

RESEARCH STRATEGY

ADVANCING F.A.I.R.

PRINCIPLES

**BASED ON COUNCIL CONCLUSIONS ON PROMOTING EVIDENCE-
INFORMED POLICY AND PRACTICE IN EDUCATION AND TRAINING TO
ACHIEVE THE EUROPEAN EDUCATION AREA, 13TH MAY 2024**



GOVERNMENT OF MALTA
MINISTRY FOR EDUCATION, SPORT, YOUTH,
RESEARCH AND INNOVATION



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RESEARCH & SCHOOL INTERNAL
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Abstract

This paper outlines a comprehensive framework for strengthening the role of research and data in the formulation and implementation of evidence-informed educational policy and practice in the Ministry for Education, Sport, Youth, Research and Innovation. Rooted in the FAIR principles (Findability, Accessibility, Interoperability, and Reusability), it provides a standard for managing the research lifecycle across all projects funded or overseen by the Ministry. The strategy begins by establishing the importance of quality inclusive educational research and the critical role of research and reliable data in achieving equitable learning outcomes. It highlights the current challenges in the education sector, including communication gaps between researchers and practitioners, capacity constraints, and fragmented data systems. To address these challenges, the paper introduces a detailed strategy that serves as a blueprint for conducting research within the Ministry's remit. The strategy establishes the requirements for ethical research design, data collection, analysis, dissemination, and long-term preservation. Core elements of the strategy include the promotion of transparency, reproducibility, and the use of structured metadata and persistent identifiers. The framework also promotes the use of open access publishing and the integration of research outputs into trusted digital repositories to increase visibility, accessibility, and reusability of educational research. Furthermore, this paper provides practical guidance for implementing FAIR-aligned practices while contributing to national goals for educational equity, digital transformation, and research excellence.

Keywords: FAIR, Ethics, Metadata, Research, Policy, Transparency

Table of Contents

Abstract.....	ii
Table of Contents	iii
List of Abbreviations.....	v
1. Introduction.....	1
2. Literature Review	1
2.1 Enhancing Capacity Building for Research Production, Mediation, and Use in Education and Training.....	1
2.2 Contribution of Research and Data to Knowledge and Quality Information in the Field of Education and Training	3
2.2.1 Evidence-Informed Decision-Making in Education and Training	3
2.2.2 The Role of Data in Educational Policy and Practice.....	4
2.2.3 Challenges in Bridging Research and Practice	4
2.2.3.1 Accessibility and Relevance of Research.....	4
2.2.3.2 Communication Gaps between Researchers and Practitioners.....	5
2.2.3.3 Organisation and Cultural Resistance	5
2.2.3.4 Capacity and Resources Limitations.....	5
2.2.3.5 Capacity and Skills of Policymakers and Educators	5
2.2.3.6 Policy and Practice Disconnection.....	6
2.2.4 Recommendations for Effective Integration of Research and Data in Educational Policy and Practice	6
2.2.4.1 Research-Practice Partnerships (RPPs)	6
2.2.4.2 Academic-Policy Partnerships	6
2.2.4.3 Professional Development and Capacity Building.....	6
2.2.4.4 Policy Frameworks for Collaboration.....	7
2.2.4.5 Evidence-Informed Policy and Practice (EIPP).....	7
2.3 FAIR Principles and European Legislation.....	7
3. Strategy for Research and Data Management	9
3.1 Introduction and Purpose	9
3.2 Research Design and Data Collection	9
3.3 Data Management and FAIR Principles.....	10
3.3.1 Findability.....	10
3.3.2 Accessibility	11

3.3.3	Interoperability	11
3.3.4	Reusability	11
3.4	Data Analysis and Documentation	12
3.5	Publication and Dissemination of Results.....	13
3.6	Archiving and Long-Term Accessibility.....	13
3.7	Governance, Ethics, and Quality Control.....	14
3.8	Summary.....	14
4.	Conclusion	15
	References.....	16

List of Abbreviations

DEAP	Digital Education Action Plan
EAA	European Accessibility Act
EIPP	Evidence-Informed Policy and Practice
EU	European Union
FAIR	Findability, Accessibility, Interoperability, Reusability

1. Introduction

This strategy outlines a robust methodology for conducting, managing, and utilising research within the Ministry for Education, Sport, Youth, Research, and Innovation (MEYR). It presents a structured approach to how research activities are to be designed and data systematically organised, coded, analysed, published, and archived in alignment with the FAIR principles (Findability, Accessibility, Interoperability, and Reusability). These principles serve not only as technical guidelines, but also as a foundation for ensuring transparency, accountability, and long-term value in all research efforts.

The aim is to support high-quality, ethical, and sustainable research practices that generate reliable evidence for educational policy and practice. Grounded in a review of key literature, the paper highlights three interrelated themes: *the need to enhance capacity building for research production, mediation, and use; the contribution of research and data to knowledge and informed decision-making; and the central role of evidence-informed policy, practice, and European legislation in driving improvement across the education and training sectors.*

The strategy provides a roadmap for embedding efficient research methodologies and transparent data management systems within the Ministry. By presenting this strategy, the Ministry affirms its commitment to establish a research culture that is data-driven, evidence-informed, and impact-oriented. The framework provides clear guidance on methodological standards, ethical considerations, and data stewardship practices, ensuring consistency, comparability, and credibility across research initiatives. It seeks to bridge the gap between research and practice by promoting the use of evidence in shaping and evaluating policies and by enhancing collaboration among researchers, educators, policymakers, and stakeholders.

2. Literature Review

This section explores the foundational themes that inform and support the development of a national strategy for research practice and data management in education and training. It begins by examining the critical need for enhancing capacity building in the production, mediation, and use of research, highlighting how strengthened institutional and individual capabilities enable more effective knowledge generation and application. A further focus is placed on the contribution of research and data to the creation of knowledge and the provision of reliable quality information in the education and training sectors, which are essential for evidence-informed decision-making. Finally, the review addresses the growing significance of European legislation, emphasising the integration of robust research into educational governance, planning, and implementation. Together, these themes provide a conceptual and empirical foundation for the strategy outlined in this paper, and position research as a transformative tool for innovation and improvement within the education system.

2.1 Enhancing Capacity Building for Research Production, Mediation, and Use in Education and Training

The implementation of the FAIR principles in education research demands a holistic and inclusive approach to capacity building. This involves not only developing individual competencies among educators, researchers, and policymakers, but also strengthening institutional and systemic structures that promote the generation, mediation, and equitable use of evidence. In research terms, building FAIR capacity means embedding fairness in

participation, representation, access, and utility, ensuring that research is not only technically open, but also socially inclusive and contextually meaningful. Research highlights that advancing research capacity in education requires institutional investment (Sanyal & Varghese, 2006; Oancea et al., 2021) alongside the recognition of diverse knowledge forms (Biesta et al., 2011; Rees et al., 2007). Four key studies provide important insights for ministerial strategies, such as the one being proposed here.

Fowler et al. (2009) examined three UK-based initiatives—TLRP¹, AERS², and WERN³—emphasising the importance of expansive research workplaces that combine experiential learning, formal mentorship, and cross-institutional collaboration. They argue that capacity building must go beyond technical research skills, nurturing professional identity, collaborative inquiry, and mutual learning. For ministries, this dual focus suggests that FAIR-aligned policies should encompass not only technical infrastructures like repositories, but also professional development and collaborative platforms for co-producing and critiquing evidence (Newbury-Birch & Allan, 2020).

