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How to use visualizations for better text comprehension



make literacy meaningful

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What is it about?

Text structure awareness supports reading comprehension. The development of text structure awareness can be promoted by visualizing the corresponding structure of the text. The creation of a visualization of the text structure also enables the cognitive processing of what has been read (more about this here: <http://euliteracy.eu/wp-content/uploads/2018/09/Focus-on-Form-1.pdf>).

Four different forms of visualization (Dymock 2005)

Susan Dymock has developed four possibilities of visualization (Dymock 2005), which can be used for reading and thematizing text structures. These include

1. Mind map,
2. table,
3. list, and
4. arrow diagram.

These four forms are explained in detail below. However, it is important to point out that the text structures with their respective visualization possibilities should not be understood as isolated, juxtaposed forms. Rather, it is common that different forms are used for the visualization of factual texts. Which visualization is suitable depends on the content of the read text: In a factual text about the penguin (see PDF with an example text about the penguin), for example, its habitat, eating habits and reproduction could be described. In this case, a mind map would be suitable as a visualization. When describing eating habits, however, it is quite possible that a list of frequently consumed foods is given. In this case, a list is useful for visualization. In addition, the penguin could be compared with another bird species using a table for visualization. The text therefore has not only one structure, but depending on the content a different representation and text structure is used.

Consequently, such a versatile text offers a mixture of different visualization types for the representation of the structures of a text.

Mind map

The mind map almost always represents the basic structure for the visualization of a factual text. It can be used to display hierarchical relationships within texts particularly well. The middle of a mind map always represents the topic (e.g. penguin), from which different subcategories (e.g. reproduction, eating habits) branch off, which in turn can be subdivided into subitems (e.g. fish, crabs).

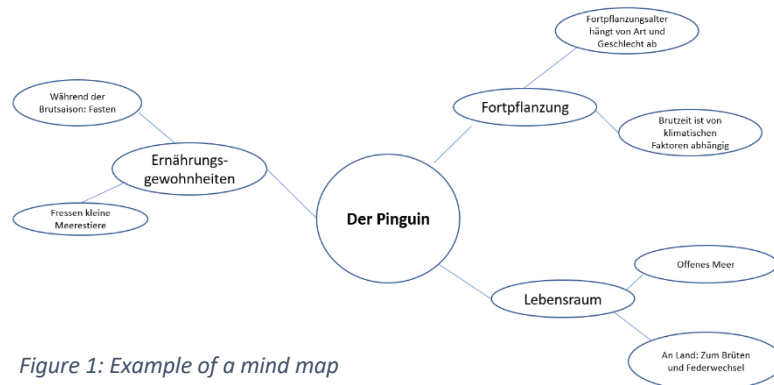


Figure 1: Example of a mind map

Table

The table, on the other hand, is particularly suitable when comparisons are made within a text. Since a table has two dimensions (rows and columns), it allows comparisons within different categories. For example, the penguin can be compared with the puffin and the swan within different categories (e.g. lifestyle, habitat, etc.).

	<u>Pinguin</u>	<u>Papageientaucher</u>	<u>Schwan</u>
<u>Lebensraum</u>	<u>Offenes Meer</u> <u>Kommt nur zum</u> <u>Brüten und für den</u> <u>Federwechsel an Land</u> <u>(z.B. felsige Küsten</u> <u>Wälder, Sandstrände)</u>	<u>Offenes Meer</u> <u>Kommt nur zum</u> <u>Brüten an Land:</u> <u>Küsten und Inseln des</u> <u>nördlichen Atlantiks</u> <u>und des westlichen</u> <u>Polarmeers</u>	<u>Brüten in der</u> <u>arktischen Tundra</u> <u>und ziehen dann in</u> <u>gemäßigere Gebiete</u>
<u>Lebensweise</u>	<u>flugunfähig</u> <u>Leben in Kolonien</u>	<u>Zugvögel</u> <u>Leben in kleinen</u> <u>Gruppen</u>	<u>Zugvögel</u> <u>Einzelgänger</u>

Abbildung 2: Beispiel für eine Tabelle

List

Lists also occur frequently, especially in factual texts. However, these are usually only part of the text. For example, in a factual text about the penguin, a list could be used to show what types of food the penguin eats.

