

CAPTURING THE RESEARCH BASE: FRAMING A LITERATURE SEARCH ON DIGITAL COMPETENCES

Annika Wilmers¹, Carolin Keller¹, Pia Sander², Alexander Christ¹, Tanja Mayer²
and Katja Buntins²

¹DIPF | Leibniz Institute for Research and Information in Education, Germany

²University of Duisburg-Essen, Germany

ABSTRACT

This paper reflects how the broad concept of digital competences can be translated into a search strategy to capture relevant research literature in the field using research synthesis methodology. Two key areas of interest are the transfer of existing definitions and understandings of digital competences into search criteria and terms, and the planning process involved in conducting a literature search on broad and interdisciplinary research topics while using PRISMA-SEARCH. The chosen review type is an overview of reviews, defined as a review based on existing research syntheses, which is particularly well-suited to mapping broader areas such as digital competences.

KEYWORDS

Digital Competences, Research Synthesis, Overview of Reviews, Literature Search, PRISMA-S

1. UNDERSTANDING AND CLUSERING A FIELD WITH REVIEW METHODOLOGY

Research into digital competences, also discussed as digital skills or media literacy among other terms, has increased significantly in recent years (Kreuder et al., 2024). This growth has been driven by the necessity to define, frame, and implement competences for a digitalized world, and by rapid technical developments. Maintaining an understanding of this field of research is challenging, and an overview of reviews can be a useful method. Overviews of reviews, also referred to as reviews of reviews, meta-reviews or umbrella reviews, point to research syntheses that generate their findings based on research syntheses (Sutton et al., 2019). Overviews of reviews are close to systematic reviews procedures while dealing with multiple study levels: the level of the overview, of the included reviews and of the underlying primary studies (Polanin et al., 2017). Overviews generally cover broader questions or thematic areas, which corresponds to the aim of capturing developments in the research field by reviewing existing research syntheses (e.g. Pollock et al., 2023; Lunny et al., 2017).

This reflection paper provides insights into how a broad literature search in the field of digital competences can be designed while the exact procedure as well as results regarding the efficacy of the search are discussed elsewhere. Special attention will be drawn to the question of the transferability of the PRISMA-S guidelines, which were originally developed for the medical field (Rethlefsen et al., 2021). The documentation of the literature search can be accessed via the Research Data Center for Education at the DIPF | Leibniz Institute for Research and Information in Education.

2. THEORETICAL FRAMING: DEFINING THE TOPIC AND THE TARGET GROUP

The term ‘digital competence’ as a collective term for the ability to act competently in a digital world is the subject of controversial debate in research. In particular, there is criticism that it is primarily understood as a technological term, which may overlook reflective and critical skills in dealing with digitality (see Kerres,

2023). But even when understanding the term more broadly, digital' competences present definitional challenges: Firstly, they encompass many different sub-aspects (e.g. information literacy), and secondly, the distinction between digital and non-digital competences is not clear-cut, as many underlying abilities (e.g. problem-solving) are relevant in both contexts. Another difficulty arises from the diversity of terms such as digital skills, or media literacy, which are used inconsistently and sometimes interchangeably. This inconsistency further increases in multilingual contexts where translations do not always align precisely.

In this situation we initially decided to consider competences that are explicitly linked to 'digitisation' only, so that general competences such as 'critical thinking' were not taken into account. The understanding of digital competences underlying this overview is based both on relevant literature in the field (e.g. Fraillon, 2024) and on a comparison of national and international strategies and frameworks for digital education (e.g. KMK, 2021; EC, 2019; BMBF, 2019). As a basis for determining and clustering digital competences we chose UNESCOs differentiated 'Digital Literacy Global Framework' from 2018, which is an extension of the European Digital Competence Framework for Citizens (DigComp 2.0 from 2016; updated in 2022). The UNESCO Digital Literacy Global Framework defines digital literacy as "the ability to access, manage, understand, integrate, communicate, evaluate and create information safely and appropriately using digital technologies to create employment, decent jobs and entrepreneurship. It includes competences variously referred to as computer literacy, ICT literacy, information literacy and media literacy." (UNESCO, 2018, p. 6)

The target group includes all learners aged six to 27 years in formal and non-formal settings and in different stages or transitions within the education system using the definition of "young people" found in international contexts, in the sociological context and in German legislation.

3. DEFINING THE SCOPE OF THE LITERATURE SEARCH

In line with the considerations above, the literature search was not dominated by a specific research question but rather mapped the range of current research syntheses on the topic of digital competences of young learners. In this context, we chose a limited number of inclusion and exclusion criteria for the literature search. Included languages were German and English and the search covered literature from the year 2000 onwards.

Instead of using an analytical framework like the PICO model which structures the literature search according to specific criteria (e.g. population or intervention) but risks limiting searches with a broader and/or qualitative approach (Cooke et al., 2012; Methley et al., 2014), we identified core elements of the research topic and separated these into individual blocks (block search). These blocks consist of (1) types of research syntheses, (2) digital competences and (3) the target group of young learners.

4. DATABASE SEARCH AND ADDITIONAL SEARCH TACTICS

For each of these blocks search terms were collected in English and German, for example for types of research syntheses the selection of terms was based on the English-language classification of review types by Sutton et al. (2019). In addition, German terms were also used to identify research syntheses, if these are commonly used in the German literature. To determine keywords for 'young learners', we used terms that covered both the target group and the learners' educational stages. To determine digital competences, keywords were grouped in a phrase search.