Langer et al. (2016) present a conceptual framework for evidence-informed policy-making. They categorise intervention strategies into six evidence-use mechanisms (such as improving access and communication, building skills, fostering researcher–policy interaction, and embedding supportive structures). These are analysed using a CMO (Capability–Motivation–Opportunity) lens, linking specific interventions to their expected effects on CMO and ultimately on decision-makers’ use of evidence. The report emphasises that no single actor can implement all mechanisms and that effective uptake of evidence requires collaborative institutional work across policymakers, researchers, and practitioners.

Cordingley (2016) frames CPD at the school level as most effective when it foregrounds practitioner knowledge alongside research, embedding evidence within real classroom contexts. Drawing on English case studies, she describes models involving teacher-led inquiry and collaboration, where CPD is sustained, contextually relevant, and supported by leadership, time, peer networks, and expert facilitation. Crucially, she argues that knowledge production and use should be co-constructed, reinforcing a blurred boundary between researcher and practitioner—an orientation that dovetails with FAIR’s emphasis on interoperability and reuse.

Finally, Whitworth et al. (2012) propose a dual-framework approach that combines individual skill development with systemic reform and draws from healthcare as well as higher education sectors. Their cross-sectoral model aligns closely with FAIR principles, advocating for integrated, cross-boundary networks that ensure research is findable and applicable across schools, universities, ministries, and even industry. This connectivity supports the governance dimensions of FAIR—ensuring that open data and research practices are not only permitted, but also actively facilitated and incentivised.

¹ Teaching and Learning Research Programme

² Applied Educational Research Scheme

³ Welsh Education Research Network

2.2 Contribution of Research and Data to Knowledge and Quality Information in the Field of Education and Training

In recent decades, the integration of research and data into education and training policymaking has gained significant traction (Davies, 1999; Pellegrini & Vivanet, 2020). This shift towards evidence-informed decision-making aims to enhance the effectiveness, equity, and accountability of educational systems. By grounding policies and practices in empirical evidence, stakeholders seek to address persistent challenges and improve learning outcomes across diverse contexts. FAIR-aligned data and research infrastructures allow evidence to be shared across institutions, languages, and platforms, supporting more inclusive and collaborative policymaking.

The European Union (EU) has increasingly emphasised the importance of evidence-informed policymaking in education (Pellegrini & Vivanet, 2020). While the movement towards such practices has been slower in Europe than in countries like the United States, the European Commission has initiated several frameworks and programmes to foster a culture of evaluation and evidence use across member states. These include mechanisms for data collection (e.g., via *Eurydice*), investment in comparative research (e.g., through *Horizon Europe*), and platforms for policy learning and peer review. Integrating FAIR principles into these EU efforts is essential to bridge the gap between policy ambition and practice. However, significant gaps remain in practice and ongoing efforts are required to overcome existing barriers (Pellegrini & Vivanet, 2020). Many challenges remain, such as limited access to disaggregated data, inconsistent data sharing protocols, and underutilisation of local knowledge, which hinder the effective use of research.

2.2.1 Evidence-Informed Decision-Making in Education and Training

Evidence-informed decision-making (EIDM) has become increasingly pivotal in shaping educational policies and practices. Unlike evidence-informed approaches that may rely solely on empirical data, EIDM integrates research findings with professional expertise and contextual understanding, allowing for more nuanced and effective decisions in educational settings. This approach acknowledges the complexity of educational environments and the need for decisions that are both data-driven and contextually relevant (Nelson & Campbell, 2017). It also reflects the real-world complexity of educational systems, where data must be interpreted through the lens of local needs, professional judgement, and evolving pedagogical challenges.

Understanding how policymakers utilise research and data in education and training is crucial for fostering evidence-informed decision-making. Historically, the two communities theory posited a divide between researchers and policymakers, suggesting limited interaction due to differing languages, values, and reward systems (Newman et al., 2016). However, recent studies challenge this notion, highlighting a spectrum of engagement levels and emphasising the importance of context and communication in bridging the gap between research and policy (Ion et al., 2019). In this evolving landscape, the FAIR principles play a vital enabling role, not only for sharing data, but also for enhancing the practical usability of research evidence across diverse educational roles.

Beyond policy, educational research significantly influences classroom practices and pedagogical approaches. Studies have shown that when educators engage with research

findings, they are more likely to implement innovative teaching strategies and interventions that enhance student learning outcomes (Ilhan, 2021). Yet, this engagement hinges not only on access, but also on the clarity, relevance, and usability of the research provided, which links, once again, to the importance of FAIR principles. Operationalising these principles in education research is not merely a technical task, but also a strategic enabler of inclusive, high-impact evidence use, both in policymaking and in everyday teaching. The Organisation for Economic Co-operation and Development (OECD) (2023) highlights that fostering a culture of research engagement among educators leads to more reflective and effective teaching practices. Furthermore, research-informed practices contribute to professional development, enabling educators to keep abreast of the latest pedagogical advancements. By engaging with current research, educators can critically assess and adapt their teaching methods to meet diverse student needs, thereby enhancing learning outcomes (Martin, 2023).

2.2.2 The Role of Data in Educational Policy and Practice

Data plays a pivotal role in shaping educational policy and practice, offering empirical evidence that informs decision-making processes, supports accountability systems, and guides instructional improvements (Schildkamp, 2019). Policymakers rely on large-scale assessment data, such as results from standardised tests, to evaluate the effectiveness of educational programmes and to allocate resources efficiently. Data can identify achievement gaps among student subgroups, leading to policies that aim to promote equity and inclusion (Datnow & Park, 2014).

Despite its potential, the effective use of data in education faces several challenges. Yet, the utility of data depends not only on its availability, but also on how it is managed, shared, and interpreted, areas where the FAIR principles offer crucial guidance. Furthermore, the overemphasis on quantitative data may overshadow qualitative aspects of education that are harder to measure but equally important, such as student well-being and classroom climate (Schildkamp, 2019).

2.2.3 Challenges in Bridging Research and Practice

Despite the recognised benefits of integrating empirical research and data into policy decisions, numerous challenges hinder the effective application of evidence-informed approaches.

2.2.3.1 Accessibility and Relevance of Research

As argued by Pellegrini & Vivanet (2020), a significant barrier to the utilisation of research in policy-making is the limited accessibility of research findings. Many academic publications are behind paywalls, restricting access for policymakers and practitioners who may not have institutional affiliations. This limitation hampers the timely and effective use of research in decision-making processes. Additionally, this creates an inequitable knowledge environment, where only select actors can fully engage with the evidence that shapes educational decisions. From a FAIRness perspective, this situation undermines equitable participation in policy processes, as it privileges those with access over those without.

Furthermore, the relevance of research to practical educational settings is often questioned. Studies may not address the immediate concerns of educators or may be presented in a manner

that is not easily interpretable by non-academic audiences. This disconnection between research outputs and practical needs diminishes the applicability of research in policy contexts (Pellegrini & Vivanet, 2020).

