

Beyond Numeracy, a Data Literacy Topical Scoping Review (2011-2023)

Lotte Vermeire, Wendy Van den Broeck, Fazlyn Petersen, and Leo Van Audenhove

Supplementary Material

Appendix 1. Research protocol

Review protocol ‘Beyond Numeracy, a Data Literacy Topical Scoping Review (2011-2023)’

Lotte Vermeire, Wendy Van den Broeck, Fazlyn Petersen, and Leo Van Audenhove

Abstract: See article.

Introduction

Rationale: Despite the increasing recognition of data literacy as a critical skillset in today’s datafied society (Frank et al., 2016; Pangrazio & Sefton-Green, 2022; Van Audenhove et al., 2020), its definition remains ambiguous, with varying interpretations across disciplines. The lack of a unified definition and the evolving nature of data literacy, shaped by technological and societal changes, has led to significant conceptual ambiguity. This complicates efforts to clearly define the scope and competences associated with data literacy. This scoping review seeks to provide a comprehensive and clear overview of the topics and themes within data literacy research as well as to inform future research and practice.

Objective: The study aims to provide an overview of the topics and themes that are the focus of data literacy research within the social and educational sciences. It offers an initial contextual understanding of scientific research on data literacy. To date, no scoping reviews have been identified within this field. Existing systematic reviews tend to focus on specific subfields or subthemes, such as intervention assessments, educator and professional development, or business education, with many published in 2023 (e.g., Cui et al., 2023; Ghodoosi et al., 2023; Godaert et al., 2022; Loría-Solano et al., 2023; Raffaghelli & Stewart, 2020).

The following research questions guide this study:

What is the topical evolution of data literacy in social and educational science publications from 2011 to 2023?

- What thematic trends can be identified in the topical evolution of data literacy (2011-2023)?
- What main themes and topics are addressed in publications on data literacy (2011-2023)?

Methods

Inclusion and eligibility criteria:

We chose to combine Clarivate Analytics’ Web of Science and Elsevier’s Scopus databases for a broad selection of literature as well as to mitigate potential charting biases. We applied a

screening of title and abstract to select the articles that were in line with our inclusion and eligibility criteria, which were defined as follows:

- Only literature in English is included in our analysis. Studies published in languages other than English are excluded unless translations are accessible. We recognise that the exclusion of Non-English literature might be a limitation of the study, but we decided to only include English-language papers in our review for several reasons, namely accessibility, consistency, and resource constraints (time, budget). Although we are proficient in certain other languages, including those and not others would have introduced bias, as it would exclude valuable research published in languages we do not understand. We are aware that this choice leaves out other valuable contributions, however, we do believe that the focus on English language papers allows us to maintain a rigorous, comprehensive, and globally relevant review.
- To ensure the quality of the selected literature, we include only peer-reviewed journal articles and book chapters, encompassing all types of open access as well as early-access publications. Conference proceedings, editorials, reviews, opinion pieces, and other grey literature were excluded.
- We limit the timeframe to literature published between 2011 and 2023. Through a preliminary search, 2011 is the first mention of 'data literacy' in an open access article recorded in the selected databases. Therefore, we use 2011 as our starting date.
- We include all literature on the topic of data literacy within the following social science and educational science disciplines in the two databases: communication, sociology, political sciences, library and information studies, psychology, social issues, urban studies, education, social sciences other. The selection of these subdisciplines is based on the fields defined by WoS and Scopus. The decision to focus on these areas is guided by the interdisciplinary nature of data literacy and the topic not being confined to a specific field, as it is a multifaceted concept involving social and technical dimensions. By including multiple disciplines, the review aims to provide a holistic understanding and comprehensive mapping of the field
- The study explores various aspects of data literacy such as conceptual frameworks, teaching and development strategies and activities, competence assessments, application in societal or organisational contexts. The review includes empirical studies (quantitative, qualitative, mixed methods) as well as theoretical and conceptual contributions.
- Studies that do not touch upon data literacy or only mention it peripherally are excluded.

Search and selection: Our original search string - ("Data literac*") AND ("competence" OR "skills" OR "proficiency" OR "understanding" OR "use") - was too limiting, only giving 104 results starting at 2016. Accordingly, we broadened our search looking for papers containing "Data literac*". This provided a dataset of 392 initial results. We then applied the abovementioned criteria for inclusion and exclusion to the dataset and removed duplicates. This led to a final dataset of 210 publications (see figure 1). The main author carried out the coding, which was then reviewed by the secondary author. Any uncertainties were discussed within the author team, and

decisions were made collectively. The results of the search and the study inclusion process are presented in a PRISMA flow diagram that can be found in the article.

Data charting and items: We extracted the full metadata records from both databases and charted the following data in Excel: author, article title, source title (journal), document type, author keywords, indexed keywords if applicable, abstract, publisher, publisher address, publication year, DOI, research areas within the database. We also added the following new columns to further analyse the data manually: ‘topic’, ‘subtopic 1’, ‘subtopic 2’, ‘target group(s)/demographic’, and ‘specific concepts’.

