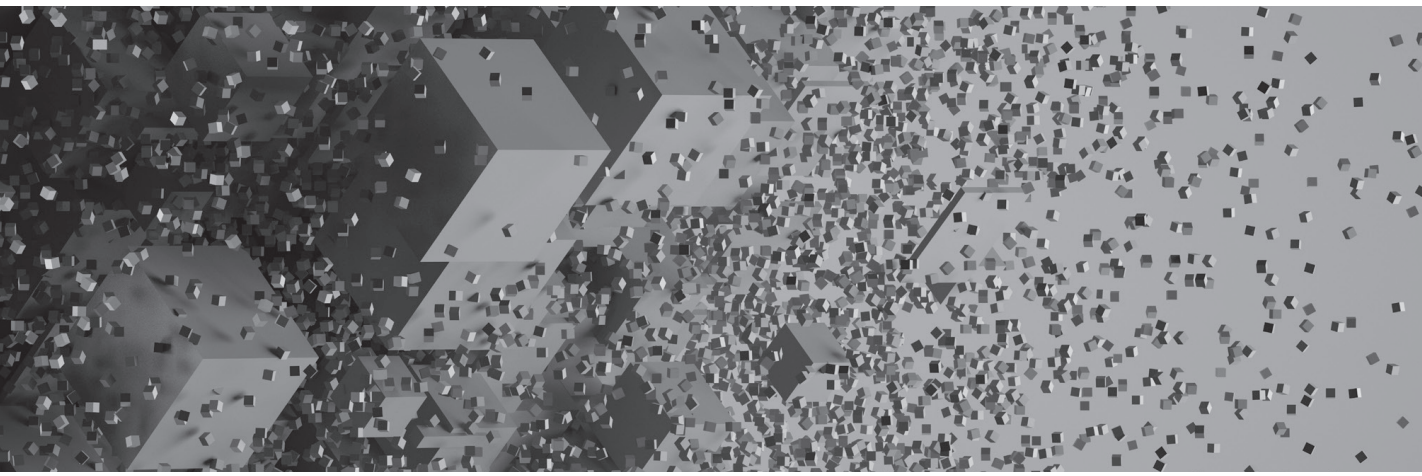
RESEARCH METHODS & METHODOLOGIES IN EDUCATION

4TH EDITION



EDITED BY

ROBERT COE, MICHAEL WARING,
LARRY V. HEDGES & LAURA DAY ASHLEY

Sage

1 Oliver's Yard
55 City Road
London EC1Y 1SP

2455 Teller Road
Thousand Oaks
California 91320

Unit No 323-333, Third Floor, F-Block
International Trade Tower
Nehru Place, New Delhi – 110 019

8 Marina View Suite 43-053
Asia Square Tower 1
Singapore 018960

Editor: James Clark
Assistant editor: Esosa Otabor
Production editor: Sarah Sewell
Copyeditor: Sunrise Setting
Proofreader: Christine Bitten
Indexer: Melanie Gee
Marketing manager: Lorna Patkai
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About the Editors

Dr Robert Coe is Director of Research and Development at Evidence Based Education and a Senior Associate at the Education Endowment Foundation. He is a Visiting Professor at Loughborough University and was previously Professor of Education at Durham University, with research interests in assessment and evaluation.

Dr Michael Waring, School of Education, University of Leeds, UK. Michael's research interests focus on the development of inclusive participatory pedagogies, with particular interests in enhancing students' assessment-feedback skills within HE and developing research literacy in initial teacher education (ITE) with students and researchers. As part of his exploration of personalised learning and a holistic notion of pedagogy, he is interested in the quality and innovative development of educational and qualitative research methodology.

Professor Larry V. Hedges, Northwestern University, Board of Trustees Professor of Statistics and Social Policy. A national leader in the fields of educational statistics and evaluation, his research is in the fields of sociology, psychology and educational policy. He is best known for his work to develop statistical methods for meta-analysis in the social, medical and biological sciences.

Dr Laura Day Ashley, University of Birmingham, Associate Professor, Department of Education and Social Justice, and College of Social Sciences Sustainability Lead. Laura has a background in social anthropology and comparative and international education, with research interests in alternative, informal and non-state forms of education. She has particular expertise in conducting case study research and literature review research in multiple contexts.

Notes on the Contributors

Dr Michael Atkinson, University of Toronto, Professor. He is past-editor of *Qualitative Research in Sport, Exercise and Health*, and the *Sociology of Sport Journal*. His research interests include pain and suffering, mental illness, masculinity, bioethics, violence, existentialism and physical cultural studies.

Dr Greg Benfield, formerly Oxford Brookes University, Educational Development Consultant. His work focused on supporting technology-enhanced learning. His research interests included learner experiences of technology-enhanced learning, computer-aided assessment and computer-mediated communication in student group work.

Dr Ghazala Bhatti, Honorary Research Fellow, Education Department, University of Oxford. She is a founding member of the Network for Social Justice and Intercultural Education of the European Conference on Educational Research. Her research interests include social justice, ethnographic research, bilingualism and the educational achievements of children and young people from minority ethnic backgrounds. She has been involved in international collaborative projects with colleagues based in universities in the USA and Europe. More recently, Ghazala has worked with colleagues in Nordic countries to explore migrant youth, education, culture and identity.