2.2.3.2 Communication Gaps between Researchers and Practitioners

Effective integration of research into practice necessitates robust communication channels between researchers and educational practitioners. However, differences in language, priorities, and timelines often create communication barriers. Researchers may focus on theoretical advancements, while practitioners seek immediate solutions to pressing issues. This misalignment can lead to scepticism among practitioners regarding the utility of research findings. Moreover, the lack of collaborative platforms for ongoing dialogue further exacerbates this divide, limiting opportunities for co-creation of knowledge and mutual understanding (Levin, 2004).

2.2.3.3 Organisation and Cultural Resistance

Resistance to change within educational organisations can impede the adoption of evidence-informed policies. This resistance may stem from a lack of trust in research findings, fear of increased accountability, or a preference for traditional practices. Additionally, the hierarchical nature of educational institutions can limit the flow of information and hinder collaborative decision-making processes necessary for implementing new policies (Yilmaz & Kilicoglu, 2013). From the perspective of the Interoperable principle of FAIR, such organisational resistance also reflects a failure to ensure that research and data can seamlessly integrate into existing decision-making workflows.

2.2.3.4 Capacity and Resources Limitations

Implementing evidence-informed policies requires adequate capacity and resources, including trained personnel, funding, and infrastructure. Many educational institutions, particularly in under-resourced areas, lack the necessary support to adopt and sustain evidence-informed practices. This encompasses challenges such as insufficient training for educators, limited time for professional development, and inadequate financial resources to implement new programmes (Forman et al., 2010). As discussed earlier, building capacity for equitable and effective research use is not only a technical or logistical endeavour, but also a deeply institutional one.

2.2.3.5 Capacity and Skills of Policymakers and Educators

The effective use of research in policy and practice is contingent upon the capacity and skills of those involved. Policymakers and educators may lack the necessary training to critically appraise research, interpret data, and apply findings to their specific contexts. This skills gap can lead to misinterpretation or misuse of research, undermining its potential benefits. Professional development opportunities that enhance research literacy are essential to empower stakeholders to engage with research meaningfully (Mandinach & Gummer, 2016).

2.2.3.6 Policy and Practice Disconnection

A disconnection often exists between policymakers and practitioners, leading to policies that are not grounded in the realities of classroom practice. This gap can result in the implementation of policies that are impractical or ineffective at the ground level. Moreover, the lack of mechanisms for feedback and continuous improvement further exacerbates this issue, preventing the refinement of policies based on practical experiences (UNESCO, 2024).

2.2.4 Recommendations for Effective Integration of Research and Data in Educational Policy and Practice

Integrating research and data into educational policy and practice is essential not only for effectiveness and sustainability, but also for advancing FAIRness and equity within education systems. In bridging the gap between research, policy and practice, several strategies have been proposed to facilitate the effective integration of research into educational policy and practice as shown below (2.2.4.1 – 2.2.4.5).

2.2.4.1 Research-Practice Partnerships (RPPs)

Research-Practice Partnerships (RPPs) are long-term, collaborative relationships between researchers and practitioners aimed at addressing practical problems in education. These partnerships facilitate mutual learning and ensure that research is relevant and applicable to real-world educational settings (Alazmi & Alazmi, 2023). In addition, such partnerships have been shown to enhance the utility of research in decision-making processes and to lead to improved educational outcomes (Alazmi & Alazmi, 2023).

However, establishing effective RPPs requires careful consideration of communication channels, shared goals, and organisational structures. Formal partnership frameworks, partnership agreements, and Memoranda of Understanding (MOUs) are often used to clarify roles, responsibilities, governance arrangements, and expectations between partners. Challenges include differences in language and expectations between researchers and practitioners, as well as navigating complex educational systems (Coburn & Penuel, 2016). Deliberate strategies, such as developing clear roles, routines, and formalised partnership structures, are necessary to foster successful collaborations.

2.2.4.2 Academic-Policy Partnerships

Collaboration between academic institutions and policymakers can enhance the implementation of evidence-informed practices. Such partnerships facilitate the translation of research findings into actionable policies and programs (UNESCO, 2024).

2.2.4.3 Professional Development and Capacity Building

Enhancing the capacity of all stakeholders to engage with and apply research is essential for evidence-informed policymaking. Pellegrini and Vivanet (2020) highlight the need for investing in professional development for educators and policymakers in order to enhance their ability to understand and apply research findings. Indeed, training programmes that focus on

data literacy, critical appraisal of research, and implementation strategies can empower stakeholders to make informed decisions. Building capacity at all levels of the education system ensures that evidence-informed practices are not only adopted, but also sustained over time (Forman et al., 2010).

2.2.4.4 Policy Frameworks for Collaboration

Developing structured frameworks can guide the collaboration between researchers, policymakers, and practitioners. Alazmi and Alazmi (2023) propose a six-stage model based on Lasswell's heuristic and Kingdon's multiple streams framework to facilitate effective collaboration. The stages comprise problem identification, agenda setting, policy formulation, decision-making, implementation, and evaluation. This model emphasises the importance of continuous feedback and adaptation, ensuring that policies remain responsive to emerging evidence and stakeholder needs. Regular evaluation and stakeholder engagement are critical components of this iterative process.

2.2.4.5 Evidence-Informed Policy and Practice (EIPP)

Evidence-Informed Policy and Practice (EIPP) means systematically using the best available data and research in policymaking and classroom practice. This involves:

- Embedding data and evaluation into every policy cycle
- Facilitating effective knowledge transfer between researchers, policymakers, and practitioners
- Supporting practitioners in using research in real-world contexts

Effective EIPP begins with building evaluation mechanisms directly into each stage of the policy process, including policy design (identifying needs using existing research and data, and defining measurable goals), implementation (collecting data in real time to monitor fidelity and progress), impact assessment (evaluating the outcomes of policies using quantitative and qualitative evidence), and continuous improvement (using evaluation findings to revise, refine, or scale interventions). A major challenge in education systems is the so-called 'research-to-practice gap', where research findings are not effectively communicated or translated into actionable insights for policymakers and educators. EIPP addresses this by promoting collaboration between researchers and policymakers as well as using accessible platforms that disseminate findings, events and forums to bring stakeholders together. The goal is to ensure that all education actors have access to, understand, and can apply evidence in a way that is context-sensitive and impactful.

2.3 FAIR Principles and European Legislation

The realisation of FAIR data relies on, at minimum, the following essential components: policies, data management platforms, identifiers, standards and repositories. There need to be registries cataloguing each component of the ecosystem as well as automated workflows between them. However, achieving FAIRness also requires alignment with overarching legislation—particularly, the European Accessibility Act (EAA) (2019).

Implementing the FAIR principles cannot be achieved without aligning policy actions and initiatives with the implementation of overarching legislation, such as the EAA. Malta, as an EU member state, implemented the EAA in full (formally Directive (EU) 2019/882) in June 2025, with the aim of improving the accessibility of products and services, including digital technologies, publicly accessible educational resources, and communication tools across the EU.

The FAIR Principles and the EAA are distinct yet complementary frameworks that together promote inclusive, equitable, and open access to digital resources and services in various sectors, such as education, research, and public service delivery. The EAA stipulates that digital learning environments, such as websites, e-books, software, and digital services (e.g., learning platforms, apps), must be accessible to all people equally, including persons with disabilities. Therefore, educational institutions using commercial digital tools must ensure that those tools comply with EAA standards and that universal design in education is promoted, benefitting all learners. Besides, the EAA specifically aims to verify that all education systems are gender-sensitive in their presentation to their users. This also applies to Open Educational Resources (OERs) created internally or for public use.

