Npuls

# With a Little Help from My Friends

Encouraging the reuse of open educational resources

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## Encouraging the reuse of open educational resources

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# Table of contents

# 1. Introduction

Within the Npuls Growth Fund programme, we are working to encourage the sharing and reuse of open educational resources[1] in order to make 'open' the norm.

Sharing open educational resources should logically be followed by their reuse. But does that actually happen? Research into reuse shows that there are barriers that hinder optimal reuse. The most important of these are the poor findability of suitable educational resources, lack of time and doubts about the quality of open educational resources. Research also shows that reuse can lead to learning materials that retain their value better (sustainability), to the introduction of different perspectives on a subject in education, and to innovative forms of education.

Reuse of open learning materials also means building on previous knowledge and insights. This is a requirement in research. A fixed component of a scientific article is an overview of what previous research has yielded. Applying this approach to the creation of learning materials leads to a cycle in which learning materials are continuously improved and adapted to new insights and contexts. This cycle can be found in Npuls' model for the life cycle of open educational resources[2] .

This is one of the reasons why Nuls intends to facilitate and encourage reuse at institutions of further education (vocational education, higher professional education and university education). In order to do this effectively, Nuls needs a literature review on the reuse of digital and open learning materials, with a specific emphasis on the dos and don'ts of encouraging reuse and on the opportunities it offers for innovative educational design.
To this end, the following assignment has been formulated:

1. Conduct a literature and source review of practices for reusing open educational resources in order to answer the following research question: what activities and measures are known to promote the reuse of educational resources?
2. Translate the insights gained from the research into practical tools that educational institutions can use to encourage the reuse of open educational resources.

This report is the account of this research. It begins with a description of the research method. Next, the context of the reuse of open educational resources is described. This is followed by a description of the factors that influence reuse, organised into a number of categories. These factors are then translated into practical tools that educational institutions can use to promote the reuse of open educational resources. Finally, some thoughts on the role of generative AI and its influence on reuse are described, followed by a concluding remark.

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[1] This report uses the term 'open learning materials' instead of 'Open Educational Resources' or 'OER'.
[2] https://nuls.nl/kennisbank/levenscyclus-open-leermateriaal/

# 2. Method

To obtain an initial overview of the literature and a summary of the most important results, the following prompts were formulated in two AI tools specifically aimed at (literature) research:

*What encourages reuse of freely available and open educational resources, based on research findings from papers not older than 10 years?*

The AI tools used were Elicit[3] and Futurehouse[4] . The results of both tools did not provide any new insights compared to previous publications on reuse research in which the author of this report was involved (Schuwer & Janssen, 2018; Baas & Schuwer, 2020; Baas, Jacobi & Schuwer, 2021). Both results were based on a total of 20 sources. Upon further investigation, it appeared that five of these were so-called hallucinations (non-existent sources).

A search was then carried out in Proquest and Google Scholar using the following query

*Reuse of "Open Educational Resources"*

The search had to be limited to sources from 2015 or later. Starting with the most recent sources, the suitability of the source was determined based on the abstract and the conclusions. For suitable sources, the references to other potentially suitable sources were also examined (*snowballing*). The list was supplemented with sources that had already been collected in previous studies involving the author of this report. This ultimately resulted in 27 sources. The list of these sources is shown in Appendix D. Figure 1 shows a schematic representation of the results of the research.

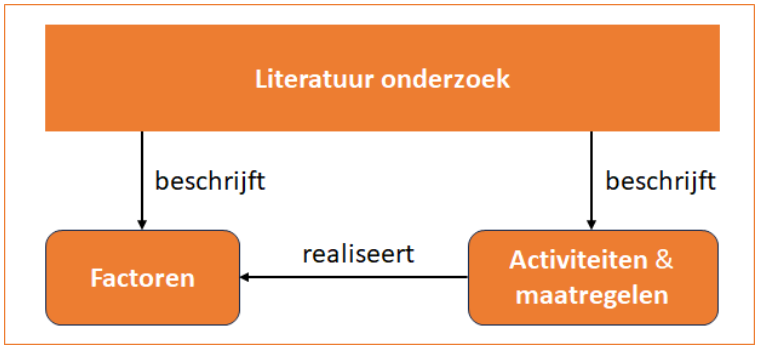


*Figure1 Research structure and results*

The results from the publications were mostly the result of surveys, interviews or a combination of both. Two studies were meta-studies on the adoption of open educational resources, in which reuse was one of the items to be investigated (Abri et al, 2018; Marin et al, 2021).

Figure 1 shows two types of results from these studies:

[3] https://elicit.com/
[4] https://platform.futurehouse.org/

- Factors that positively or negatively influence the reuse of open educational resources by teachers (and in some cases also by students). This led to a list of factors that were reported in one or more studies.
- Activities and measures to create a setting in which the factors that have a positive influence on reuse are realised, or the factors that have a negative influence on reuse are avoided. In a few cases, the effectiveness of the activities and measures was also demonstrated within the context of the study. This usually involved a limited research setting, in which a limited group of teachers worked with a limited collection of open educational resources, often for a single subject area. However, in most cases, the measures and activities described were suggestions, but it was not demonstrated that these suggestions actually led to more reuse by teachers.

For the results described in this report, this means that the factors described below are based on sufficient evidence. The activities and measures and the practical tools derived from them are also based on sufficient evidence. However, their **effectiveness** in terms of reuse has not been sufficiently demonstrated. Therefore, when using the practical tools described below, regularly check whether the intended improvements in reuse are actually being achieved.

