitate*
3		Are there **different kinds of representation** of the subject matter adapted to various learners' needs (UDL, Inclusive Design Guide)?	Key concepts presented in one form of representation (e.g., a text or a math equation) are supplemented with an alternative form of representation. For example: - *an illustration* - *diagram* - *table* - *model* - *video* - *comic strip* - *animation* Alternatives for visual or auditory information are available. For example: - *descriptions are provided for images and videos* - *graphic symbols are provided with text descriptions*

			- *relationships between elements are made explicit* - *highlighting the transition words in an essay,* - *links between ideas in a concept map etc.* - *support for vocabulary and symbols within the text is embedded* - *hyperlinks* - *footnotes* - *definitions* - *explanations* - *illustrations*
		Can the material be **adapted to individual needs** by changing it partially (OER)?	The material can be customized so it is possible to make adaptations and changes. For example: - *size of text and images* - *the colour used for emphasis* - *the volume or rate of sound* - *the speed or timing of video etc.* In addition, adaptations to the learners, their learning environment and local, temporal and political contexts are also possible/easily to implement.

Learners' environment(s)

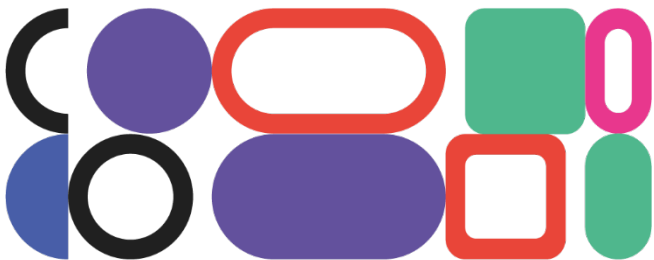| Area	Introduction	Reflection Questions	Indicators
learners' environment	Based on a broad understanding of environment, the material should be **adaptable for various kinds of learning scenarios**, might they take place in groups or individually. A material should be adaptable to different physical surroundings (at home/ in the classroom/library/ hospital), but also digital environments (e.g. during distance learning scenarios). Hence, the material should not have any particular demands, which may limit the usage to a specific location or setting. This implies the inclusion-sensitivity of digital materials in terms of **accessibility and openness.**	Can the material be used in different kinds of **group work as well as for individual work**?	The material can be used by one learner but also provides impulses so that two or more learners can work on the same task together. This makes it necessary to provide, for example, additional selected stimuli to the material in order to encourage discussion with the partner(s). For example: - *Comparing the partners' ideas on action on climate change in a shared online mind map.*
		Can the material be used in **different physical and digital learning settings**?	The material can be used in the classroom as well as at home, in the library or in hospital etc. Also, it is usable in different digital learning scenarios. There are different requirements for this. For example, This requires that tasks are based on easily accessible components. For example: - *the material may also be accessible with a poorer internet connection* - *there are alternatives for audio content if headphones are not available or the environment is noisy* - *it consists of easily accessible components, e.g. a task in science education might be to*

			build a bridge out of paper in order to learn about statics
		Is the material **available and freely accessible in different formats**?	The material is available on the PC or tablet as well as in a mobile phone version. This implies that the material requires formatting that makes images, text modules and interactive elements easy to display on different technical devices. The material is available in different formats and published under an open license, allowing for people to freely use, adapt, remix and share it.
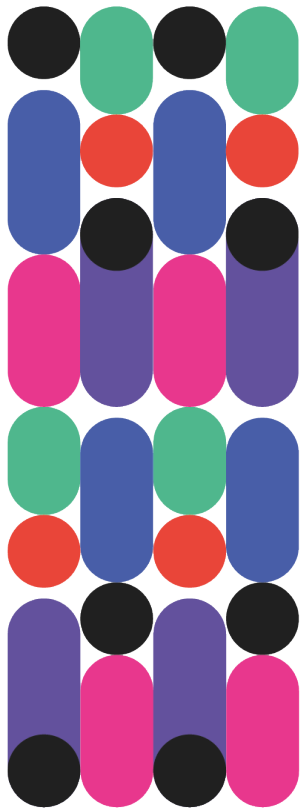
Learning feedback for learners