In order to ensure compliance with the EAA standards, these requirements should be reflected in the procurement processes, policy and strategy documents as well as in internal quality assurance processes within Ministry Directorates or the school environment. Moreover, skills and awareness training on integrating FAIR principles and EIPP should be provided to educators through training in data literacy techniques that are in line with the EAA accessibility standards. This training should focus on practical implementation examples, such as the creation of educational content using inclusive pedagogy. These standards should also be embedded in initial teacher education and train-the-trainer programmes delivered as part of a Professional Development Programme.

Certification and endorsement are other incentives to recognise positive efforts in this direction. Other incentives to ensure successful implementation include the appropriate, strategic, and evidence-informed funding to verify that the shared data resources are fit-for-purpose and meet community needs.

The FAIR Principles align closely with the goals of the Digital Education Action Plan (DEAP) (European Commission, 2020), creating a more inclusive, open, and digitally resilient education ecosystem across the European Union. At the heart of knowledge equity is the notion that all learners and educators, regardless of their socio-economic background, geographic location, language, or abilities, should have equal access to high-quality educational content.

Moreover, these principles are directly compatible with the DEAP's mission to foster high-quality, inclusive, and effective digital education. One of the DEAP's key objectives is to support the development and use of high-quality digital learning content. The FAIR framework enhances this by ensuring that such content is not only created and shared, but also discoverable and adaptable across EU member states. Furthermore, FAIR complements DEAP's emphasis on open education and open educational resources (OERs) as it promotes the kind of licensing and design practices that enable widespread sharing and local adaptation of content.

Digital inclusion is another pillar of the DEAP. Likewise, the principle of interoperability reinforces DEAP's goal of building robust digital education infrastructure, ensuring that tools and resources can function across multiple platforms and systems. Moreover, the FAIR

principles promote better use of educational data and evidence, another DEAP priority, by supporting open access to research findings, policy-relevant data, and impact assessments. This enhances evidence-informed decision-making at all levels of education, from classroom practice to national policy.

Together, the FAIR principles and the DEAP provide a foundation for achieving the EAA's goals. They work in tandem to reduce digital and geographic disparities, support inclusive and equitable education, encourage innovation in teaching and learning, and enable cross-border collaboration and knowledge exchange across Europe.

In summary, the FAIR principles are not only technical guidelines, but also powerful enablers of digital and educational justice. By integrating these principles into digital education policy and practice, educators and institutions can ensure that knowledge is not only open and efficient, but also fair—truly serving all learners.

3. Strategy for Research and Data Management

3.1 Introduction and Purpose

This strategy defines the policies for managing the entire research lifecycle of the Ministry for Education, Sport, Youth, Research, and Innovation—from proposal through data collection, analysis, dissemination, and archiving—with a strong emphasis on the implementation of the FAIR principles (Belliard et al., 2023; Cudalbu et al., 2023; Wilkinson et al., 2016). These principles will serve as foundational guidelines for improving the quality, transparency, and reusability of research outputs (Inau et al., 2021) across all educational institutions and projects funded or overseen by the Ministry. By embedding FAIR principles into all stages of the research lifecycle, the Ministry aims to promote evidence-informed decision-making in education and training, enhancing both the quality and inclusiveness of educational outcomes. While the FAIR principles provide valuable conceptual guidance, they do not impose specific technical requirements or prescribe particular technologies for their implementation (Bailo et al., 2020; Gagnard et al., 2023; Mons et al., 2017). This strategy attempts to bridge that gap by offering practical support for their adoption, contributing to the broader goal of generating quality information and knowledge in education and training.

3.2 Research Design and Data Collection

Research initiatives must begin with a well-structured project proposal that clearly outlines the research questions, the study's objectives, methodology (quantitative, qualitative, mixed-methods) and the expected outcomes. Particular attention should be given to the ethical dimensions of the study (Mokrane & Recker, 2019). For all research involving human participants, ethical approval must be obtained from a recognised and accredited ethics board prior to the commencement of any data collection activities. Clear procedures for informed consent, data anonymisation, confidentiality, and data protection, fully compliant with the General Data Protection Regulation (GDPR) as established under Regulation (EU) 2016/679 and the Maltese Data Protection Act (Chapter 586 of the Laws of Malta), must be outlined (Belliard et al., 2023).

To address common communication gaps between researchers and practitioners, researchers are encouraged to engage practitioners and policymakers early in the research design phase. This co-design process is aligned with the principles of Research-Practice Partnerships, ensuring that studies are relevant to real-world challenges and contribute directly to inclusive education systems.

During the data collection and analysis phase, researchers are required to adopt protocols that ensure data accuracy, replicability, and standardisation across all stages and sites of collection (Jacobsen et al., 2020). All tools and instruments—whether digital or physical—must be validated and, where applicable, calibrated to international standards (Sinaci et al., 2020). Data standardisation facilitates collaboration and improves data management and analysis efficiency (Belliard et al., 2023). Data collection procedures must be documented in a manner that allows for consistent application and later verification. Where surveys or interviews are conducted, questionnaires and interview guides must be pre-tested and refined to eliminate bias and ensure clarity.

Data should be recorded using open, non-proprietary formats such as Comma-Separated Values (CSV), Extensible Markup Language (XML), or JavaScript Object Notation (JSON) to maximise future usability and interoperability. These are structured formats used to store and exchange data in a way that is both human- and machine-readable. Special consideration should be given to data types that may require specialised formats (e.g., geospatial data, audio/video, or imaging), ensuring that they remain compatible with FAIR-aligned systems. Metadata creation must begin concurrently with data collection and continue iteratively throughout the research project. Metadata should follow widely adopted standards like Data Catalog Vocabulary (DCAT) and Dublin Core, using lightweight, hierarchical structures that support automated discovery and access (Thompson et al., 2020). These are widely adopted metadata standards that provide structured vocabularies for describing datasets and digital resources, enabling better organisation, discovery, and interoperability across systems and platforms. At a minimum, metadata should include the name and role of the data creator, date and location of data capture, instruments and software used, versioning details, and any environmental or procedural context that may affect interpretation (Bahim et al., 2020).

3.3 Data Management and FAIR Principles

The commitment to FAIR principles reinforces the importance of evidence-informed policy and practice in education. By ensuring that research outputs are findable and reusable, educational data can inform decisions at local, national, and regional levels.

Each FAIR principle is closely tied to strategic policy goals.

3.3.1 Findability

Researchers must be able to locate research resources online, using clear descriptions so that they can easily be found and understood—even if access is restricted (García-Closas et al., 2024). Each dataset must be assigned a globally unique and persistent identifier (e.g., Digital Object Identifier [DOI]) and stored in a registered, searchable repository (Bailo et al., 2020; Cudalbu et al., 2023; Jacobsen et al., 2020). Additionally, metadata must follow recognised schemas, such as Dublin Core or DCAT, and include essential descriptors (creator, subject, data identifiers, and data collection methodology) (Amadi et al., 2024; Jacobsen et al., 2020).

Moreover, researchers are required to maintain a central metadata catalogue for their projects, linked to the institutional data portal for national-level discoverability (Wilkinson et al., 2025). Data and/or metadata must also be registered or indexed in a searchable resource (Bishop & Hank, 2018).