The results of the study are described in the following chapters. The results are divided into two categories: findings that describe the **context** in which the reuse of open educational resources takes place and findings that clarify the **process** of reuse.

# 3. Context of reuse

This chapter describes the results of the research that describe the context in which the reuse of open educational resources takes place.

## 3.1 More than open educational resources

Although the sources focus on the reuse of open educational resources, analysis of those sources shows that they often do not only concern open educational resources (Baas & Schuwer, 2020; Schuwer & Janssen, 2018; Weller, 2014). After all, students in particular, but in many cases also teachers, do not always intend to adapt learning materials. This is also in line with the practice whereby many people include freely available learning materials, without necessarily having rights to adapt them, in their search for suitable open educational resources for their context. In order to enable students and teachers to compile an optimal mix of learning materials, the reuse of freely available learning materials, without rights of adaptation, is therefore also valuable to consider. Figure 2, translated from (Schuwer & Janssen, 2024) clarifies this.

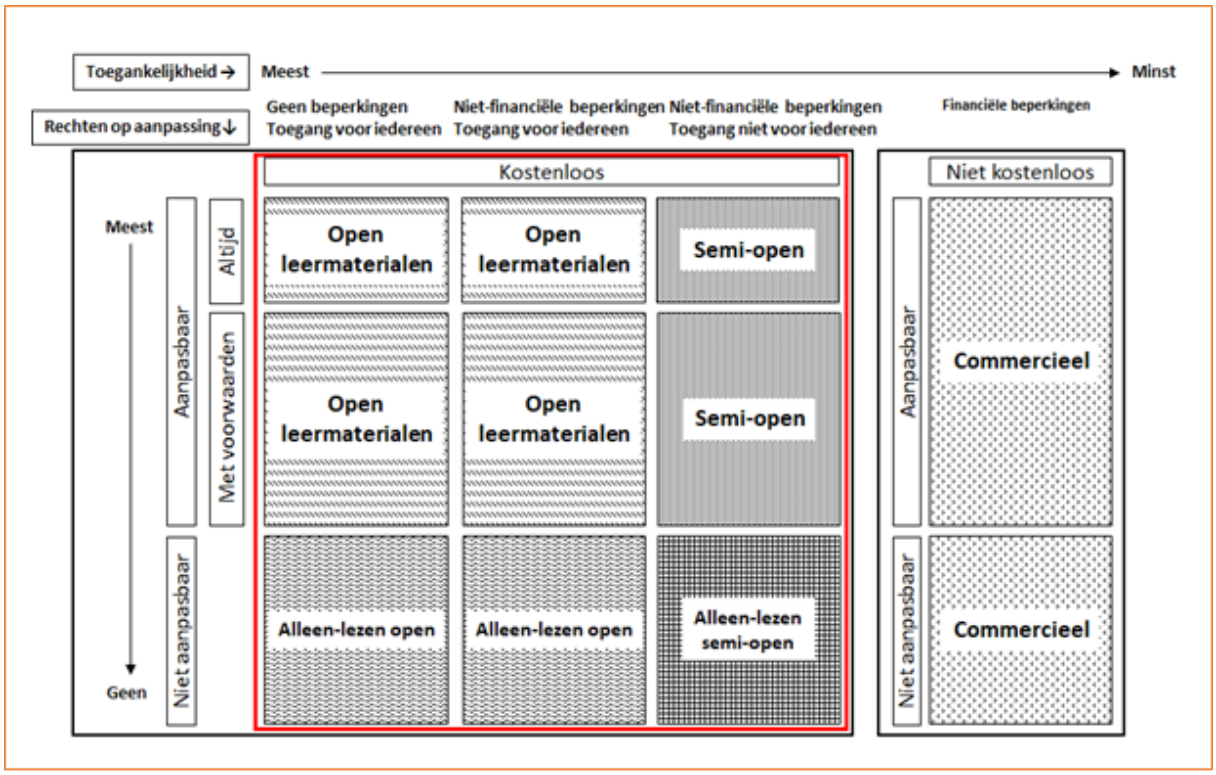


*Figure2 Framework for types of learning materials*

Figure 2 shows types of learning materials organised according to the dimensions: Accessibility and Rights to modification. The learning materials that are freely available, whether or not to anyone interested, are outlined in red, with a subset of open learning materials to which a user has 5R rights for adaptation. This red-outlined collection can be referred to as **'Open and other freely available learning materials**'. The term 'open learning materials' will be used throughout the rest of this report,

but in places where the context of reuse does not necessarily require the rights to adaptation, the broader collection 'open and other freely available learning materials' may be read.

Availability and accessibility of learning materials are two different concepts. Learning materials are **available** if they are accessible to interested parties or can be found somewhere. Learning materials are **accessible** to interested parties if they are both available and usable.

Examples of factors that determine accessibility are language (learning materials in Chinese are only accessible if you know Chinese) and the extent to which the content matches your prior knowledge (learning materials on the laws of thermodynamics are only accessible if you understand the underlying physics). Post (2025) also mentions the importance of **digital accessibility,** designing websites, apps and digital documents in a way that ensures that everyone, including people with disabilities or other special circumstances, can easily understand and use them. Therefore, bear in mind that not all open and other freely available learning materials need to be accessible to your target group.