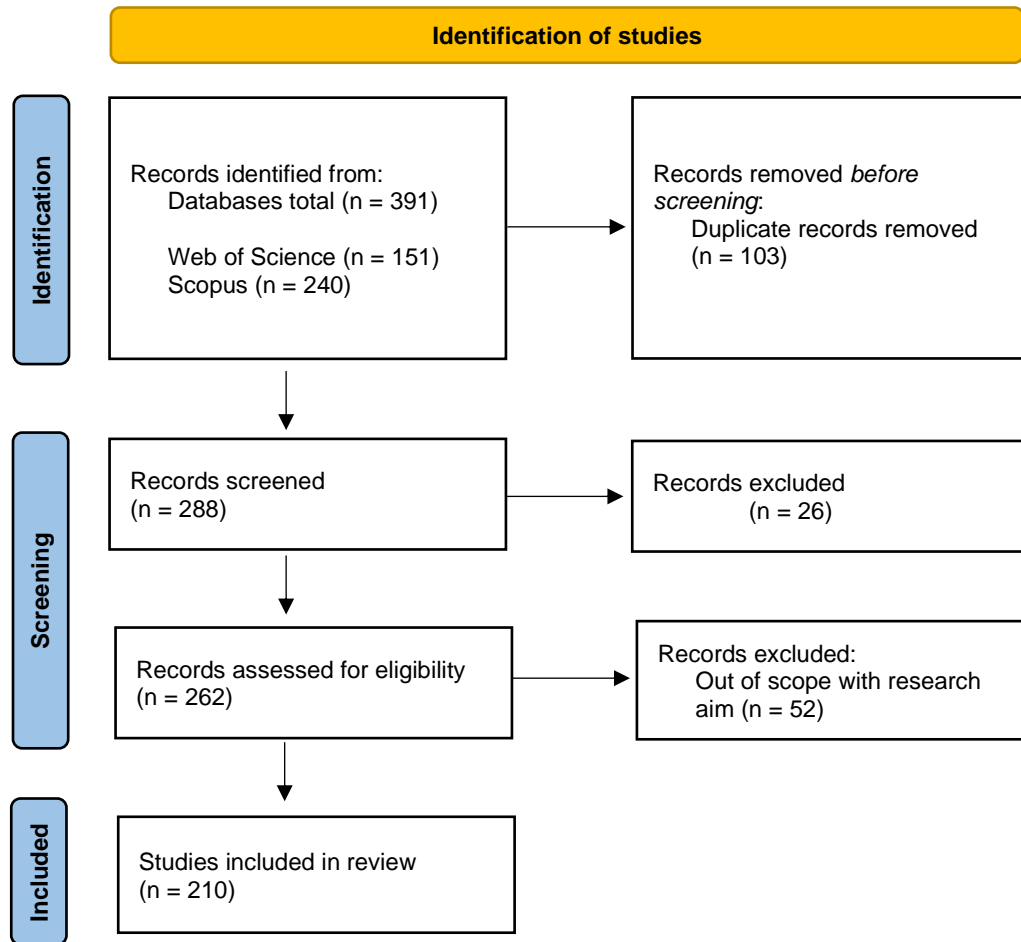


Figure 1. Prisma flowchart

Collating and summarising: We used a mixed methods approach consisting of quantitative and qualitative content analysis.

The authors conducted a quantitative content analysis through a word frequency analysis and a bibliometric analysis. We used 4CAT Capture and Analysis Toolkit (Peeters & Hagen, 2021) for the word frequency analysis, where we uploaded the metadata to the programme and having it tokenise all the words. We then carried out a frequency analysis per word for the article abstracts, noting the most studied and used topics/concepts in the abstracts. We also

conducted a manual bibliometric analysis to discover possible publication trends in the articles' 1/ authors, 2/ journals, and 3/ geographical distribution.

The authors conducted a qualitative content analysis, applying the grounded theory approach (Glaser & Strauss, 1967), Grounded Theory is an inductive approach, starting from the analysis of the raw data and contributing to theory-building based on the data analysis. Within inductive research, 'sensitising concepts' can be used to guide the analytical process (Bowen, 2006). Concretely we applied the three levels of coding as defined by Glaser & Strauss (1967); open coding, axial coding and selective coding. Following this approach, all articles were coded in a constant comparative way. This means that we first checked whether there was already an existing code that was relevant, before adding a new code to discover the emerging topics and subtopics. In line with the notion of sensitising concepts, we used topics discovered through the quantitative analysis as sensitising or guiding concepts in our analysis, but in line with the typical feature of a qualitative content analysis and the study selection in scoping reviews, the coder remained open to new emerging themes as the coding evolves (Bryman, 2016).

See article for more information and data visualisation.

Reporting: See article.