3.3.2 Accessibility

Data must be retrievable through open, standardised communication protocols (Bishop & Hank, 2017; Jacobsen et al., 2020; Ugochukwu & Phillips, 2024; Wilkinson et al., 2025). These protocols must be universally implementable, free, and should not pose any bottleneck (Bishop & Hank, 2017; Jacobsen et al., 2020). Additionally, such protocols should allow for authorisation and authentication mechanisms that must comply with GDPR and other relevant data protection laws. Access terms, licenses, and restrictions should be explicitly defined in metadata (Dunning et al., 2018). Moreover, any Application Programming Interfaces (APIs) used should be practical and user-friendly, with updates and issues clearly communicated and actively addressed (Addink et al., 2023). It should be noted that, in some cases, data access may be limited for proprietary or confidentiality purposes. In these scenarios, such restrictions as well as authentication procedures and restricted-use agreements must be documented clearly and transparently in the metadata (Ugochukwu & Phillips, 2024).

3.3.3 Interoperability

Data must retain its meaning across platforms and disciplines, enabling merging and reuse of data and results (Ugochukwu & Phillips, 2024). Additionally, researchers must use domain-specific ontologies, broadly applicable vocabularies, and standardised units of measurement (Bailo et al., 2020). Moreover, metadata should be encoded in interoperable formats such as XML. Furthermore, data should reference other related datasets through qualified links and shared identifiers (Bahim et al., 2020; Bishop & Hank, 2017; Wilkinson et al., 2025). Semantic interoperability should be supported by aligning data structures with community standards and the use of controlled terminologies (e.g., International Organisation for Standardization [ISO]). Indeed, achieving true interoperability goes beyond technology—it demands institutional frameworks, legal agreements (e.g., Memoranda of Understanding [MOUs] or licensing arrangements), and a shared understanding of semantic metadata (Ugochukwu & Phillips, 2024).

3.3.4 Reusability

All datasets must include a clear license (e.g., Creative Commons) specifying permissible uses, and terms of use must be properly defined (Reiser et al., 2018). Provenance information is mandatory, including who collected the data, how it was processed, quality control measures that were taken, and how the research relates to previous work. Documentation, such as README files, must accompany datasets and contain file descriptions, variable definitions, processing steps, and potential limitations or assumptions (Cudalbu et al., 2023). Even with findable, accessible, and interoperable data, true reusability depends on rich, accurate and relevant metadata that clearly defines usage conditions, provenance, and domain-relevant standards, all of which are essential for meaningful and lawful data reuse (Bishop & Hank, 2017; Thompson et al., 2020).

These principles also directly enhance the Ministry's ability to build national capacity for research production, mediation, and use in education and training.

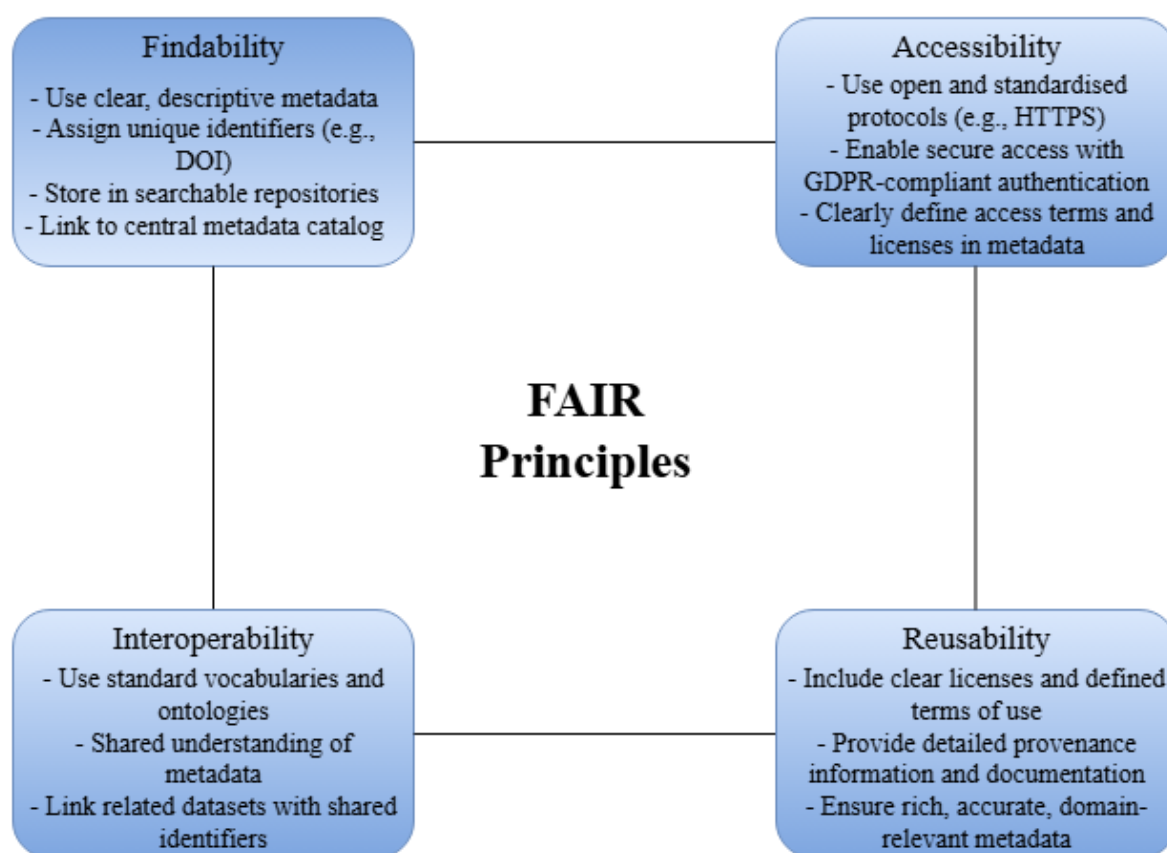


Figure 3.1: FAIR Principles Summarised

3.4 Data Analysis and Documentation

All data analysis must be reproducible and conducted using recognised scientific and statistical standards. This contributes to trust in the data underpinning educational reforms and helps develop evidence-informed policy frameworks for collaboration. Complete documentation of the analytical process is required to ensure independent verification and future reuse. Moreover, researchers must employ version control systems—such as GitHub, GitLab, or equivalent platforms—to manage scripts, algorithms, configuration files, and workflow documentation (Wilkinson et al., 2025). Furthermore, all software environments used in the analysis must be comprehensively documented. This includes the specification of programming languages (e.g., *R*, *Python*, *SPSS*, *NVivo*), statistical packages, software versions, and all dependencies required to reproduce the computational environment (García-Closas et al., 2024). Where appropriate, researchers should provide environment configuration files or use containerisation tools, such as Docker, to encapsulate the runtime environment. This ensures that analysis can be replicated consistently across different systems and over time. It also strengthens capacity and resource

development, particularly when analytical tools and methodologies are openly shared for training purposes in education institutions.