Professor Gert Biesta, Professor of Public Education, Maynooth University, Ireland, and Professor of Educational Theory and Pedagogy, University of Edinburgh. He is co-editor of the *Asia-Pacific Journal of Teacher Education*, and associate editor of the journal *Educational Theory*. He conducts theoretical and empirical research on a range of topics, with a particular interest in education, democracy and citizenship, and the theory and philosophy of educational and social research.

Dr Christian Bokhove, Professor, University of Southampton. He is a Professor in Mathematics Education with a focus on secondary education. In his research, he combines conventional qualitative and quantitative methods with novel computational methods.

Michael Borenstein is a researcher who specialises in statistical power analysis and meta-analysis. He has been funded by the National Institutes of Health and the Institute of Education Sciences in the USA for the purpose of developing computer programs for statistical power analysis and meta-analysis, and lectures widely on these topics.

Dr Melanie Boyce, Anglia Ruskin University, Associate Professor of Gender and Social Justice in the School of Allied Health and Social Care. With over 20 years' experience of working as a community-based researcher with those defined as marginalised, an emphasis throughout Melanie's research is a commitment to inclusive and participatory methodologies to influence the development of socially just policy and practice approaches.

Professor Wendy Chan, University of Pennsylvania, Assistant Professor of Education. Her research comprises two strands: applied statistical methods to improve the generalisability of experimental results from educational evaluation studies; and model-based methods to improve the precision of inferences in studies with limited sample sizes.

Professor Anita Gibbs, University of Otago. She supervises postgraduate research related to neuro-disability, criminal justice and family practice areas. Her research interests include fetal alcohol spectrum disorders, criminal justice and best practices for parenting children with neuro-disabilities.

Drew H. Gitomer, DeMarzo Chair in Education at Rutgers Graduate School of Education. He studies the assessment and evaluation of teaching. His research examines policy-related issues in teaching and teacher education and considers a range of constructs related to teaching quality – teacher knowledge, teacher beliefs, student achievement and quality of classroom interactions.

Professor Stephen Gorard, Professor of Education and Public Policy, Durham University, and Director of the Durham University Evidence Centre for Education. He is author of over 1,000 pieces, and has conducted studies of early childhood, primary and secondary education, further education, higher education, adult and continuing education and informal learning in the home. His research approach is multi-method, combining large-scale surveys, focus group work, complex statistical modelling and historical-archive analysis, among others. He is the lead editor of *Review of Education*, and author of *Making Sense of Statistics* (SAGE, 2021), and *Making Schools Better for Disadvantaged Students* (Routledge, 2022), which was given the BERA award for Best Research Book, 2023.

Ms Jill Hall, University of Edinburgh, Research Fellow. She works as a Study Coordinator in the Centre for Reproductive Health and has written and co-written numerous publications around her research interests in telehealth systems, complex wounds, patient involvement in patient safety, clinical trials in fracture prevention and podiatry and systematic reviews of the effectiveness of interventions.

Professor Martyn Hammersley, The Open University, Emeritus Professor of Educational and Social Research. He has carried out research in the sociology of education and studied the role of the media in reporting research findings. However, much of his work has been concerned with the methodological issues surrounding social enquiry. He has written several books, including (with Paul Atkinson) *Ethnography: Principles in Practice*, 4th edn (Routledge, 2019), (with Anna Traianou) *Ethics in Qualitative Research* (Sage, 2012), *The Radicalism of Ethnomethodology* (Manchester University Press, 2018), *The Concept of Culture* (Palgrave Macmillan, 2019) and *Methodological Concepts* (Routledge, 2023).

Professor Steve Higgins, Durham University, Professor of Education. He has a particular interest in the use of evidence from education research to support learning in schools, and is the lead author of the *Education Endowment Foundation Teaching and Learning Toolkit*. His research interests include the analysis of randomised trials in education, effective use of digital technologies for learning, understanding how children's thinking and reasoning develop and how teachers can be supported in developing the quality of teaching and learning in their classrooms.

Professor Arend M. Kuyper, Northwestern University, Associate Professor of Instruction in Statistics and Data Science. His primary work is dedicated to developing and implementing methods, techniques and strategies for teaching statistics and data science.

Mrs Kate Lewis-Light, Information Specialist. She was an Information Specialist for 15 years at the Centre for Reviews and Dissemination (CRD), University of York. At CRD she was responsible for contributing to systematic reviews, mainly through the design and running of complex search strategies. She also contributed to the production of CRD's DARE, HTA and PROSPERO databases, and taught on systematic review training courses run by CRD.