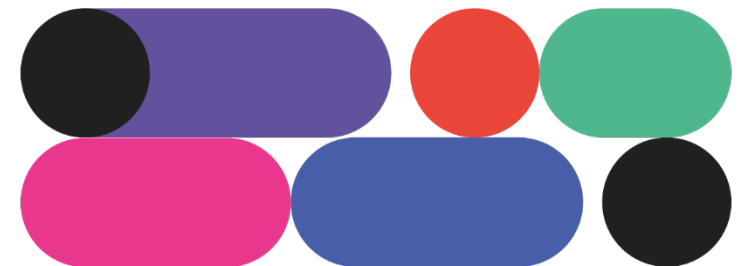| Area	Introduction	Reflection Questions	Indicators
learning feedback for learners	The material should imply elements of **qualitive as well as quantitative feedback**. It should enable self-assessment formats as well as peer-feedback. Feedback can be designed as immediate learning feedback or as a more broad reflection on the learners' progress. The provided feedback elements **should support the learners in reflecting on their learning process** in a valuing and affirmative way. Additionally, feedback options may appoint to next steps in a learning journey.	Does the material imply **different kinds/formats of feedback**?	The material includes checklists or rubrics that guide learners to evaluate their own work or the work of others and provide criteria for improvement. For example, - *a checklist for writing a persuasive essay might include items such as "I have a clear thesis statement", "I have provided relevant evidence to support my arguments", "I have addressed possible counterarguments and refuted them", and so on* - *a rubric might assign different levels of performance (such as excellent, good, satisfactory, or needs improvement) to each item, and provide descriptors for each level.*
		Can the children use the **feedback to reflect** on their learning process on their own?	The material can contain *examples* or *models* that illustrate the expected outcomes or standards of performance for a given task or assignment. For example: - *an example for a math textbook might show how to solve a complex problem using different methods or strategies, and explain the steps and reasoning involved.* - *a model for an English textbook might show a sample essay or paragraph that demonstrates the use of effective writing techniques, such as*

		topic sentences, transitions, evidence, and analysis. The material includes the correct solutions to the learning problems if they are convergent in nature or a suggestion of possible solutions if they are divergent in nature. The material comprises assessment tests for learners to check for themselves whether they mastered the subject matter.

Learners' reflections on learning

Area	Introduction	Reflection Questions	Indicators
Learners' reflections on learning	The material should actively support the learner's knowledge about different **learning strategies**. The learner should be encouraged by the material to try out different learning strategies and to integrate them into their learning process. Also, the learner should generally be supported on how to **reflect on their learning process** as a whole, regarding their progress, main strengths as well as weaknesses.	Does the material give explanations about and refer to **different learning strategies/ techniques?**	The material suggests different ways to approach the assignments. For example: - *group discussions,* - *learning from text,* - *hands-on experiments,* - *creating videos,* - *story-telling,* - *reciprocal questioning,* - *peer teaching.* The assignments/tasks are not stereotypical, i.e. it is possible to apply different cognitive operations to address the task. For example: - *concept formation (e.g. classifying animals by their characteristics or defining abstract concepts like democracy or justice)* - *problem-solving (e.g. finding the best route to a destination or designing an experiment to test a hypothesis).*
		Does the material actively encourage the learner to individually **reflect on his/ her own learning process?**	The assignments (sometimes) require learners to explicitly describe and/or evaluate their thinking process. For example: - *what steps they took,* - *how they thought about the problem,*

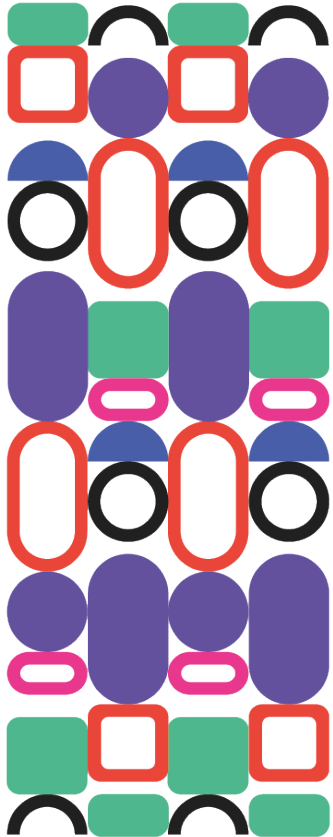| | | | - *why they adopted the procedure, or* |
			- *give reasons why they solved the problem in a way they did.*
			Learners are encouraged to work deliberately with mistakes, either their own or those of their classmates.

Learner's agency

Area	Introduction	Reflection Questions	Indicators
Learners' agency	Within a material, **learners should be considered agents of their own learning path**. The material should enable the learners to express their individuality within the learning process. This is about a learner's needs, but also a learner's **wishes, creativity and boundaries as well as aspects of wellbeing.** This approach is based on **inclusion** as an ethical standard related to human rights.	Does the material provide a range of opportunities for the learners to **make their own decisions** within their learning process?	The material encourages learners to reflect on their own learning, their strengths and capabilities. For example: - *by addressing the learner directly and taking them seriously, by offering opportunities for self-reflection and dialogue, posing different types of tasks, enable decision making, using encouraging language.* - *by encouraging a learner to opt for another material if they do not find the material they are currently working with helpful.* A material enables learners to generate their own ideas. For example: - *when not everything is directed at a specific learning goal or outcome,* - *a learner is invited to make up more examples/scenarios for a learning objective on his/her own* - *is asked to engage with the learning objective creatively.* - *A learner is invited to use the language they feel most comfortable in, for example during a writing task.*