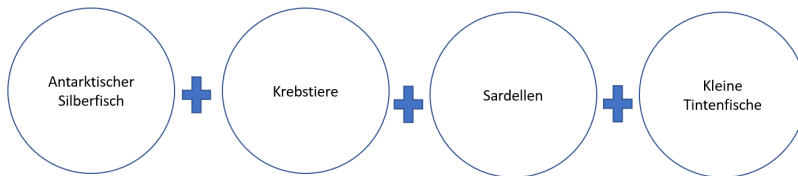


Figure 3: Example of a list

Arrow diagram

Arrow diagrams are particularly suitable for displaying time sequences. For example, they can be used to represent a factual text in history. In relation to the penguin, for example, an arrow diagram could be used to illustrate the breeding process.

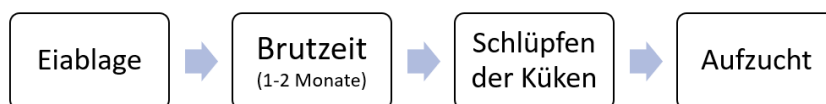


Figure 4: Example of an arrow diagram

Integrating mind map

As mentioned at the beginning, factual texts can often be displayed using not only one but several of these visualization options. Texts often contain different sections in which different forms of visualization are available. In order to be able to use the different visualization forms in an optimal way and to achieve networking of the individual text sections, a mind map is a good option, into which other visualization forms can be integrated. This includes the visualization forms presented here (table, list, arrow diagram), but also other photos or graphics (e.g. a labeled graphic of the body parts of the penguin).

The creation of integrating mind maps in the classroom offers many advantages, as it enables the networking of imaginary images ("image-like information structures of characteristics of the external appearance of objects or persons" (Woolfolk 2014, p. 295)), propositional networks (network of meanings) and scripts (represents a typical sequence of events (Woolfolk 2014, p. 295)). Such networking also occurs in the human brain in the form of schemata (Woolfolk 2014, p. 298). The integrating mind map thus seems to correspond to the cognitive processing of information.