All data processing and transformation activities must be systematically recorded (García-Closas et al., 2024). This includes steps, such as data cleaning, normalisation, imputation of missing values, and the creation of derived variables. Each transformation, including the criteria and methods used, must be described in sufficient detail to allow replication. Output files—such as results tables, model outputs, and visualisations—must include associated metadata that describe their content, units of measurement, statistical significance, and any post-processing steps applied. It is often recommended to publish all outputs and any supplementary information (Reiser et al., 2018). Where multiple outputs are generated, a data dictionary or similar reference should be provided to clarify variable names, coding schemes, and derived indicators (Amadi et al., 2024).

3.5 Publication and Dissemination of Results

Research results must be shared through open access platforms, whenever possible. Indeed, all research results arising from Ministry-funded or Ministry-led projects must be disseminated through open access channels, whenever feasible, in line with national and European policies. Publications (e.g., peer-reviewed journals, website content, books, reports, policies, and strategies) must reference and formally cite all underlying datasets, software codes, and analytical tools that contributed to the results, using persistent identifiers such as Digital Object Identifiers (DOIs) (Reiser et al., 2018). The Ministry supports and encourages the use of integrated publishing frameworks that combine data, code, and written narrative. These methods enhance transparency, allow readers to inspect and rerun analyses, and facilitate greater reproducibility of results.

Each publication must include a comprehensive statement specifying the location of all datasets and related resources (e.g., Git repositories, data repositories), the conditions under which access was granted, any licensing or usage restrictions, and the structure of the data (and models) presented (Niarakis et al., 2022). Moreover, limitations of the study must be documented transparently (Niarakis et al., 2022). As has been stated earlier, if data access was limited due to confidentiality or privacy constraints, this must be clearly explained along with a point of contact for access requests and information about anonymisation as well as confidentiality protocols or data-sharing agreements.

Prior to submission for publication, all research outputs must undergo a final internal review to assess adherence to FAIR principles and overall data quality (Bailo et al., 2020). This review should confirm that data are properly documented, appropriately licensed, and made available through recognised and interoperable repositories. Moreover, review procedures should include checks for completeness of metadata, presence of persistent identifiers, consistency between reported results, compliance with FAIR principles, and the associated datasets and code.

3.6 Archiving and Long-Term Accessibility

In order to ascertain that research outputs remain accessible, reliable, and usable over time, it is critical to store data in long-term, institutional, or certified repositories that are equipped to ensure its preservation for many years (Altun et al., 2023). These repositories should meet

recognised standards and certifications for data storage and integrity, such as the Trustworthy Repositories Audit & Certification (TRAC) criteria, or similar. By using such repositories, the long-term sustainability and reproducibility of research are safeguarded, promoting further reuse of the data by other researchers and stakeholders. In addition to preserving the data itself, it is essential that archived datasets are versioned systematically and that data is also migrated to new formats as technology evolves.

Metadata plays a crucial role in this process. For each dataset version, comprehensive metadata must be created using standard formats and annotations (Niarakis et al., 2022), and must be maintained to provide context, including information about the data's provenance, methodology, collection methods, and any changes made between versions. These metadata records should also document the relationships between different versions of the dataset, ensuring transparency regarding the evolution of the data over time. This documentation helps ensure that the dataset is not only accessible, but also interpretable, which is a key aspect of ensuring FAIRness.

Furthermore, to mitigate risks associated with data loss or corruption, robust backup and disaster recovery protocols must be established. These protocols should be clearly documented, ensuring that the data is regularly backed up, and that there is a clear recovery plan in the event of hardware failures or other disruptions. The effectiveness of these protocols should be periodically tested and updated to adapt to evolving technologies and challenges in data storage.

In addition, each directorate, entity, or organisational unit must comply with its own data retention and disposal policies, ensuring that research data is retained only for as long as necessary, and in accordance with legal, regulatory, and institutional requirements. By doing so, the long-term accessibility and security of the data are guaranteed, promoting confidence in the integrity and availability of the research outputs for future use.

3.7 Governance, Ethics, and Quality Control

The Ministry will take an active and pivotal role in ensuring the effective implementation of the strategy for data collection, analysis, and publication, grounded in FAIR principles. A robust governance framework is essential to uphold the integrity of research outputs and to ascertain that all data handling and dissemination practices align with ethical guidelines and legal requirements.

3.8 Summary

This strategy establishes a framework for rigorous, ethical, and FAIR-aligned research practices under the Ministry for Education, Sport, Youth, Research and Innovation. Through consistent application of these standards, the Ministry will ensure that research outputs are discoverable, accessible, meaningful, and impactful across national and international educational and scientific communities. The integration of FAIR principles into every stage of the research process is not only a compliance measure, but also a strategic investment in the value, longevity, and utility of data for future generations.

4. Conclusion

This strategic paper sets forth a framework for enhancing the quality, integrity, and impact of research and data management in the education and training sectors. By aligning the Ministry's research lifecycle with the FAIR principles—Findable, Accessible, Interoperable, and Reusable—this paper underscores the Ministry's commitment to advancing evidence-informed policy and practice, strengthening institutional capacity, and fostering innovation in educational governance.

The integration of rigorous data standards, ethical research protocols, and open science principles ensures that the knowledge generated is not only scientifically robust, but also socially relevant, legally compliant, and accessible to all stakeholders. This includes policymakers, researchers, practitioners, students, and the wider public. Through structured and interoperable data systems, transparent analytical methodologies, and sustainable archiving mechanisms, the Ministry aims to build a resilient research infrastructure capable of supporting long-term educational reform and continuous improvement.

Critically, this framework addresses current challenges, such as communication gaps between researchers and practitioners, resource limitations, and the fragmentation of data and metadata ecosystems. It promotes a culture of collaboration, facilitates professional development across all levels of the education system, and reinforces the Ministry's role as a steward of educational data and research.

Furthermore, this strategy aligns with Malta's broader national and European obligations regarding Open Science, data protection, and inclusive education. It affirms that high-quality, equitable, and inclusive education systems must be informed by trustworthy, accessible, and well-governed data. By embedding these principles into institutional practice, the Ministry not only supports local educational excellence, but also contributes to the shared European and global goal of harnessing research and innovation to promote lifelong learning, social cohesion, and economic resilience.

The successful implementation of this strategy requires continued investment in human and technological capacities, the development of enabling policy frameworks, and a sustained commitment to collaboration across sectors. Moving forward, the Ministry will encourage the adaptation and the operationalisation of this strategy, ensure alignment with evolving standards and technologies, and periodically review progress to ascertain that Malta remains at the forefront of educational research and innovation.

In conclusion, this paper serves as a cornerstone for strengthening Malta's educational research ecosystem. It establishes a clear, ethical, and future-ready path for generating and applying knowledge that will inform policies, improve practices, and ultimately enhance learning outcomes for all.