			In order to leverage this kind of agency, the material is committed to transparency. For example: - *by explaining its intentions and learning goals clearly,* - *providing context about learning theories*
12		Does the material address the learner as able in **handling and controlling their own learning process**?	Authors of a material communicate learning goals transparently. The material encourages learners not to work on a task if it is categorised as unsuitable for their own learning path/needs. This gives learners control over their own learning path. The material also allows learners to relate to their own environment. For example: - *inviting them to reflect on examples of a topic in their environment (places, animal species, political situation, geographical conditions, etc.).*
		Does the material empower the learner to **critically reflect on the material**?	The material and its authors are committed to the idea of open and participatory further development of materials, e.g. by enabling automatic feedback and providing a space for comments, ratings and reviews.

		Does the material **respect the diversity** of learners overall?	The material reflects the diversity of learners in terms of their identities as well as social, family, cultural, religious and community backgrounds. This is reflected in images and texts that avoid stereotypical or even discriminatory content. Learners, no matter their background, feel seen and respected. - *Pictures/contents mirror the diversity of people in the community. There are no stereotypical, biased or even discriminatory pictures/contents.* - *Cultural and religious diversity is being represented, but not in a stereotypical or biased manner.* - *Diverse perspectives are being represented.* *Issues like racism, sexism, ableism, ageism, and homophobia are not detectable.* The material reflects the diversity of environments and lifeworlds (or it can be adapted easily). - *This is reflected in images and texts that avoid stereotypical or even discriminatory content.* - *Aspects like family life, social life, communities, religion, sexuality etc. are not presented in normative ways.*
	13		

			- *Different social, political, financial backgrounds or places to live (cities, rural areas) are being represented.*

Philosophy

Area	Introduction	Reflection Questions	Indicators
Philosophy	Author(s) of a material should explain its philosophy and conceptions. This implies comments **on design choices and theoretical backgrounds**. Target groups should be made explicit as well as needs the material addresses. Moreover, a material's limitations should be made transparent. Also, the material should clarify how it relates to the national school curriculum. **Reliable sources** should be provided in order prevent mis- and disinformation. Whenever a material claims to be "inclusive", the authors should clarify their **understanding of inclusion** thoroughly.	Does the material give explanations regarding **its set-up, choices and design?** (transparency)	Learning and teaching philosophy/design applied in the material is explained. For example: - *project teaching and learning,* - *on problem-solving,* - *on constructivist ideas in general, it may favour* - *storytelling,* - *case-studies* It is suggested how to use the material. For example: - *mainly as a reference book* - *learning tasks repository* - *comprehensive guide to lessons* - *for the whole class vs. self-study* - *if it is necessary to go through the material systematically, from beginning to end, or, the contrary, it is possible to select parts of the text; the material may be preferably designed for whole-class teaching or can be used for* self-study as well).
		Does the material comment on **intentions and limitations regarding inclusion**?	The material contains specific information directed to the teacher and learners on its content, how it can be used and the key ideas in how it is set up. This includes a definition of inclusion, if inclusion-sensitivity is claimed. The intentions and limitations

			regarding inclusion and different target groups are mentioned.
16		Is the material structured **logically and comprehensible** with a focus on the subject matter? -	The material is ordered in a transparent and coherent way. The general idea of learning and teaching, content and core concepts are presented early. A navigation or mapping function supports the understanding of the material's structure. Subject areas are displayed and ordered in logical sub-sub areas. When entering these, there is first information on the topic followed by clarifying videos or other resources. It is always possible to navigate back and to understand where in the material one is at the moment. The material contains *signals* for distinguishing content with different levels of importance and novelty. *For example:* - *graphical markers (signaling basic content, information to memorize)* - *polygraphic signals (different colours or fonts for certain parts of the text, etc.).* At the level of expository text or instructions, this can be, *for example, so-called signal words (such as: firstly, secondly..., for example ..., as in ..., as opposed to ..., as compared to ..., the result is...) or advance organizers (like Venn diagram or*

			Fishbone chart to show cause and effect relationships, etc.).
		Is the content represented in the material referring to **valid sources** (against misinformation)?	The content is validated by references and refers to the latest scientific knowledge. References are both old and up-to-date.
		Does the material refer to **curricular requirements and main research results**?	The introduction (or elsewhere in the text) is explicit about the extent to which and how the content of the material covers the curriculum, the syllabus, or which parts of the formal curriculum it relates to.