Reflecting the heterogeneous and interdisciplinary nature of education research, searches were conducted in the following databases in the areas of education, psychology and social sciences: German Education Research Portal - Fachportal Pädagogik (including the German Education Index FIS-Bildung, ERIC (Education Resources Information Center), "EBSCOhost ebooks", the FID national licenses as well as education areas of the "Library of Congress" and the BASE (Bielefeld Academic Search Engine) database), ERC (Education Research Complete), APA PsychInfo, APA PsychArticles, Scopus, Web of Science (Core Collection) and PubPsych. Additionally, we manually searched the publication lists of central institutions (Campbell Collaboration, the EPPI Center and the What Works Clearinghouse) and a list of relevant journals from the fields of e-learning, knowledge management and media didactics. After removing duplicates and titles published in other languages 4,871 studies were included in the screening process.

5. ASSESSMENT OF THE APPLICABILITY OF PRISMA-SEARCH

The extension developed by PRISMA for complete documentation of literature searches, PRISMA-Search, contains 16 criteria which are divided into four subject areas: Information Sources, Search Strategies, Peer Review and Managing Records. These categories can be applied to all complex search strategies, regardless of the type of review or research discipline except for researching study registries. In educational research, studies from different disciplines may be relevant to the synthesis. Comprehensive study registries in which central topics can be researched are lacking in both education and social sciences. Similarly, research syntheses in educational research are not centrally registered, as is the case with the Cochrane Library or PROSPERO. This leads to more time-consuming searches for research syntheses in education sciences, as these are distributed across various data sources. For the same reason, nuanced search strategies that can be applied to various research contexts (e.g. different database systems or different use of vocabulary in subdisciplines) are essential for capturing all of the relevant literature. In our experience, the PRISMA-S approach can therefore be transferred to other disciplines. However, this does not change the fact that a literature search such as the one we conducted in our case on digital competences must still be very broad in scope and grounded in a theoretical context in order to cover all facets of the subject matter.

ACKNOWLEDGEMENT

This research is funded by BMBFSFJ under the funding numbers 01JD2300A and 01JD2300B.

REFERENCES

- Bundesministerium für Bildung und Forschung (BMBF). (2019). *Digitale Zukunft: Lernen. Forschen. Wissen. Die Digitalstrategie des BMBF*. Berlin.
- Cooke, A., Smith, D., & Booth, A. (2012). Beyond PICO: the SPIDER tool for qualitative evidence synthesis. *Qualitative health research*, 22(10), 1435–1443. <https://doi.org/10.1177/1049732312452938>
- European Commission (2019). *Key competences for lifelong learning*. Publications Office.
- Fraillon, J. (2024). *An international perspective on digital literacy. Results from ICILS 2023*. IEA.
- Kerres, M. (2023). Bildung in der digitalen Welt: (Wie) Kann digitale Kompetenz vermittelt werden? In N. McElvany, R. Lorenz, M. Becker, H. Gaspard, & F. Lauermann (Eds.), *IFS-Bildungsdialoge: Vol. 6. Lernen in und für die Schule im Zeitalter der Digitalität – Chancen und Herausforderungen für Lehrkräfte, Unterricht und Lernende*. Waxmann.
- Kreuder, A., Frick, U., Rakoczy, K., & Schlittmeier, S.J. (2024). *Digital competence in adolescents and young adults: a critical analysis of concomitant variables, methodologies and intervention strategies. Humanities and Social Sciences Communications*, 11(48). <https://doi.org/10.1057/s41599-023-02501-4>
- Kultusministerkonferenz (KMK) (2021). *Lehren und Lernen in der digitalen Welt. Die ergänzende Empfehlung zur Strategie „Bildung in der digitalen Welt“*. Berlin and Bonn.
- Lunny, C., Brennan, S. E., McDonald, S., & McKenzie, J. E. (2017). Toward a comprehensive evidence map of overview of systematic review methods: Paper 1-purpose, eligibility, search and data extraction. *Systematic Reviews*, 6(1), 231.
- Methley, A. M., Campbell, S., Chew-Graham, C., McNally, R., & Cheraghi-Sohi, S. (2014). PICO, PICOS and SPIDER: a comparison study of specificity and sensitivity in three search tools for qualitative systematic reviews. *BMC health services research*, 14, 579. <https://doi.org/10.1186/s12913-014-0579-0>
- Polanin, J. R., Maynard, B. R., & Dell, N. A. (2017). Overviews in Education Research. *Review of Educational Research*, 87(1), 172–203. <https://doi.org/10.3102/0034654316631117>
- Pollock, M., Fernandes, R. M., Becker, L. A., Pieper, D [D.], & Hartling, L. (2023). Chapter V: Overviews of Reviews. In J. P. T. Higgins, J. Thomas, J. Chandler, M. Cumpston, T. Li, M. J. Page, & V. A. Welch (Eds.), *Cochrane book series. Cochrane handbook for systematic reviews of interventions* (Version 6.4). Wiley-Blackwell.
- Rethlefsen, M. L., Kirtley, S., Waffenschmidt, S., Ayala, A. P., Moher, D., Page, M. J., Koffel, J. B., & PRISMA-S Group (2021). PRISMA-S: an extension to the PRISMA Statement for Reporting Literature Searches in Systematic Reviews. *Systematic reviews*, 10(1), 39. <https://doi.org/10.1186/s13643-020-01542-z>
- Sutton, A., Clowes, M., Preston, L., & Booth, A. (2019). Meeting the review family: exploring review types and associated information retrieval requirements. *Health Information & Libraries Journal*, 36(3), 202–222.
- UNESCO (2018). *A Global Framework of Reference on Digital Literacy Skills for Indicator 4.4.2. Information Paper No. 51*. UIS/2018/ICT/IP/51. <https://uis.unesco.org/sites/default/files/documents/ip51-global-framework-reference-digital-literacy-skills-2018-en.pdf>