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Appendix 2. Evolution of 25 most occurring concepts (n=210)

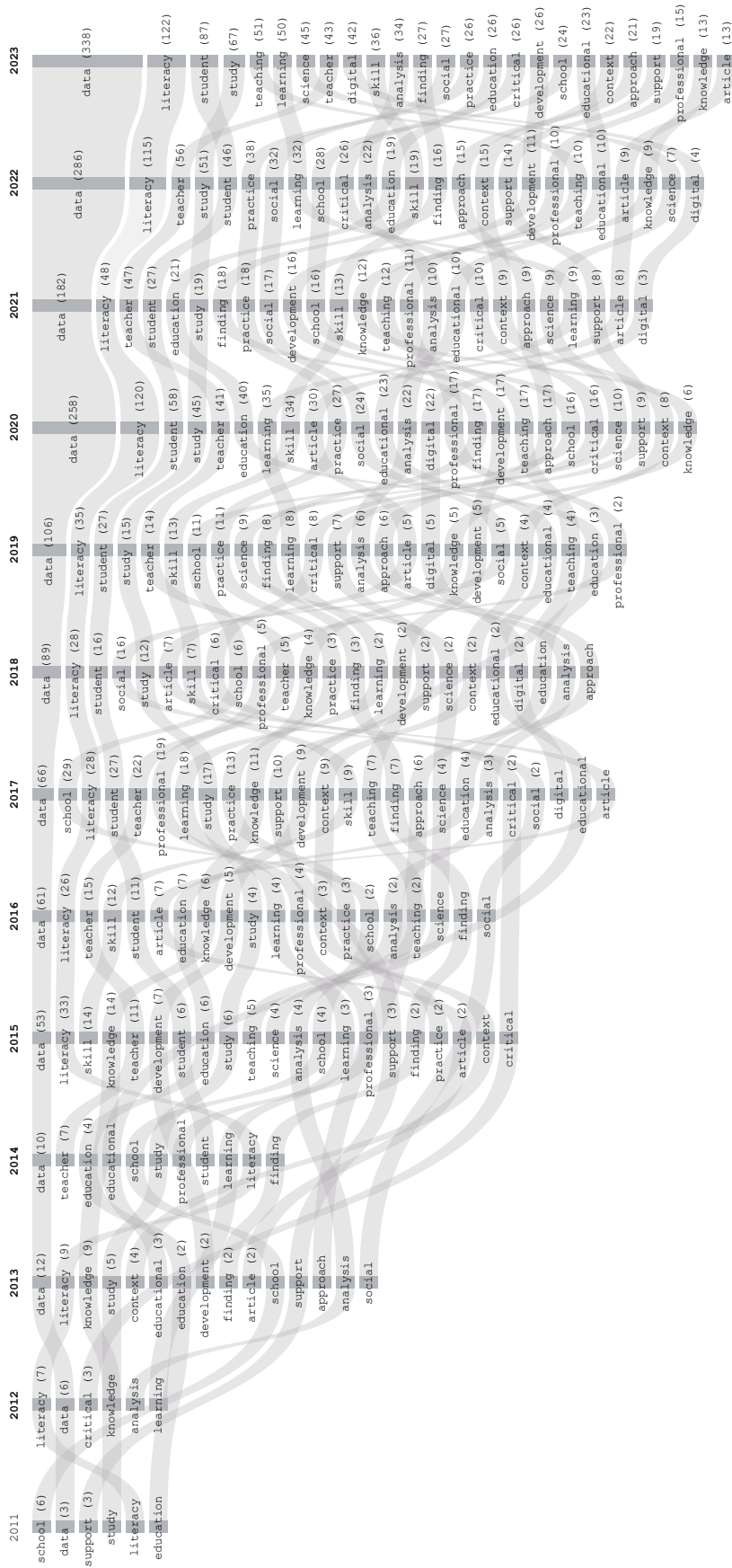


Figure 5. Evolution of 25 most occurring concepts (n=210)

Appendix 3. List of selected articles

Year	Author	Title
2011	Vanhoof J; Verhaeghe G; Verhaeghe JP; Valcke M; Van Petegem P	The influence of competences and support on school performance feedback use
2012	Berendt B	Data Mining for Information Literacy
2013	Prado JC; Marzal MA	Incorporating Data Literacy into Information Literacy Programs: Core Competencies and Contents
2013	Vanhoof J; Mahieu P	Local knowledge brokerage for data-driven policy and practice in education
2013	Perrotta C	Assessment, technology and democratic education in the age of data
2014	Piro JS; Dunlap K; Shutt T	A collaborative Data Chat: Teaching summative assessment data use in pre-service teacher education
2015	Macmillan D	Developing data literacy competencies to enhance faculty collaborations
2015	Koltay T	Data literacy: in search of a name and identity
2015	Gummer ES; Mandinach EB	Building a Conceptual Framework for Data Literacy
2015	Bocala C; Boudet KP	Teaching Educators Habits of Mind for Using Data Wisely
2015	Reeves TD; Honig SL	A classroom data literacy intervention for pre-service teachers
2016	Mandinach EB; Gummer ES	What does it mean for teachers to be data literate: Laying out the skills, knowledge, and dispositions
2016	Federer LM; Lu YL; Joubert DJ	Data literacy training needs of biomedical researchers
2016	Philip TM; Olivares-Pasillas MC; Rocha J	Becoming Racially Literate About Data and Data-Literate About Race: Data Visualizations in the Classroom as a Site of Racial-Ideological Micro-Contestations
2016	Frank EP; Pharo N	Academic Librarians in Data Information Literacy Instruction: A Case Study in Meteorology
2016	Koltay T	Data governance, data literacy and the management of data quality
2016	Hansen CJ; Wasson B	Teacher inquiry into student learning: The TISL heart model and method for use in teachers' professional development