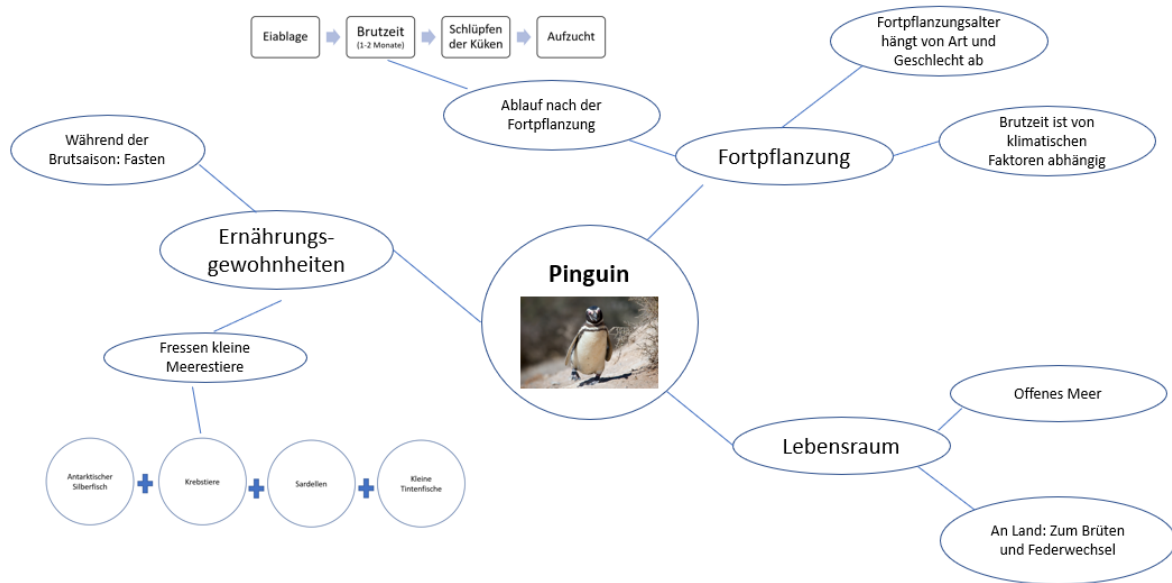


Figure 5: Example of an integrating mind map
 Image of Penguin by David - Penguin Waddle, CC BY 2.0, <https://commons.wikimedia.org/w/index.php?curid=3738311>

Implementation in class

Allow sufficient time to secure a text structure and visualization

If the different text structures are introduced in class, sufficient time should have been given between the introduction of an old and a new structure to recognize the structure treated so far in a text and to develop from it an own visualization on the basis of the pattern. It is therefore a good idea to gradually introduce the various forms of visualisation into the classroom, building on each other. However, it is central to establish the reference to the text. If, for example, the arrow diagram is introduced, it is important to make it clear that it is suitable for the visualization of processes. In order to better understand this, parts of the text can be cut out and placed with arrows. The symbol meaning of the arrow can also be explained. It is also possible to visualise only individual sections of a text in order to give the children sufficient opportunity to identify a certain pattern and to process it cognitively in their own visualisation. The visualisation is more than just a graphic representation: it is the result of an active examination of the text (section).

Internal differentiation in the sense of scaffolding

In addition, an internal differentiation in the sense of scaffolding (Gibbons 2015) should also take place when visualizations are used. For example, words that only need to be inserted into a graphic can be given as assistance. Likewise, a given mind map, for example, can initially only be laid out in the following way: The children receive word and key point maps, which they arrange and thus create relationships. Here, too, they take action, try out different options and can work out together in exchange which arrangement is most conclusive for them. In many cases, there is not only one solution, and even when working with given terms/word cards, the children should always be asked to add further terms/cards.

Use visualizations to decipher stumbling points

Working with different visualization forms to clarify the text structures also includes the explicit discussion of keywords of a text. This can be done from both directions: from the keywords to the visualization or from the visualization to the highlighting of the keywords. The fact that important terms are discussed and explained is not only helpful for DaZ learners.

Certain linguistic structures can also be discussed in the creation of visualizations: Time words are displayed in an arrow diagram, passive constructions can also be "decoded" in a mind map. Linguistic stumbling blocks, which can make text comprehension more difficult, are therefore not ignored, but rather used to further process the content cognitively.

Checklist for lessons

The following checklist provides an overview of the various aspects that should be considered when reading factual texts in a language-sensitive class. This checklist contains questions that you as a teacher should ask yourself during the various phases of the lesson.

Before class:

- Which visualizations are suitable for the different text sections?
 - Which of these visualizations have already been introduced in class?
 - Which of these visualizations have not yet been introduced in class?
- Is the number of unknown visualization forms appropriate for the lesson?
- How will I communicate the unknown form of visualization to the children?
- What are the language hurdles in the text? (For more information on this aspect, see: <http://euliteracy.eu/wp-content/uploads/2018/04/Fachsprache-Schmetterling.pdf>)
- Which key words of the text should I explicitly thematise, explain and visualise in class?
- What additional reading strategies can I offer the children when reading the text? (Table with reading strategies, see: <http://euliteracy.eu/wp-content/uploads/2018/09/Focus-on-Form-1.pdf>)
- How can I activate the prior knowledge of learners?

During class:

- Have the learners penetrated the structure of the text?
- Have the learners penetrated the content of the text?
- Have the learners understood how to deal with visualizations?
- How can I further support the learners?
- Were the learners able to reflect on their learning progress in a metaphase?

After class:

- How can I improve my handling of visualizations/text?
- How can I support the learners in the further course of the lesson?

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