## 3.2 Reference model for reuse

The reuse of open learning materials can be characterised in two dimensions:

1. With adaptation
   a. Yes, minor (e.g. adding or replacing an institution logo, replacing images, minor corrections to the text, omitting text)
   b. Yes, major (e.g. translating, adapting to local context, adding or changing assignments and case studies)
   c. No
2. Mixing
   a. Yes (e.g. combining texts and images, placing video in a text)
   b. No

This gives the following possible combinations of types of reuse. For each type, the type of learning material that is permitted is also indicated.

| With adaptation | Mixing | Type of learning material |
|---|---|---|
| **Large** | **Yes** | Open learning material |
| | **No** | Open learning materials |
| **Small** | **Yes** | Open educational resources |
| | **No** | Open educational resources |
| **No** | **Yes** | Open educational resources, other freely available educational resources |
| | **No** | Open educational resources, other freely available educational resources |

This framework can also be used to analyse which reuse practices are common and which competencies are needed to implement them. See (Schuwer & Baas, 2023) for a description of these competencies.

## 3.3 Reuse by students

In addition to reuse practices by teachers, a few studies also describe reuse by students (Adedoyin & Altinay, 2023; Baas et al, 2021). For example, in educational practices that fall under the banner of Open Pedagogy (Post et al, 2022), the reuse of open learning materials by students plays a major role. This report will therefore also focus on encouraging reuse by students.

# 4. Factors influencing reuse

This chapter describes the results for answering the research question in the first assignment:

What activities and measures are known to promote the reuse of learning materials?

A number of studies focused, among other things, on the question of which types of learning materials are most commonly reused (Baas & Schuwer, 2020; Jhangiani et al, 2016; Marin et al, 2022; White & Manton, 2011). These studies show that in many cases, learning materials are not actually reused, but do inspire the development or adaptation of one's own learning materials (reuse of the 'idea behind the learning material'). In addition, videos (which are expensive to produce), open textbooks and assignments are frequently mentioned.

Studies also point to the practice of **'dark** reuse' (Baas & Schuwer, 2020; Beaven, 2018; Weller, 2014; White & Manton, 2011). This refers to reuse that takes place under the radar: teachers reuse open learning materials but do not communicate this. The disadvantage of this type of reuse is that potentially valuable learning materials are not recognised as such and therefore remain hidden from colleagues. Another disadvantage is that modifications to existing learning materials are often not shared openly, resulting in less efficient use of open educational resources. Later on, it will become clear that recognising the reuse of high-quality open educational resources is an important motivating factor. Giving recognition therefore seems to be a measure to limit practices of dark reuse.

The sources studied identify factors that influence whether or not teachers reuse open educational resources. This influence can be both positive and negative. In many cases, a negative factor is the absence of a positive factor. For example, having sufficient time to search for open educational resources is a factor that positively influences reuse. When that time is lacking, it is a factor that negatively influences reuse.

Table 1 lists the categories into which the factors are divided, with a description of each category and examples (Cox & Trotter, 2018; Pegler, 2012; Wills & Pegler, 2016).

| Category | Description | Examples |
|---|---|---|
| **Generic** | Factors that cannot be assigned to any of the other categories | Presence of an open culture (see below for description) |
| **Motivation** | Factors influencing a teacher's motivation to reuse open educational resources | Presence of policy, uniqueness of open educational resources |
| **Quality** | Factors that indicate the quality of open educational resources | Timeliness of the learning materials, degree of reuse elsewhere |
| **Technical** | Factors relating to the technical infrastructure used for reusing open educational resources | Presence and quality of metadata, granularity of the learning materials |
| **Student-related** | Factors from the student's point of view | Cost of learning materials replaced by open educational resources |

*Table 1 Categories of factors influencing reuse*

Appendix A contains a complete overview of the factors that influence the reuse of open educational resources.

All these factors are interdependent and not all equally important (Pegler, 2012). Factors in the categories 'Motivation' and 'Quality' are particularly influential when considering whether or not to reuse open educational resources. Factors in the 'Technical' category support reuse, but are not decisive.

Two factors are of great importance. First of all, the most important factor is the teacher's **confidence** in the quality of the open educational resources (Wills & Pegler, 2016; Clements & Pawlowski, 2012; De los Arcos et al, 2016; De los Arcos et al, 2017; Hatakka, 2009; Marin et al, 2022). This factor is a result of the extent to which other factors are present. The table in Appendix A lists the factors that contribute to trust in the Comments column. Another important factor mentioned in several studies is the presence of an **open culture.** This concept is described in more detail in the box below.

**Box: open culture**
Based on (Bozkurt et al, 2019; Bozkurt et al, 2023; Cox & Trotter, 2018; Cronin, 2017; Hodgkinson-Williams et al, 2017; Rolfe, 2017).

Open culture in education refers to a set of values, practices and institutional norms that prioritise transparency, accessibility, collaboration and the free exchange of knowledge within educational environments. This culture is influenced by social, technological and institutional changes. An open culture has the following characteristics:

- **Accessibility and the removal of barriers.** Openness in education aims to eliminate barriers (financial, geographical or institutional) to learning and knowledge sharing. This includes the use of open educational resources, open access publications and the design of inclusive learning environments.
- **Collaboration and co-creation.** An open culture encourages collaboration between students, teachers and external partners. Examples of such collaborations include the joint creation of knowledge and the application of *open pedagogy* working methods.

- **Transparency and sharing.** An open culture promotes transparency in education, research and assessment. Open sharing of learning materials, research data and scientific output is encouraged and valued.
- **Flex**ibility **and lifelong learning.** An open culture supports flexible learning pathways to meet diverse learning needs and promote lifelong learning.
- **Inclusivity, equality and social justice.** Central to an open culture is a commitment to inclusivity, equality and social justice. The aim is to democratise access to knowledge and empower marginalised or underrepresented groups.
- **Importance of values.** In an open culture, values such as sharing, trust, innovation, sustainability, participation and respect for diversity are essential.