2016	Chan M; Johnson PA; Shookner M	Assessing the use of government open data and the role of data infomediaries: The case of Nova Scotia's community counts program
2016	Dunlap K; Piro JS	Diving into data: Developing the capacity for data literacy in teacher education
2017	Bargagliotti AE; Anderson CR	Using Learning Trajectories for Teacher Learning to Structure Professional Development
2017	Cowie B; Cooper B	Exploring the challenge of developing student teacher data literacy
2017	van Geel M; Keuning T; Visscher AJ; Fox JP	Changes in educators' data literacy during a data-based decision making intervention
2017	LaPointe-McEwan D; DeLuca C; Klinger DA	Supporting evidence use in networked professional learning: the role of the middle leader
2017	Robinson L; Bawden D	"The story of data": A socio-technical approach to education for the data librarian role in the CityLIS library school at City, University of London
2017	Goertzen M	Mixed method study examines undergraduate student researchers' knowledge and perceptions about scholarly communication practices
2017	Stowell Bracke M	Agricultural librarians becoming informationists: A paradigm shift
2017	Ebbeler J; Poortman CL; Schildkamp K; Pieters JM	The effects of a data use intervention on educators' satisfaction and data literacy
2017	Riddle DR; Beck JS; Morgan JJ; Brown N; Whitesides H	Making a case for case-based teaching in data literacy
2017	Uiterwijk-Luijk L; Krüger M; Zijlstra B; Volman M	Inquiry-based leadership: The influence of affective attitude, experienced social pressure and self-efficacy
2018	Burns LS; Matthews BJ	First Things First: Teaching Data Journalism as a Core Skill
2018	Carey M; Grainger P; Christie M	Preparing preservice teachers to be data literate: a Queensland case study
2018	Gao WL; Ke I; Martin L	Using Consultation Data to Guide Data Services Training for Liaison Librarians
2018	Shreiner TL	Data Literacy for Social Studies: Examining the Role of Data Visualizations in K-12 Textbooks
2018	Gebre EH	Young Adults' Understanding and Use of Data: Insights for Fostering Secondary School Students' Data Literacy

2018	Kippers WB; Poortman CL; Schildkamp K; Visscher AJ	Data literacy: What do educators learn and struggle with during a data use intervention?
2018	Gray J; Gerlitz C; Bounegru L	Data infrastructure literacy
2018	Quill TM	Humanitarian Mapping as Library Outreach: A Case for Community-Oriented Mapathons
2018	Pangrazio L; Selwyn N	"It's Not Like It's Life or Death or Whatever": Young People's Understandings of Social Media Data
2019	Hixson T	Reactions vs. Reality: Using Sentiment Analysis to Measure University Students' Responses to Learning ArcGIS
2019	Li Q; Wang P; Sun YF; Zhang YL; Chen CF	Data-driven decision making in graduate students' research topic selection Cognitive processes and challenging factors
2019	Reeves TD; Chiang JL	Effects of an asynchronous online data literacy intervention on pre-service and in-service educators' beliefs, self-efficacy, and practices
2019	Reynolds KA; Triant JH; Reeves TD	Patterns in how pre-service elementary teachers formulate evidence-based claims about student cognition
2019	Arreguit O'Neill SA	Fostering Data Literacy Across Fields
2019	Halliday SD	Data literacy in economic development
2019	Köuts-Klemm R	Data literacy among journalists: A skills-assessment based approach
2019	Wolff A; Wermelinger M; Petre M	Exploring design principles for data literacy activities to support children's inquiries from complex data
2019	Kjelvik MK; Schultheis EH	Getting Messy with Authentic Data: Exploring the Potential of Using Data from Scientific Research to Support Student Data Literacy
2019	Markham AN	Critical Pedagogy as a Response to Datafication
2019	McGowan BS	The role of the university library in creating inclusive healthcare hackathons: A case study with design-thinking processes
2019	Annes J; Krüger M; Suhre C; van Veen K	Impact of inquiry-based working on the capacity to change in primary education
2019	Arreguit X; Hugues JF	Competences and Education for Tomorrow's Jobs and Challenges: A Company's Perspective