References

- Addink, W., Kyriakopoulou, N., Penev, L., Fichtmueller, D., Norton, B., & Shorthouse, D. P. (2023). Deliverable D1.3 Best practice manual for findability, re-use and accessibility of infrastructures. ARPHA Preprints. <https://doi.org/10.3897/arphapreprints.e107169>
- Alazmi, A., & Alazmi, H. (2023). Closing the gap between research and policy-making to better enable effective educational practice: a proposed framework. *Educational Research for Policy and Practice*, 22, 91-116. <https://doi.org/10.1007/s10671-022-09321-4>
- Alhassan, A., & Ali, H. I. H. (2020). EFL teacher research engagement: Towards a research-pedagogy nexus. *Cogent Arts & Humanities*, 7(1), Article 1840732. <https://doi.org/10.1080/23311983.2020.1840732>
- Altun, O., Oladazimi, P., Wawer, M. L., Raumel, S., Wurz, M., Barianti, K., Nürnberger, F., Lachmayer, R., Mozgova, I., Koepler, O., & Auer, S. (2023). Enhanced Findability And Reusability of Engineering Data by Contextual Metadata. *Proceedings of the Design Society*, 3, 1635–1644. <https://doi.org/10.1017/pds.2023.164>
- Amadi, D., Kiwuwa-Muyingo, S., Bhattacharjee, T., Taylor, A., Kiragga, A., Ochola, M., Kanjala, C., Gregory, A., Tomlin, K., Todd, J., & Greenfield, J. (2024). Making Metadata Machine-Readable as the First Step to Providing Findable, Accessible, Interoperable, and Reusable Population Health Data: Framework Development and Implementation Study. *Online Journal of Public Health Informatics*, 16, Article e56237. <https://doi.org/10.2196/56237>
- Bahim, C., Casorrán-Amilburu, C., Dekkers, M., Herczog, E., Loozen, N., Repanas, K., Russell, K., & Stall, S. (2020). The FAIR Data Maturity Model: An Approach to Harmonise FAIR Assessments. *Data Science Journal*, 19, Article 41. <https://doi.org/10.5334/dsj-2020-041>
- Bailo, D., Paciello, R., Sbarra, M., Rabissoni, R., Vinciarelli, V., & Cocco, M. (2020). Perspectives on the Implementation of FAIR Principles in Solid Earth Research Infrastructures. *Frontiers in Earth Science (Lausanne)*, 8, Article 3. <https://doi.org/10.3389/feart.2020.00003>
- Belliard, F., Maineri, A. M., Plomp, E., Ramos Padilla, A. F., Sun, J., & Zare Jeddi, M. (2023). Ten simple rules for starting FAIR discussions in your community. *PLoS Computational Biology*, 19(12), Article e1011668. <https://doi.org/10.1371/journal.pcbi.1011668>
- Biesta, G., Allan, J., & Edwards, R. (2011). The theory question in research capacity building in education: Towards an agenda for research and practice. *British Journal of Educational Studies*, 59(3), 225-239. <https://doi.org/10.1080/00071005.2011.599793>
- Bishop, B. W., & Hank, C. (2018). Measuring FAIR Principles to Inform Fitness for Use. *International Journal of Digital Curation*, 13(1), 35–46. <https://doi.org/10.2218/ijdc.v13i1.630>
- Coburn, C., & Penuel, W. (2016). Research-Practice Partnerships in Education: Outcomes, Dynamics and Open Questions. *Educational Researcher*, 45(1), 48-54. <https://doi.org/10.3102/0013189X16631750>

- Cordingley, P. (2016). Knowledge and research use in local capacity building. In D. Godfrey (Ed.), *Leadership of schools and professional learning communities in times of change* (pp. 153–167). Routledge. <https://doi.org/10.1787/9789264255364-9-en>
- Cudalbu, C., Babos, T., & Pitea, F. (2023). Methods Used To Adapt Fair Principles To Scientific Data. *Geo-Eco-Marina*, (29), 117–123. <https://doi.org/10.5281/zenodo.10254901>
- Datnow, A., & Park, V. (2014). *Data-Driven Leadership*. John Wiley & Sons.
- Davies, P. (1999). What is Evidence-informed Education? *British Journal of Educational Studies*, 47(2), 108-121. <https://doi.org/10.1111/1467-8527.00106>
- European Commission. (2020). *Digital Education Action Plan 2021–2027: Resetting education and training for the digital age*.
- Dimmock, C. (2016). Conceptualising the research–practice–professional development nexus: mobilising schools as ‘research-engaged’ professional learning communities. *Professional development in education*, 42(1), 36-53. <https://doi.org/10.1080/19415257.2014.963884>
- Dunning, A., De Smaele, M., & Böhmer, J. (2018). Are the FAIR Data Principles fair? *International Journal of Digital Curation*, 12(2), 177–195. <https://doi.org/10.2218/ijdc.v12i2.567>
- European Union. (2019). *Directive (EU) 2019/882 of the European Parliament and of the Council of 17 April 2019 on the accessibility requirements for products and services (European Accessibility Act)*. *Official Journal of the European Union*, L 151, 70–115.
- Forman, S. G., Olin, S. S., Hoagwood, K. E., Crowe, M., & Saka, N. (2010). Evidence-informed Interventions in Schools: Developers’ Views of Implementation Barriers and Facilitators. *School Mental Health*, 1(1), 26-36. <https://doi.org/10.1007/s12310-008-9002-5>
- Fowler, Z., Baird, A., Baron, S., Susan, M. B. D., Procter, R., & Salisbury, J. (2009). Building research capacity in Education: evidence from recent initiatives in England, Scotland and Wales. *International Journal for Researcher Development*, 1(2), 173–189. <https://doi.org/10.1108/1759751X201100011>
- Gaignard, A., Rosnet, T., De Lamotte, F., Lefort, V., & Devignes, M. (2023). FAIR-Checker: supporting digital resource findability and reuse with Knowledge Graphs and Semantic Web standards. *Journal of Biomedical Semantics*, 14(1), Article 7. <https://doi.org/10.1186/s13326-023-00289-5>
- García-Closas, M., Ahearn, T. U., Gaudet, M. M., Hurson, A. N., Balasubramanian, J. B., Choudhury, P. P., Gerlanc, N. M., Patel, B., Russ, D., Abubakar, M., Freedman, N. D., Wong, W. S. W., Chanock, S. J., de Gonzalez, A. B., & Almeida, J. S. (2024). Erratum: “Moving toward findable, accessible, interoperable, reusable practices in epidemiologic research”. *American Journal of Epidemiology*, 193(12), 1882. <https://doi.org/10.1093/aje/kwae103>
- Ilhan, N. (2021). The Effect of Research Evidence-informed Teaching Practices in Science Classrooms on Student Teachers' Attitudes towards Educational Research. *Journal of Science Learning*, 4(4), 316-326. <https://doi.org/10.17509/jsl.v4i4.32025>