The (technical) factor of **granularity** (size) of the learning material refers to a spectrum ranging from a small element that, with or without modifications, must be combined with other elements to obtain usable learning material, to a complete lesson or course that hardly needs any modification before it can be used. The latter type seems most interesting for reuse because of the little work that needs to be done, but finding such learning materials will usually be difficult. In (Wiley, 2021, June 28), this is described as a *Reusability Paradox*:

> The Reusability Paradox can be stated in its simplest form as follows:
> - There is an inverse relationship between the amount a student can learn from a resource and the reusability of the resource.
> - “Larger” resources like a complete module – which may include text, images, interactives, practice with feedback, etc. – can support significant student learning BUT are reusable only in a very small number of circumstances. (How many places can you reuse an entire chapter on sonata form?)
> - “Smaller” resources like an individual image are reusable in a wide range of circumstances BUT support very little student learning. (How much can a student learn from an isolated photograph of an orchestra?)

In practice, this means that the entire spectrum of granularity of open educational resources is important for reuse.

A number of studies have investigated which factors are important to **students** in their decision to use open educational resources when these are not recommended or prescribed by the teacher or when this is not related to didactic working methods under the heading of *open pedagogy* (Adedoyin & Altinay, 2023; Baas et al, 2021; De los Arcos et al, 2016; De los Arcos et al, 2017; Plantak Vokuvac et al, 2024). These factors are as follows:

- free availability of learning materials,
- perceived ease of use (usually meaning easy findability),
- perceived usefulness (relevance) of the learning material,
- simpler explanation of the subject matter,
- presence of a description (e.g. learning objectives),
- learning materials come from a reputable source,

- learning material has a good look and feel,
- learning material is better suited to learning preferences (e.g. video instead of text), and
- attitude and intention to use open learning materials.

Activities and measures to encourage reuse focus on promoting the factors that have a positive influence on reuse and on limiting as much as possible the factors that have a negative influence on reuse. In research, these are often formulated as recommendations or lessons learned. These recommendations and lessons learned can be found in the table in Appendix A in the 'Comments' column.

In the following chapter, these findings have been incorporated into a number of guidelines for teachers to encourage reuse.

# 5. Practical tools for encouraging reuse

This chapter describes the results for the second assignment:

> Translate the insights gained from the research into practical tools that educational institutions can use to encourage the reuse of open educational resources.

A number of practical guidelines have been identified in the literature. These have been included as lessons learned in the table in Appendix A (Comments column), but will be repeated in this chapter. In addition, guidelines have been created as practical interpretations of factors or combinations of factors that promote reuse. Finally, tools have been created to minimise factors or combinations of factors that hinder reuse.

The tools are organised according to the areas of focus identified in Npuls' Digital Open Learning Materials 2.0 impact scan (Woert et al, 2025). Table 2 shows this classification with an example of a practical tool for each area of focus.

| Area of focus | Example tool |
|---|---|
| **Vision & policy** | Formulate ambitions for reuse |
| **Professionalisation** | Ensure that teachers and students acquire the skills and competences needed for reuse |
| **Support** | Ensure an accessible support structure for the reuse of open educational resources for teachers and students |
| **Infrastructure** | Aim for integration of repository and LMS |
| **Collaboration** | Encourage the provision of reviews on published learning materials |
| **Culture** | Recognise and value open sharing and reuse of learning materials |

*Table 2 Classification framework for tools*

A number of tools concern encouraging the creation of high-quality open learning materials. These contribute to the realisation of factors that are taken into account in decisions to reuse open learning materials.

The complete overview of practical tools is provided in Appendix B. Appendix C contains a table indicating which practical tools address which factors. This table shows that no practical tools can be found in the literature for one factor. This concerns the factor 'extent to which reusable learning materials contain useful new insights' (M6) in the Motivation category. This factor is highly dependent on the context in which the material is to be reused, including the teacher's existing insights.

The literature does not provide any information on how and when to start using the practical tools. A systematic approach can be followed (depending on the context, for example, starting with the tools listed under Collaboration), or you can focus on a few factors and start using the tools that address those factors. Since trust in the quality of open educational resources and an open culture seem to be the most important factors for reusing open educational resources, it makes sense to focus on these.

# 6. Role of generative AI

With the advent of generative AI, teachers potentially have a choice between reusing existing open educational resources or generating educational resources using tools that utilise Large Language Models (such as ChatGPT). On social media in particular, (often self-proclaimed) AI experts report impressive results with the latter approach.

A literature study was conducted to gain insight into the advantages and disadvantages of such an approach. First, the following search query was formulated in Google Scholar: "generative AI creating educational resources", with sources from 2022 or later. After removing sources from so-called predatory journals (due to the low quality or often even lack of serious reviews in that type of journal[5] ) and sources that did not address the generation of learning materials, this yielded two useful sources. Next, the prompt "What experiences with creating educational resources with Generative AI have been studied?" was entered into Elicit. This yielded ten potential sources, one of which also appeared in the Google Scholar search. After reading, a number of sources were discarded for the same reasons as mentioned earlier in the Google Scholar search. Ultimately, eight useful sources remained (Banjade et al, 2024; Holmes & Miao, 2023; Patarakin et al, 2024; Pesovski et al, 2024; Ullman et al, 2024; Weerakoon et al, 2024; Wiley, 2024, September 4; Wiley, 2024, September 10).