2019	Willaert T; Cottyn J; Kenens U; Vandendriessche T; Verbeke D; Wyns R	Research data management and the evolutions of scholarship: Policy, infrastructure and data literacy at KU leuven
2019	Irish T; Berkowitz A; Harris C	Data explorations: Secondary students' knowledge, skills and attitudes toward working with data
2019	Gutiérrez M	Participation in a datafied environment: Questions about data literacy
2019	Aung T; Niyeha D; Shagihilu S; Mpembeni R; Kaganda J; Sheffel A; Heidkamp R	Optimizing data visualization for reproductive, maternal, newborn, child health, and nutrition (RMNCH&N) policymaking: data visualization preferences and interpretation capacity among decision-makers in Tanzania
2019	Vilar P; Zabukovec V	Research data management and research data literacy in Slovenian science
2020	Abrams LM; Varier D; Mehdi T	Librarian's perspective for the implementation of big data analytics in libraries on the bases of lean-startup model
2020	Ahmad K; Zheng JM; Rafi M	The intersection of school context and teachers' data use practice: Implications for an integrated approach to capacity building
2020	Duever M; McGinn E	Teaching GIS in a Digital Humanities Environment
2020	Beck JS; Morgan JJ; Brown N; Whitesides H; Riddle DR	Asking, Learning, Seeking Out: An Exploration of Data Literacy for Teaching
2020	Behrends M; Hoffmann I; Marschollek M	Teamwork, communication and exchange despite Covid-19 - experiences from a digital elective in human medicine studies as part of the HiGHmed project
2020	Jefferson CO	Business and economics librarians' insights on data literacy instruction in practice: An exploration of themes
2020	Jefferson CO; Stierholz K; Fontichiaro K; Hoelter L	Considering data literacy using Kuhlthau's Information Search Process: Implications for librarians and data providers
2020	Kennedy-Clark S; Galstaun V; Reimann P; Martyn T; Weight J; Williamson K	Voices On Data Literacy In Initial Teacher Education: Pre-Service Teachers' Reflections And Recommendations

2020	Loftus M; Madden MG	A pedagogy of data and Artificial Intelligence for student subjectification
2020	Markham AN	Taking Data Literacy to the Streets: Critical Pedagogy in the Public Sphere
2020	Mendez-Carbajo D	Baseline Competency and Student Self-efficacy in Data Literacy: Evidence from an Online Module
2020	Merk S; Poindl S; Wurster S; Bohl T	Fostering aspects of pre-service teachers' data literacy: Results of a randomized controlled trial
2020	Pangrazio L; Sefton-Green J	The social utility of 'data literacy'
2020	Schuetz C; Been J; Chan-Park CY	Here and hereafter: Preparing business students for a data-driven world
2020	Shreiner TL	Building a data literate citizenry: how US state standards address data and data visualizations in social studies
2020	Sander I	What is critical big data literacy and how can it be implemented?
2020	Raffaghelli JE	Is Data Literacy a Catalyst of Social Justice? A Response from Nine Data Literacy Initiatives in Higher Education
2020	Pothier WG; Condon PB	Towards data literacy competencies: Business students, workforce needs, and the role of the librarian
2020	Carmi E; Yates SJ; Lockley E; Pawluczuk A	Data citizenship: rethinking data Literacy in the age of disinformation, misinformation, and malinformation
2020	Burress T; Mann E; Neville T	Exploring data literacy via a librarian-faculty learning community: A case study
2020	Seidlmayer E; Müller R; Förstner KU	Data Literacy for Libraries - A Local Perspective on Library Carpentry
2020	Schultheis EH; Kjolvik MK	Using Messy, Authentic Data to Promote Data Literacy & Reveal the Nature of Science
2020	Batt S; Grealis T; Harmon O; Tomolonis P	Learning Tableau: A data visualization tool
2020	Kashyap G; Bhaskaran H	Teaching Data Journalism: Insights for Indian Journalism Education
2020	McGowan BS	OpenStreetMap mapathons support critical data and visual literacy instruction
2020	Marzal MA	A taxonomic proposal for multiliteracies and their competences
2020	Brower RL; Mokher CG; Jones TB; Cox BE; Hu SP	From Democratic to Need to Know: Linking Distributed Leadership to Data Cultures in the Florida College System
2020	Yoon A; Copeland A	Toward Community-Inclusive Data Ecosystems: Challenges and

		Opportunities of Open Data for Community-Based Organizations
2020	Donohoe D; Costello E	Data Visualisation Literacy in Higher Education: An Exploratory Study of Understanding of a Learning Dashboard Tool
2020	Atenas J; Havemann L; Timmermann C	Critical literacies for a datafied society: academic development and curriculum design in higher education
2020	Bailey J; Cowie B; Cooper B	"Maths outside of maths": Pre-service teachers' awareness of mathematical and statistical thinking across teachers' professional work
2020	Robertson J; Tisdall EKM	The importance of consulting children and young people about data literacy
2020	Werning S	Making data playable: A game co-creation method to promote creative data literacy
2020	Mertala P	Data (il)literacy education as a hidden curriculum of the datafication of education
2020	Knaus T	Technology criticism and data literacy: The case for an augmented understanding of media literacy
2020	Fontichiaro K; Johnston MP	Rapid shifts in educators' perceptions of data literacy priorities
2020	Prestigiacomo R; Hunter J; Knight S; Maldonado RM; Lockyer L	Data in practice: A participatory approach to understanding pre-service teachers' perspectives
2020	Carmichael P	Postdigital Possibilities: Operaismo, Co-research, and Educational Inquiry
2020	Oguguo BCE; Nannim FA; Okeke AO; Ezechukwu RI; Christopher GA; Ugorji CO	Assessment of Students' Data Literacy Skills in Southern Nigerian Universities
2020	Grundy S	The past, present and future of q-step – a programme creating a step-change in quantitative social science skills
2020	Whitesides H; Beck JS	"There is Subjectivity, There is Bias": Teacher Candidates' Perceptions of Equity in Data Literacy for Teaching
2020	Yang N; Li T	How stakeholders' data literacy contributes to student success in higher education: a goal-oriented analysis
2020	Seymoens T; van Audenhove L; van den Broeck W; Mariën I	Data literacy on the road: Setting up a large-scale data literacy initiative in the DataBuzz project
2020	Claes A; Philippette T	Defining critical data literacy for recommender systems: A media-grounded approach