- Inau, E. T., Sack, J., Waltemath, D., & Zeleke, A. A. (2021). Initiatives, Concepts, and Implementation Practices of FAIR (Findable, Accessible, Interoperable, and Reusable) Data Principles in Health Data Stewardship Practice: Protocol for a Scoping Review. *JMIR Research Protocols*, 10(2), Article e22505. <https://doi.org/10.2196/22505>
- Ion, G., Iftimescu, S., Carmen, P., & Marin, E. (2019). Understanding the Role, Expectations, and Challenges That Policy-Makers Face in Using Educational Research. *Education Sciences*, 9(2), Article 81. <https://doi.org/10.3390/educsci9020081>
- Jacobsen, A., de Miranda Azevedo, R., Juty, N., Batista, D., Coles, S., Cornet, R., Courtot, M., Crosas, M., Dumontier, M., Evelo, C. T., Goble, C., Guizzardi, G., Hansen, K. K., Hasnain, A., Hettne, K., Heringa, J., Hooft, R. W. W., Imming, M., Jeffery, K. G., ... Schultes, E. (2020). FAIR Principles: Interpretations and Implementation Considerations. *Data Intelligence*, 2(1-2), 10–29. https://doi.org/10.1162/dint_r_00024 33
- Langer, L., Tripney, J., & Gough, D. (2016). The science of using science: Researching the use of research evidence in decision-making. *EPPI-Centre, UCL Institute of Education*.
- Levin, B. (2004). Making Research Matter More. *Education Policy Analysis Archives*, 12(56). <https://doi.org/10.14507/epaa.v12n56.2004>
- Mandinach, E. B., & Gummer, E. S. (2016). *Data Literacy for Educators: Making it count in teacher preparation and practice*. Teachers College Press.
- Martin, S. (2023). The Transformative Power of Educational Research: Advancing Learning and Empowering Minds. *International Research Journal of Educational Research*, 14(4), 1-3. <https://doi.org/10.14303/2141-5161.2023.271>
- Mokrane, M., & Recker, J. (2019). Enabling findable, accessible, interoperable, and reusable (FAIR) data. 16th International Conference on Digital Preservation (iPRES), Amsterdam, The Netherlands.
- Mons, B., Neylon, C., Velterop, J., Dumontier, M., da Silva Santos, L. O. B., & Wilkinson, M. D. (2017). Cloudy, increasingly FAIR; revisiting the FAIR Data guiding principles for the European Open Science Cloud. *Information Services & Use*, 37(1), 49–56. <https://doi.org/10.3233/ISU-170824>
- Mouza, C. (2009). Does research-based professional development make a difference? A longitudinal investigation of teacher learning in technology integration. *Teachers college record*, 111(5), 1195-1241. <https://doi.org/10.1177/016146810911100502>
- Nelson, J., & Campbell, C. (2017). Evidence-informed practice in education: meanings and applications. *Educational Research*, 59(2), 127-135. <https://doi.org/10.1080/00131881.2017.1314115>
- Newbury-Birch, D., & Allan, K. (2020). *Co-creating and co-producing research evidence*. Routledge, London, UK.
- Newman, J., Cherney, A., & Head, B. W. (2016). Do Policy Makers Use Academic Research? Reexamining the “Two Communities” Theory of Research Utilization. *Public Administration Review*, 76(1), 24-32. <https://doi.org/10.1111/puar.12464>

- Niarakis, A., Waltemath, D., Glazier, J., Schreiber, F., Keating, S. M., Nickerson, D., Chaouiya, C., Siegel, A., Noël, V., Hermjakob, H., Helikar, T., Soliman, S., & Calzone, L. (2022). Addressing barriers in comprehensiveness, accessibility, reusability, interoperability and reproducibility of computational models in systems biology. *Briefings in Bioinformatics*, 23(4), 1–11. <https://doi.org/10.1093/bib/bbac212>
- Oancea, A., Fancourt, N., Robson, J., Thompson, I., Childs, A., & Nuseibeh, N. (2021). Research capacity-building in teacher education. *Oxford Review of Education*, 47(1), 98–119. <https://doi.org/10.1080/03054985.2020.1842184>
- Organisation for Economic Co-operation and Development. (2023). *Who Really Cares about Using Education Research in Policy and Practice?* OECD Publishing.
- Pellegrini, M., & Vivanet, G. (2020). Evidence-informed Policies in Education: Initiatives and Challenges in Europe. *ECNU Review of Education*, 4(1), 25–45. <https://doi.org/10.1177/2096531120924670>
- Rees, G., Baron, S., Boyask, R., & Taylor, C. (2007). Research-capacity building, professional learning and the social practices of educational research. *British Educational Research Journal*, 33(5), 761–779. <https://doi.org/10.1080/01411920701582447>
- Reiser, L., Harper, L., Freeling, M., Han, B., & Luan, S. (2018). FAIR: A Call to Make Published Data More Findable, Accessible, Interoperable, and Reusable. *Molecular Plant*, 11(9), 1105–1108. <https://doi.org/10.1016/j.molp.2018.07.005>
- Sanyal, B. C., & Varghese, N. V. (2006, November). Research capacity of the higher education sector in developing countries. In *A: UNESCO Forum on Higher Education, Research and Knowledge. Paris*.
- Schildkamp, K. (2019). Data-based decision-making for school improvement: Research insights and gaps. *Educational Research*, 61(3), 257–273. <https://doi.org/10.1080/00131881.2019.1625716>
- Sinaci, A. A., Nunez-Benjumea, F. J., Gencturk, M., Jauer, M., Deserno, T., Chronaki, C., Cangioli, G., Cavero-Barca, C., Rodriguez-Perez, J. M., Perez-Perez, M. M., Erturkmen, G. B. L., Hernandez-Perez, T., Mendez-Rodriguez, E., & Parra-Calderon, C. L. (2020). From Raw Data to FAIR Data: The FAIRification Workflow for Health Research. *Methods of Information in Medicine*. 59. <https://hdl.handle.net/11511/51901>
- Thompson, M., Burger, K., Kaliyaperumal, R., Roos, M., & da Silva Santos, L. O. B. (2020). Making FAIR Easy with FAIR Tools: From Creolization to Convergence. *Data Intelligence*, 2(1-2), 87–95. https://doi.org/10.1162/dint_a_00031
- Ugochukwu, A. I., & Phillips, P. W. B. (2024). Open data ownership and sharing: Challenges and opportunities for application of FAIR principles and a checklist for data managers. *Journal of Agriculture and Food Research*, 16, Article 101157. <https://doi.org/10.1016/j.jafr.2024.101157>
- United Nations Educational, Scientific and Cultural Organization (2024). *Strategic View: Improving the use of evidence for education policy, planning and implementation*. UNESCO.
- Whitworth, A., Haining, S., & Stringer, H. (2012). Enhancing research capacity across healthcare and higher education sectors: Development and evaluation of an integrated

model. *BMC Health Services Research*, 12(1), 287. <https://doi.org/10.1186/1472-6963-12-287>

- Wilkinson, M. D., Dumontier, M., Aalbersberg, I. J., Appleton, G., Axton, M., Baak, A., Blomberg, N., Boiten, J., da Silva Santos, L. B., Bourne, P. E., Bouwman, J., Brookes, A. J., Clark, T., Crosas, M., Dillo, I., Dumon, O., Edmunds, S., Evelo, C. T., Finkers, R., ... Mons, B. (2016). The FAIR Guiding Principles for scientific data management and stewardship. *Scientific Data*, 3(1), Article 160018. <https://doi.org/10.1038/sdata.2016.18>
- Wilkinson, S. R., Alokala, M., Belhajjame, K., Crusoe, M. R., de Paula Kinoshita, B., Gadelha, L., Garijo, D., Gustafsson, O. J. R., Juty, N., Kanwal, S., Khan, F. Z., Köster, J., Peters-von Gehlen, K., Pouchard, L., Rannow, R. K., Soiland-Reyes, S., Soranzo, N., Sufi, S., Sun, Z., ... Goble, C. (2025). Applying the FAIR Principles to computational workflows. *Scientific Data*, 12(1), 328–9. <https://doi.org/10.1038/s41597-025-04451-9>
- Yilmaz, D., & Kilicoglu, G. (2013). Resistance to change and ways of reducing resistance in educational organizations. *International Association of Social Science Research*, 1(1), 14-21.