The practical experiences from the studies concern small-scale (one-off?) experiments. The studies mainly describe the **potential** of Gen-AI. This potential lies in the ability to generate text, images and videos, as well as elements such as assignments, test questions and quizzes. The researchers also describe their experiences with adapting the *tone of voice* of the learning material to better suit the target group. This potential makes the creation of personalised material more feasible. In addition to personalisation, this approach also addresses the factors of time, accessibility, language, style, appearance and tone, and topicality from the table in Appendix A.

Most researchers point to the importance of human control in this approach, for example to prevent errors or make ethical considerations. They also point to the frequently heard criticisms of the use of generative AI, such as bias in language models and hallucination. The studies do not address the extent to which teachers have confidence in the quality of the generated learning materials. As mentioned earlier, this is the most important factor for teachers when reusing open learning materials.

Generating learning materials in this way can be seen as a form of reuse of learning materials. These learning materials can be unknown sources, own sources that are offered to the generative AI tool, or a mix of both. In the case of unknown sources, it is unclear whether they are open and what their quality is. Whether the factors mentioned earlier for reuse also apply in this situation may be a subject for further research, but it is likely that the important factor of confidence in the quality of the reused learning materials will also apply in this situation . This raises the question of whether and how the quality of unknown sources can be verified.

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[5] See https://nl.wikipedia.org/wiki/Rooftijdschrift for a description.

Teachers can choose between both approaches or combine them, with each approach requiring its own competencies and skills. Given the arguments mentioned above, it is advisable to experiment with generating learning materials and to share experiences with colleagues. In particular, experiences regarding confidence in the quality of the generated learning materials are a point of attention.

# 7. Conclusion

This study identifies factors that influence the reuse of open educational resources. It also lists activities and measures to create a context in which factors that have a positive influence on reuse are realised and those with a negative influence are suppressed as much as possible.

As little is known about the effects of the tools described, it is advisable to regularly monitor whether the measures taken are effective in stimulating the reuse of open educational resources. When using the practical tools described below, therefore, regularly check whether the intended improvements in reuse are actually being achieved. It would be great if the lessons learned from this could be shared, for example in the edusources community.

The developments in generative AI described above make it clear that there is not yet much research available on the potential impact of AI on the reuse of open educational resources. A number of potential benefits have been identified, but also some issues and ethical considerations. However, this topic is certainly not yet fully developed. It does make it clear that digital literacy and AI literacy are important skills for dealing responsibly with generative AI. Experience and related follow-up research are needed to gain more insight into the impact of generative AI on the reuse of open educational resources and the importance of collections of high-quality open educational resources.

# 8. Acknowledgements

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# Appendix A: Factors for reuse

The following table lists the factors that influence whether or not teachers reuse open educational resources.

| No. | Factor | Description | Comments |
|---|---|---|---|
| **Generic** | | | |
| **G1** | Awareness | Extent to which teachers and students are aware of open educational resources and their potential value | |
| **G2** | Open culture | A set of values, practices and institutional norms that emphasise transparency, accessibility, collaboration and the free exchange of knowledge within educational environments. | |
| **Motivation** | | | |
| **M1** | Exclusivity | The extent to which the learning material has already been used by others | |
| **M2** | Habituation | Extent to which it is customary for learning materials to be reused | |
| **M3** | Personalisation | Extent to which reuse of learning materials should contribute to personalisation of education | |
| **M4** | Cost savings (institution) | Extent to which reuse of learning materials saves costs compared to developing or purchasing materials yourself | |
| **M5** | Policy | Extent to which (institutional) policy indicates that the reuse of learning materials should be pursued as much as possible. | |
| **M6** | New insights | Extent to which reusable learning materials contain useful new insights. | |
| **M7** | Uniqueness | Extent to which the reusable learning material is unique | Consider, for example, videos from Beeld & Geluid. Difficult to make yourself. |

| No. | Factor | Description | Comments |
|---|---|---|---|
| **M8** | Ease | Extent to which the reuse of learning materials contributes to convenience for teachers or students | |
| **M9** | Time | Extent to which time plays a role in the decision to reuse learning materials | Consider: how quickly is it needed? Do you have time for an alternative (making it yourself)? How much time do you estimate it will take you to search? |
| **M10** | Usability | Extent to which the reusable learning materials fit in with teaching (vision), assessment and learning objectives | This is a very broad question and also touches on several other factors. However, this should be the most important factor. |
| **M11** | Availability | Extent to which sufficient open learning materials are available | |
| **Quality** | | | |
| **K1** | Brand | Name and reputation of the source of the learning materials | Contributes to trust. Consider both the institution and the author (is the latter well-known and trusted) |
| **K2** | Language, style, appearance and tone | The extent to which the language, style, appearance and tone of the learning material to be reused match what is desired | |
| **K3** | Subject matter | Extent to which the subject matter of the learning material to be reused is adequate | Contributes to confidence |
| **K4** | Community | Extent to which learning materials of assured quality are available within a community | Contributes to trust |
| **K5** | Quality assurance | Extent to which it is clear how quality assurance is organised | Contributes to trust |
| **K6** | Up-to-date | Extent to which the learning materials are up to date | Contributes to trust |
| **K7** | Permanent availability | Extent to which it is clear that (the collection of) reusable learning materials is permanently available | |
| **K8** | Evidence-based/informed | Extent to which it is clear that the reusable learning materials are based on research | Contributes to trust |