2021	Cezar BGD; Masada ACG	Data literacy and the cognitive challenges of a data-rich business environment: an analysis of perceived data overload, technostress and their relationship to individual performance
2021	Copeland A; Yoon A; Zhang S	Data Reuse Practices and Expectations for Data Resources and Services among Public Library Users
2021	Edwards F; Ogle D	Data informed leadership: the work of primary mathematics lead teachers in New Zealand
2021	Gehrke M; Kistler T; Lubke K; Markgraf N; Krol B; Sauer S	Statistics education from a data-centric perspective
2021	Gould R	Toward data-scientific thinking
2021	Kennedy-Clark S; Galstaun V; Reimann P	Preparing pre-service teachers for Teaching Performance Assessments using the OTTO Model
2021	LaMar T; Boaler J	The importance and emergence of K-12 data science
2021	Palsdottir A	Data literacy and management of research data - a prerequisite for the sharing of research data
2021	Shreiner TL; Dykes BM	Visualizing the teaching of data visualizations in social studies: A study of teachers' data literacy practices, beliefs, and knowledge
2021	Beck JS; Nunnaley D	A continuum of data literacy for teaching
2021	McDowall A; Mills C; Cawte K; Miller J	Data use as the heart of data literacy: An exploration of pre-service teachers' data literacy practices in a teaching performance assessment
2021	Nguyen D	Mediatization and datafication in the global COVID-19 pandemic: on the urgency of data literacy
2021	Papamitsiou Z; Filippakis ME; Poulou M; Sampson D; Ifenthaler D; Giannakos M	Towards an educational data literacy framework: enhancing the profiles of instructional designers and e-tutors of online and blended courses with new competences
2021	Fotopoulou A	Conceptualising critical data literacies for civil society organisations: agency, care, and social responsibility
2021	Cowie B; Edwards F; Trask S	Explicating the Value of Standardized Educational Achievement Data and a Protocol for Collaborative Analysis of This Data
2021	Ifenthaler D; Gibson D; Prasse D; Shimada A; Yamada M	Putting learning back into learning analytics: actions for policy makers, researchers, and practitioners

2021	Marín VI; Carpenter JP; Tur G	Pre-service teachers' perceptions of social media data privacy policies
2021	Saddiqa M; Magnussen R; Larsen B; Pedersen JM	Open Data Interface (ODI) for secondary school education
2021	Breuer J; Pierson J	The right to the city and data protection for developing citizen-centric digital cities
2021	Golub K; Lund A	Why Open Government Data? The Case of a Swedish Municipality
2021	Calabrese Barton A; Greenberg D; Turner C; Riter D; Perez M; Tasker T; Jones D; Herrenkohl LR; Davis EA	Youth Critical Data Practices in the COVID-19 Multipandemic
2021	Rääk K; Eisenschmidt E; Tammets K	Exploring the perceptions of Estonian teachers' data use in school development
2021	Usova T; Laws R	Teaching a one-credit course on data literacy and data visualisation
2021	Mandinach EB; Jimerson JB	DATA ETHICS IN EDUCATION: A THEORETICAL, PRACTICAL, AND POLICY ISSUE
2021	Deja M; Januszko-Szakiel A; Korycińska P; Deja P	The impact of basic data literacy skills on work-related empowerment: The alumni perspective
2022	Bhargava R; Brea A; Palacin V; Perovich L; Hinson J	Data Theatre as an Entry Point to Data Literacy
2022	Condon PB; Pothier WG	Advancing data literacy: Mapping business data literacy competencies to the ACRL framework
2022	Conn CA; Bohan KJ; Bies-Hernandez NJ; Powell PJ; Sweeny SP; Persinger LL; Persinger JD	Expected data literacy knowledge and skills for early career teachers: Perspectives from school and district personnel
2022	Depro B; Rouse K	Adapting the case method in an economics capstone research course
2022	Li AW; Sinnamon LS; Kopak R	Exploring learning opportunities for students in open data portal use across data literacy levels
2022	Louie J; Stiles J; Fagan E; Chance B; Roy S	Building toward Critical Data Literacy with Investigations of Income Inequality
2022	Luo JT; Wang MH; Yu SQ	Exploring the factors influencing teachers' instructional data use with electronic data systems
2022	McCosker A	Making sense of deepfakes: Socializing AI and building data literacy on GitHub and YouTube
2022	Miller-Bains KL; Cohen J; Wong VC	Developing data literacy: Investigating the effects of a pre-service data use intervention
2022	Mueller J	Data Visualization and Advocacy for Sexual and Gender Minority Health

