CONTENT ON ARTIFICIAL INTELLIGENCE IN THE ONLINE SCHOOLBOOK INF-SCHULE.DE

Hannes Heusel
PÄDAGOGISCHES LANDESINSTITUT RHEINLAND-PFALZ, Speyer, Germany
hannes.heusel@pl.rlp.de

Focus Topics: Learning Materials Tools

Abstract

This presentation aims to provide answers to the question of how digital teaching/learning material on artificial intelligence should be designed in the context of computer science lessons at lower secondary level (10-14 years). After an overview of the content and organizational form of the online textbook inf-schule.de, selected chapters on artificial intelligence will be used to explain the didactic and methodological concepts of the textbook in more detail.

General information about the www.inf-schule.de service

The online textbook www.inf-schule.de was originally developed in 2008 to support teacher training in Rhineland-Palatinate. It now contains more than 3000 pages of content on practically all areas of school informatics (10-19 years). The offer is published as an Open Educational Resource (OER) under a Creative Commons (CC) license and is constantly being developed by a team of around 25 editorial members are constantly developing it further.

The content offered has a standardized didactic structure and has generally been successfully tested in class beforehand. The methodological focus is on problem- and action-oriented learning with reference to the students' living environment. To optimize the content for the orientation level (10-13 years), the KIDS section was created for this target group in 2018 in a child-friendly format with clearly defined learning paths. Learning with the textbook is supported by a variety of interactive elements developed by the editorial team for many of the contents. These tools are appropriately integrated into the textbook and thus provide maximum support for the learning process.

With currently more than 100,000 page views per school day, inf-schule.de is the standard for OER materials for the subject of computer science in Germany (SWK, 2022). Many curriculum handouts of the federal states refer to corresponding content from inf-schule.de (NRW, 2021). Increasingly, content is also being created in collaboration with research projects and educational initiatives, for example:

- Genius project of the RPTU Kaiserslautern and the University of Constance
- Prodabi project of the University of Paderborn
- Cubi learning software by IT4Kids - in cooperation with RWTH Aachen University
- Spacebug learning software from inf-schule.de in collaboration with the University of Trier

The online textbook also appears in research on digital education (Döbeli, 2018 & Froitzheim, 2017).

Content on artificial intelligence

In Rhineland-Palatinate, the topic of artificial intelligence has so far only appeared in the new curricula for the computer science profile schools (IPS, 10-15 years). Accordingly, the KIDS section of inf-schule.de contains suitable learning tracks on supervised learning for 11-year-olds (Learning systems) and on decision trees for 12/13-year-olds (Decisions like an AI). There is also content on how a learning neuron works for 14/15 year olds (simplified learning neuron) and a learning track on reinforcement learning (NIM game). In all the content mentioned, the learning process is closely linked to an interactive tool developed for this purpose. Much more AI content can be found on the AI overview page of our textbook. (The links in the text refer directly to example pages with the developed tools)

The learning paths all follow a standardized didactic and methodological structure with the following guidelines for their creation:

- building on previous knowledge
- relevance to the real world
- problem orientation

- action-oriented/interactivity
- discovery/self-directed learning
- only one step of knowledge per learning step
- each learning step can contain aids for differentiation
- deepening optional learning steps at the end of the course

Concrete examples of the implementation of these guidelines will be shown in the presentation.

References

SWK (2022). Digitalisierung im Bildungssystem: Handlungsempfehlungen von der Kita bis zur Hochschule Gutachten der Ständigen Wissenschaftlichen Kommission der Kultusministerkonferenz (SWK), p60.
https://www.swk-bildung.org/content/uploads/2024/02/SWK-2022-Gutachten_Digitalisierung.pdf

NRW (2021). Qualitäts- und Unterstützungsagentur - Landesinstitut für Schule (QUA-LiS NRW): Unterstützungsmaterial und Hinweise zum Kernlehrplan Informatik (Sekundarstufe I - Klasse 5 und 6), p3.
https://www.schulentwicklung.nrw.de/materialdatenbank/material/download/11692

Döbeli, B.; Hielscher, M.; Hartmann, W. (2018). : LEHRMITTEL IN EINER DIGITALEN WELT, 55-56, 75.
https://www.ilz.ch/sites/default/files/inline-files/Expertenbericht-Lehrmittel-in-einer-digitalen-Welt_2018-11-12.pdf

Froitzheim, M.; Becker, K.; Jonietz, D.; Schneider, O.; Jochum, H. (2017). Förderung digitaler Bildung mit digitalen Schulbüchern. *In: Diethelm, Ira (Hrsg.): Informatische Bildung zum Verstehen und Gestalten der digitalen Welt, Proceedings der 17. GI-Fachtagung Informatik und Schule, INFOS 2017, 13.-15. September 2017, Oldenburg Bd. P-274, 2017 (LNI),* 443–452