| No. | Factor | Description | Comments |
|---|---|---|---|
| **K9** | Reuse elsewhere | Extent to which the reusable learning material is already being used elsewhere | User recommendations are very helpful in this regard. |
| **K10** | Description | Extent to which the description provides the information needed to decide whether to reuse the learning material | Contributes to trust. Think of information such as: learning objectives, target group (3rd year history Bachelor's degree or similar), intended/suggested use, learning time, audience, didactics. For lessons and courses, add this as a teacher's manual. |
| **K11** | New/improved | Extent to which the reusable learning material can contribute to innovation or improvement in education | |
| **Technical** | | | |
| **T1** | Metadata | Description of learning materials with the aim of increasing findability | |
| **T2** | Findability | Ease with which learning materials can be found | |
| **T3** | Granularity | Size of learning material | |
| **T4** | Reliability | Degree to which the reference to the learning material is valid | |
| **T5** | Contextuality | Degree to which the learning material is linked to a context | In general: the more context-free, the easier it is to reuse |
| **T6** | Open licence | Type of open licence associated with the learning material | |
| **T7** | Adaptability | Degree and ease of adaptability of the learning material | |
| **T8** | Interoperability | Extent to which the learning material can be used in different technical environments | For example: open standards increase interoperability. Link between repository and LMS |
| **T9** | Accessibility | The extent to which the learning material can be used by persons with disabilities | For example: subtitles for a video, so that deaf people can use the video |
| **T10** | Reusability | The extent to which the learning material needs to be adapted to make it suitable for one's own context | |
| **Student-related** | | | |

| No. | Factor | Description | Comments |
|---|---|---|---|
| **St1** | Cost savings (student) | Extent to which reuse of learning materials leads to cost savings for students | Moral factor. Consider open learning materials as an alternative to purchasing books that are rarely used. |
| **St2** | Accessibility | Extent to which the learning materials are easy for students to use | Ease of navigation |
| **St3** | Alternative explanations | Extent to which the learning material explains the subject matter using different approaches | Consider, for example, other types (video instead of text, images, diagrams) |
| **St4** | Appropriateness | Extent to which the learning material meets the needs of a student | |

# Appendix B: Tools for encouraging reuse

The following table provides an overview of practical tools, organised according to the focus areas of the impact scan, version 2.0. For each tool, the factors from Appendix A that are addressed are indicated.

| | Tip | Factors affected |
|---|---|---|
| **No** | **Vision & Policy** | |
| **V1** | Formulate ambitions for reuse | M2, M5 |
| **V2** | Involve all stakeholders in policy-making on reuse (Note: a 'reuse unless' regulation alone will not work) | G1, G2, M5 |
| **V3** | When selecting learning materials, take into account the costs for students | G2, St1 |
| **V4** | Aim for active teaching methods with a high degree of student agency | M3, M10 |
| **V5** | Formulate a vision and plan for realising the core values of equality, diversity and inclusion in learning materials | G2, T9 |
| **V6** | Formulate a vision on the quality of open learning materials that addresses the relevant characteristics. | K2, K3, K6, K7, K8 |
| **V7** | Recommend the use of CC-BY or CC BY-SA when sharing open educational resources. | T6 |
| | **Professionalisation** | |
| **P1** | Ensure that teachers and students acquire the skills and competences needed for reuse. | M9, M10 |
| **P2** | Focus on making learning materials as context-free as possible | M10, T5, T10 |
| **P3** | Encourage the indication of (research) sources on which open learning materials are based | K3, K8, T4 |
| **P4** | Encourage proper metadata tagging of open educational resources | T1 |
| **P5** | Encourage the creation of open learning materials that are as inclusive and diverse as possible | G2, M3, T9 |
| **P6** | Encourage the reuse of open educational resources that are as inclusive and diverse as possible | G2, M3 |
| **P7** | Encourage sharing of open educational resources in easily adaptable formats | T7, T10 |
| | **Support** | |
| **O1** | Ensure an accessible support structure for the reuse of open educational resources for teachers and students | M8 |
| **O2** | Relieve good authors of other tasks in favour of creating open educational resources. | M11, K3 |
| **O3** | Make trusted sources of unique, difficult-to-create open educational resources easily findable elsewhere | M7, M11, K3, K7 |
| **O4** | Make sources from trusted individuals and institutions easy to find | M11, K1, K3, K7 |
| **O5** | Provide insight into the savings that reusing open educational resources can generate for students | M4, St1 |
| | **Infrastructure** | |
| **I1** | Aim for integration of repository and LMS | M8 |
| **I2** | Pay attention to local infrastructure for making semi-open learning materials findable. | T2 |
| **I3** | Aim to use open standards for learning materials. | T8 |

| | Tip | Factors affected |
|---|---|---|
| **I4** | Ensure that the local infrastructure supports the NL-LOM metadata model. | T1 |
| **I5** | Encourage the creation of subject vocabularies for improved findability. | T1, T2 |
| | **Collaboration** | |
| **S1** | Encourage the provision of assessments on published learning materials | M1, K9 |
| **S2** | Make clear how quality assurance is carried out | K5 |
| **S3** | Encourage the provision of usage information when sharing open learning materials (such as learning objectives, target group, intended/suggested use, learning time, audience, teaching methods) | M9, K10, K11 |
| **S4** | Encourage the promotion of good open educational resources, for example in a professional community | M8, M9, M11, K3, K4, T2, T3 |
| | **Culture** | |
| **C1** | Encourage collaboration | G2 |
| **C2** | Recognise and value open sharing of high-quality open educational resources | G2, M11 |
| **C3** | Recognise and value teaching practices that make good use of open educational resources | G2 |
| **C4** | Support diverse learning needs through flexibility in teaching. | G2 |
| **C5** | Make learning materials accessible to students with disabilities | G2, T9 |
| **C6** | Communicate about the value and potential of (reusing) open learning materials | G1 |
| **C7** | When prescribing learning materials, also take student-related factors into account. | St1, St2, St3, St4 |
| **C8** | Encourage an open culture in which the reuse of open learning materials is a matter of course. | G2, M2 |
| **C9** | Communicate about open licences | G1, T6 |