2022	Overton M; Kleinschmit S	Data science literacy: Toward a philosophy of accessible and adaptable data science skill development in public administration programs
2022	Shapiro BR; Meng A; Rothschild A; Gilliam S; Garrett C; DiSalvo C; DiSalvo B	Bettering Data: The Role of Everyday Language and Visualization in Critical Novice Data Work
2022	Shreiner TL; Martell CC	Making race and racism invisible: a critical race analysis of data visualizations in online curricular materials for teaching history
2022	Trantham PS; Sikorski J; de Ayala RJ; Doll B	An item response theory and Rasch analysis of the NUDKS: a data literacy scale
2022	Wilkerson MH; Lanouette K; Shareff RL	Exploring variability during data preparation: a way to connect data, chance, and context when working with complex public datasets
2022	Wu SY	Asian Newsrooms in Transition: A Study of Data Journalism Forms and Functions in Singapore's State-Mediated Press System
2022	Edwards F; Cowie B; Trask S	Using colleague coaching to develop teacher data literacy
2022	McGowan BS; Ekeigwe A; Clase K	Designing and assessing a data literacy internship program for graduate health sciences students
2022	Matuk C; DesPortes K; Amato A; Vacca R; Silander M; Woods PJ; Tes M	Tensions and synergies in arts-integrated data literacy instruction: Reflections on four classroom implementations
2022	Martín-González Y; Iglesias-Rodríguez A	Data Literacy in university libraries-LRC: Descriptive and proactive analysis
2022	Shreiner TL; Guzdial M	The information won't just sink in: Helping teachers provide technology-assisted data literacy instruction in social studies
2022	Radinsky J; Tabak I	Data practices during COVID: Everyday sensemaking in a high-stakes information ecology
2022	McCosker A; Yao XF; Albury K; Maddox A; Farmer J; Stoyanovich J	Developing data capability with non-profit organisations using participatory methods
2022	Jackson CJ	The utility of NAPLAN data: issues of access, use and expertise for teaching and learning.
2022	Usher M; Hershkovitz A	Interest in Educational Data and Barriers to Data Use Among Massive Open Online Course Instructors

2022	Mahmud MM; Wong SF	Digital age: The importance of 21st century skills among the undergraduates
2022	Kim J; Lee H; Cho YH	Learning design to support student-AI collaboration: perspectives of leading teachers for AI in education
2022	Rodighiero D; Wandl-Vogt E; Carsenat E; Döring J; Elias O; Fragner M; Farkashazy S	Immersive architectures for visual data literacy
2022	Watson J; Smith C	Statistics education at a time of global disruption and crises: a growing challenge for the curriculum, classroom and beyond
2022	Kannengießer S	“Party like it’s December 31, 1983”: Supporting Data Literacy at CryptoParties
2022	Yang C	Index System Construction and Model Analysis of University Teachers’ Data Literacy Ability
2022	Raffaghelli JE	EDUCATORS’ DATA LITERACY: Understanding the bigger picture
2022	Burress T	Data Literacy Practices of Students Conducting Undergraduate Research
2022	Hagen AN	Datafication, Literacy, and Democratization in the Music Industry
2022	Dander V; Macgilchrist F	School of Data and Shifting Forms of Political Subjectivity
2022	Clegg TL; Cleveland K; Weight E; Greene D; Elmqvist N	Data everyday as community-driven science: Athletes' critical data literacy practices in collegiate sports contexts
2023	Bobkowski PS; Etheridge CE	Spreadsheets, Software, Storytelling, Visualization, Lifelong Learning: Essential Data Skills for Journalism and Strategic Communication Students
2023	Cottone AM; Yoon SA; Shim J; Coulter B; Carman S	Evaluating the apt epistemic processes of data literacy in elementary school students
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2023	Jennings AS	Understanding Students as Achievers and Learners A Mixed Methods Study of How Frames Shape, and Are Shaped by, Teachers' Interpretation of Interim Assessment Data
2023	Khulbe M; Tammets K	Mediating Teacher Professional Learning with a Learning Analytics Dashboard and Training Intervention

2023	Overton M; Kleinschmit S	Transforming research methods education through data science literacy
2023	Pifer ND; Lumpkin A; Henry T	Applications of Data Literacy to Course Design in Sport Performance Analytics
2023	Sanei H; Kahn JB; Yalcinkaya R; Jiang SY; Wang CZ	Examining How Students Code with Socioscientific Data to Tell Stories About Climate Change
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2023	Lerner A; Gelman A	In Pursuit of Campus-Wide Data Literacy: A Guide to Developing a Statistics Course for Students in Nonquantitative Fields
2023	Ghodoosi B; Torrisi-Steele G; West T; Li QY	An Exploration of the Definition of Data Literacy in the Academic and Public Domains
2023	Atenas J; Havemann L; Timmermann C	Reframing data ethics in research methods education: a pathway to critical data literacy
2023	Moyo M; Bangani S	Data literacy training needs of researchers at South African universities
2023	Michos K; Schmitz ML; Petko D	Teachers' data literacy for learning analytics: a central predictor for digital data use in upper secondary schools
2023	Bar C; Yarden A	Oh Deer... Practicing Scientific Inquiry and Data Literacy through an Authentic Gazelle Data Set
2023	Raffaghelli JE; Manca S	Exploring the social activity of open research data on ResearchGate: implications for the data literacy of researchers
2023	Tabak I; Dubovi I	What drives the public's use of data? The mediating role of trust in science and data literacy in functional scientific reasoning concerning COVID-19
2023	Li Y; Wang Y; Lee YGY; Chen H; Petri AN; Cha TRY	Teaching Data Science through Storytelling: Improving Undergraduate Data Literacy
2023	Chu J; Lin R; Qin ZH; Chen RN; Lou LG; Yang J	Exploring factors influencing pre-service teacher's digital teaching competence and the mediating effects of data literacy: empirical evidence from China
2023	Condon PB; Exline E; Buckley LA	Data Literacy in the Social Sciences: Findings from a Local Study on