# Appendix C: Cross-tabulation of factors and tools

The framework below shows which factors (vertical) each tool (horizontal) addresses.

| | | Visie & beleid | | | | | | | Professionalisering | | | | | | | Ondersteuning | | | | | Infra | | | | | Samenwerking | | | | Cultuur | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | V1 | V2 | V3 | V4 | V5 | V6 | V7 | P1 | P2 | P3 | P4 | P5 | P6 | P7 | O1 | O2 | O3 | O4 | O5 | I1 | I2 | I3 | I4 | I5 | S1 | S2 | S3 | S4 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| Gen | G1 | | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | X | | | X |
| | G2 | | X | X | | X | | | | | | | X | X | | | | | | | | | | | | | | | | X | X | X | X | X | | | X | |
| Motivatie | M1 | | | | | | | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | | | |
| | M2 | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | X | |
| | M3 | | | | X | | | | | | | | X | X | | | | | | | | | | | | | | | | | | | | | | | | |
| | M4 | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | | | | | | | | | |
| | M5 | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | M6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | M7 | | | | | | | | | | | | | | | | | X | | | | | | | | | | | | | | | | | | | | |
| | M8 | | | | | | | | | | | | | | | X | | | | | X | | | | | | | | X | | | | | | | | | |
| | M9 | | | | | | | | | | | | | | | | | | | | | | | | | | | X | X | | | | | | | | | |
| | M10 | | | | X | | | | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | M11 | | | | | | | | X | X | | | | | | | X | X | X | | | | | | | | | | X | | X | | | | | | | |
| Kwaliteit | K1 | | | | | | | | | | | | | | | | | | X | | | | | | | | | | | | | | | | | | |
| | K2 | | | | | | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | K3 | | | | | | | | | | X | | | | | | X | X | X | | | | | | | | | | X | | | | | | | | | |
| | K4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | X | | | | | | | | | |
| | K5 | | | | | | | | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | | |
| | K6 | | | | | | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | K7 | | | | | | X | | | | | | | | | | | X | X | | | | | | | | | | | | | | | | | | | |
| | K8 | | | | | | X | | | | X | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | K9 | | | | | | | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | | | |
| | K10 | | | | | | | | | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| | K11 | | | | | | | | | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| Technisch | T1 | | | | | | | | | | | X | | | | | | | | | | | | X | X | | | | | | | | | | | | | |
| | T2 | | | | | | | | | | | | | | | | | | | | | X | | | X | | | | X | | | | | | | | | |
| | T3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | T4 | | | | | | | | | | X | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | T5 | | | | | | | | | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | T6 | | | | | | | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | X |
| | T7 | | | | | | | | | | | | | | X | | | | | | | | | | | | | | | | | | | | | | | |
| | T8 | | | | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | | | | | | |
| | T9 | | | | | X | | | | | | | X | | | | | | | | | | | | | | | | | | | | | X | | | | |
| | T10 | | | | | | | | | X | | | | | X | | | | | | | | | | | | | | | | | | | | | | | |
| Student | St1 | | | X | | | | | | | | | | | | | | | | X | | | | | | | | | | | | | | | X | | | |
| | St2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | X | | |
| | St3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | X | | |
| | St4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | X | | |

# Appendix D. Sources, codes

The table below lists the codes of the sources used in the tables in Appendices E and F, with the corresponding references. The full source references can be found in the References chapter.

| Code | Source |
|---|---|
| **B1** | (Abri & Dabbagh, 2018) |
| **B2** | (Armellini & Nie, 2013) |
| **B3** | (Baas, 2023) |
| **B4** | (Baas et al, 2021) |
| **B5** | (Baas & Schuwer, 2020) |
| **B6** | (Clements & Pawlowski, 2011) |
| **B7** | (Clements et al, 2014) |
| **B8** | (De los Arcos et al, 2014) |
| **B9** | (De los Arcos et al, 2015) |
| **B10** | (Hatakka, 2009) |
| **B11** | (Jhangiani et al, 2016) |
| **B12** | (Krelja Kurelovic, 2020) |
| **B13** | (Kuo et al, 2024) |
| **B14** | (Marín et al, 2022) |
| **B15** | (Paskevicius & Hodgkinson-Williams, 2018) |
| **B16** | (Pegler, 2012) |
| **B17** | (Pitt, 2015) |
| **B18** | (Plantak Vukovac et al, 2024) |
| **B19** | (Pulker & Kukulska-Hulme, 2020) |
| **B20** | (Santos-Hermosa, 2014) |
| **B21** | (Santos-Hermosa et al, 2017) |
| **B22** | (Schuwer & Baas, 2023) |
| **B23** | (Schuwer & Janssen, 2018) |
| **B24** | (UNESCO, 2020) |
| **B25** | (Versantvoort & Schuwer, 2023) |
| **B26** | (White & Manton, 2011) |
| **B27** | (Wills & Pegler, 2016) |

# Appendix E. Sources for the factors

The table below lists the sources for the factors described in Appendix A. The full source descriptions can be found in Appendix D.