		Teaching with Quantitative Data in Undergraduate Courses
2023	Nguyen D	How news media frame data risks in their coverage of big data and AI
2023	Gibson H; Short ME; O'Donnell C	Data, discourse, and development: Building a sustainable world through education and science communication
2023	Heiser RE; Stritto MED; Brown AS; Croft B	Amplifying Student and Administrator Perspectives on Equity and Bias in Learning Analytics: Alone Together in Higher Education
2023	Zwiener-Collins N; Jafri J; Saini R; Poulter T	Decolonising quantitative research methods pedagogy: Teaching contemporary politics to challenge hierarchies from data
2023	Stewart B; Miklas E; Szczyrek S; Le T	Barriers and beliefs: a comparative case study of how university educators understand the datafication of higher education systems
2023	Ramírez-Andreotta MD; Buxner S; Sandhaus S	Co-created environmental health science: Identifying community questions and co-generating knowledge to support science learning
2023	Ow-Yeong YK; Yeter IH; Ali F	Learning data science in elementary school mathematics: a comparative curriculum analysis
2023	Mosha NF; Ngulube P	Teaching research data management courses in higher learning institutions in Tanzania
2023	Tanujaya B; Prahmana RCI; Mumu J	Lesson study with sharing and jumping tasks in online mathematics classrooms for rural area students
2023	Krüger R	Artificial intelligence literacy for the language industry – with particular emphasis on recent large language models such as GPT-4
2023	Capogna S	Sociology between big data and research frontiers, a challenge for educational policies and skills
2023	Hegestedt R; Nouri J; Rundquist R; Fors U	Data-Driven School Improvement and Data-Literacy in K-12: Findings from a Swedish National Program
2023	Lin R; Yang J; Jiang F; Li J	Does teacher's data literacy and digital teaching competence influence empowering students in the classroom? Evidence from China
2023	Kuhn C; Pete J; Raffaghelli JE	Critical data literacies for good
2023	Lund BD; Agbaji DA; Teel ZA	INFORMATION LITERACY, DATA LITERACY, PRIVACY LITERACY, AND CHATGPT: TECHNOLOGY LITERACIES

		ALIGN WITH PERSPECTIVES ON EMERGING TECHNOLOGY ADOPTION WITHIN COMMUNITIES
2023	Atenas J; Havemann L; Rodés V; Podetti M	Critical data literacy in praxis: An open education approach for academic development; [Alfabetización crítica de datos en la práctica: Un modelo de educación abierto para la formación docente]
2023	Palsa L; Mertala P	Contextualizing Everyday Data Literacies: The Case of Recreational Runners
2023	Jacobs S; Nash M; Burress T; Beyn K	Quality Matters: Using a Peer-Review Process to Create a Cohesive Multi-Campus Library Online Instruction Program
2023	Raffaghelli JE; Ferrarelli M; Kühn-Hilebrandt C	What does it mean to develop data literacy as an educator today? A collaborative autoethnography; [¿Qué significa alfabetizar en datos para tí (educador/educadora) hoy? Una autoetnografía colaborativa]
2023	Raffaghelli JE; Carbonell MR; Romeu-Fontanillas T	In my opinion, the TOS... Situating personal data literacy interventions
2023	Taylor M; Kennedy H; Oman S	Challenging assumptions about the relationship between awareness of and attitudes to data uses amongst the UK public
2023	Nguyen D; Beijnon B	The data subject and the myth of the 'black box' data communication and critical data literacy as a resistant practice to platform exploitation
2023	Matuk C; Vacca R; Amato A; Silander M; DesPortes K; Woods PJ; Tes M	Promoting students' informal inferential reasoning through arts-integrated data literacy education
2023	Sander I	Critical datafication literacy - a framework for educating about datafication
2023	Sanusi IT; Sunday K; Oyelere SS; Suhonen J; Vartiainen H; Tukiainen M	Learning machine learning with young children: exploring informal settings in an African context
2023	Dodman SL; DeMulder EK; View JL; Stribling SM; Brusseau R	"I knew it was a problem before, but did I really?": Engaging teachers in data use for equity
2023	Ortega AG; Bourgeois J; Hutiri WT; Kortuem G	Beyond data transactions: a framework for meaningfully informed data donation
2023	Koltay T	Data literacy and its critical perspective

2023	Martín-González Y; Rodríguez CT; Pascua JCT; Iglesias-Rodríguez A; Martín AH	Data Literacy: Perception and degree of satisfaction among university students
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