| Factor | Sources |
|---|---|
| **G1** | B1, B3, B4, B10, B14, B15, B17, B23 |
| **G2** | B2, B7, B11, B12, B16, B19, B21, B25 |
| **M1** | B16, B20 |
| **M2** | B16 |
| **M3** | B16, B27 |
| **M4** | B5, B11, B14, B16, B20, B23 |
| **M5** | B14, B16, B23 |
| **M6** | B5, B11, B14, B16, B26, B27 |
| **M7** | B16 |
| **M8** | B3, B4, B11, B13, B14, B16, B20 |
| **M9** | B5, B10, B11, B14, B16, B19, B23, B25, B26 |
| **M10** | B3, B4, B11, B13, B14, B19, B23, B26, B27 |
| **M11** | B2, B10, B14, B23, B25 |
| **K1** | B2, B3, B4, B6, B8, B9, B11, B14, B16, B19, B20, B21, B27 |
| **K2** | B3, B4, B10, B16, B25, B26, B27 |
| **K3** | B3, B25 |
| **K4** | B16, B25 |
| **K5** | B14, B16, B21, B27 |
| **K6** | B2, B3, B4, B10, B11, B16, B25 |
| **K7** | B16 |
| **K8** | B16, B27 |
| **K9** | B11, B16, B20, B21, B26, B27 |
| **K10** | B8, B9, B16, B21, B27 |
| **K11** | B16, B19, B23, B25, B26, B27 |
| **T1** | B8, B9, B14, B16, B21, B25 |
| **T2** | B1, B3, B4, B10, B11, B14, B16, B17, B25 |
| **T3** | B2, B3, B4, B10, B16, B20, B21, B27 |
| **T4** | B16 |
| **T5** | B16, B25 |
| **T6** | B2, B11, B14, B15, B16, B20, B21, B27 |
| **T7** | B2, B3, B11, B16, B27 |
| **T8** | B14, B16, B21, B27 |
| **T9** | B16, B19 |
| **T10** | B10, B16, B19, B25, B26, B27 |
| **St1** | B11, B14 |
| **St2** | B3, B18, B19 |
| **St3** | B3, B18 |
| **St4** | B1, B3, B10, B17, B18, B19 |

# Appendix F. Sources for the guidelines

The table below lists the sources for the tools described in Appendix B. The complete source descriptions can be found in Appendix D.

| Guideline | Sources |
|---|---|
| **V1** | B14, B16, B23, B24, B25 |
| **V2** | B1, B2, B3, B4, B7, B10, B11, B12, B14, B15, B16, B17, B19, B21, B23, B25 |
| **V3** | B2, B7, B11, B12, B14, B16, B19, B21, B25 |
| **V4** | B3, B4, B11, B13, B14, B16, B19, B23, B24, B26, B27 |
| **V5** | B2, B7, B11, B12, B16, B19, B21, B24, B25 |
| **V6** | B2, B3, B4, B4, B10, B11, B16, B24, B25, B26, B27 |
| **V7** | B2, B11, B14, B15, B16, B20, B21, B27 |
| **P1** | B2, B3, B4, B10, B11, B13, B14, B16, B19, B22, B23, B24, B25, B26, B27 |
| **P2** | B3, B4, B10, B11, B13, B14, B16, B19, B23, B25, B26, B27 |
| **P3** | B16, B27 |
| **P4** | B8, B9, B14, B16, B21, B25 |
| **P5** | B2, B7, B11, B12, B16, B19, B21, B24, B25, B27 |
| **P6** | B2, B7, B11, B12, B16, B19, B21, B24, B25, B27 |
| **P7** | B2, B3, B10, B11, B16, B19, B24, B25, B26, B27 |
| **O1** | B3, B4, B11, B13, B14, B16, B20, B22, B27 |
| **O2** | B2, B4, B10, B14, B23, B25, B27 |
| **O3** | B2, B3, B4, B5, B10, B14, B16, B23, B25 |
| **O4** | B2, B3, B4, B6, B8, B9, B10, B11, B14, B16, B19, B20, B21, B23, B25, B27 |
| **O5** | B11, B14, B16, B20, B23 |
| **I1** | B3, B4, B11, B13, B14, B16, B20 |
| **I2** | B1, B3, B4, B10, B11, B14, B16, B17, B25 |
| **I3** | B14, B16, B21, B24, B27 |
| **I4** | B8, B9, B14, B16, B21, B24, B25 |
| **I5** | B1, B3, B4, B8, B9, B10, B11, B14, B16, B17, B21, B25 |
| **S1** | B4, B6, B11, B16, B20, B21, B26, B27 |
| **S2** | B3, B14, B16, B21, B25, B27 |
| **S3** | B8, B9, B10, B11, B14, B16, B19, B21, B23, B25, B26, B27 |
| **S4** | B1, B2, B3, B4, B10, B11, B13, B14, B16, B17, B19, B20, B23, B25, B26 |
| **C1** | B2, B3, B4, B7, B11, B12, B16, B19, B21, B24, B25, B27 |
| **C2** | B2, B7, B10, B11, B12, B14, B16, B19, B21, B23, B24, B25, B27 |
| **C3** | B2, B4, B7, B11, B12, B14, B16, B19, B21, B23, B24, B25, B27 |
| **C4** | B2, B7, B11, B12, B16, B19, B21, B24, B25 |
| **C5** | B2, B7, B11, B12, B16, B19, B21, B24, B25 |
| **C6** | B1, B3, B4, B10, B14, B15, B17, B23, B24, B25 |
| **C7** | B1, B3, B10, B11, B14, B17, B18, B19 |
| **C8** | B2, B4, B7, B11, B12, B16, B19, B21, B25 |
| **C9** | B1, B2, B3, B4, B10, B11, B14, B15, B16, B17, B20, B21, B23, B27 |