Mike McLinden, Emeritus Professor, School of Education, University of Birmingham. Mike has over 30 years' experience of curriculum design, delivery and evaluation as an academic in higher education. He has a broad interest in professional learning and pedagogy and has been involved in a range of funded pedagogical projects in partnership with colleagues in the sector. His research interests include developing research-informed pedagogical practice with a particular focus on the development of student-centred approaches (including problem/enquiry-based learning). Until 2020, Mike was Co-Director of the Vision Impairment Centre for Teaching and

Research (VICTAR) in the Department of Disability Inclusion and Special Needs (DISN) at the University of Birmingham and Programme Director for the professional development courses in vision impairment education. He was conferred the status of Principal Fellow of the Higher Education Academy (PFHEA) in 2013 in recognition of a sustained record of effective strategic leadership in connection with teaching and learning in higher education.

Carolyn Lunsford Mears, PhD is an internationally known author, researcher and speaker on issues related to trauma in the aftermath of mass casualty events. Dr Mears is the developer of the gateway approach to qualitative research, which has been recognised by the American Education Research Association as a distinct and innovative approach for collecting, processing and presenting interview data. She holds a research appointment at the University of Denver, serves as special faculty for the University of Colorado and is an invited Fellow of the Royal Society of the Arts.

Professor Claudia Mitchell, McGill University, Professor of Education. She is a Distinguished James McGill Professor in the McGill University Department of Integrated Studies in Education. Her research interests include youth, gender and pandemics, visual and arts-based research methodologies, girlhood studies and teacher identity.

Professor Carol Munn-Giddings, Anglia Ruskin University (ARU), Emerita Professor in the School of Allied Health and Social Care. Carol worked at ARU from 1995 to 2021 and specialised in participatory and inclusive methodologies. Her work included training and supporting citizen researchers, research with peer-led mutual aid groups and the role of participatory arts organisations in enhancing community well-being. Carol is now part of a printmakers' collective running a community-based studio.

Dr Niamh O'Brien, Anglia Ruskin University, Associate Professor of Social Inclusion and Young People in the School of Allied Health and Social Care. Niamh has been working at ARU since 2004 and her expertise is in undertaking participatory and inclusive methodological approaches to research involving children and young people. Her interests are in school bullying and exploring the perspectives of those with care experiences, as well as researching children and young people's overall well-being.

Assistant Professor Jordan Rickles, Social Research Methodology Division, School of Education and Information Studies, University of California, Los Angeles. He specialises in research design and quantitative methodology. His research explores the intersection of multilevel modelling, causal inference and propensity score methods, with a particular interest in heterogeneity across educational settings.

Professor Emeritus Michael Seltzer, Advanced Quantitative Methods Program, School of Education and Information Studies, University of California, Los Angeles. He specialises in multilevel modelling, particularly its use in multi-site evaluation studies and in analysing longitudinal data. A related facet of his work focuses on the use of Bayesian statistical approaches in specifying and estimating multilevel models in complex modelling settings.

Professor Rhona Sharpe, University of Oxford, Director of Centre for Teaching and Learning. She has led projects investigating learners' experiences of technology which received national recognition in pioneering research methods and techniques for eliciting students' expectations and experiences of using technology in their learning. The culmination of these projects was the creation of ELESIG – a special interest group for those interested in evaluations of learners' experiences of e-learning. Rhona continues to champion learner-experience research and student partnerships.

Professor Emma Smith, Department of Education Studies, University of Warwick. She researches issues of educational equity and the role that education policy can play in reducing inequalities and closing achievement gaps in both the national and international context. Recent and ongoing work has been in the following areas: shortages in the STEM workforce, special education and school accountability, inequalities in participation in post-compulsory science programmes and school policy in England. Emma is the author of the textbook *Key Issues in Education and Social Justice,* 2nd edn (Sage, 2018), and her new book, *Education, Policy and Social Justice*, will be published by Sage in 2025. She has a general interest in research methods and has led research methods courses at both undergraduate and postgraduate level. Her particular area of methodological interest is in the use of numeric secondary data.

Dr Eve Stirling, Sheffield Creative Industries Institute, Sheffield Hallam University, Associate Head. She is interested in the proliferation of digital spaces within our everyday lives and the relationship between time and space within these. She uses practice-based and visual research methods to explore the everyday lives of her participants on social media. Her current work takes a speculative design-fiction approach to explore agency and making.

Dr Michael Tedder, University of Exeter, Research Fellow (retired). He taught Liberal Studies and was responsible for teacher education in a further education college for many years. His research interests included life history and biographical research, adult and community learning, the experiences of young people on vocational courses in further education and notions of professionalism in post-compulsory education.

Professor Carole Torgerson, University of York, Professor of Educational Evaluation. Previously, she held a Chair in Education at Durham University, and a Chair in Experimental Design at the University of Birmingham. Her main methodological research interests are in experimental methods (randomised controlled trials and quasi-experiments) and research synthesis. She is particularly interested in applying methodological work in experimental research previously undertaken in the field of healthcare to the field of education.

Emeritus Professor Peter Tymms, Durham University. He is Director of the iPIPS (International Performance Indicators for Primary Schools) project in the School of Education and a fellow of the British Academy. He led the start of the UK Rasch User Group and was Director of the Centre for Evaluation and Monitoring until 2011, when he took over as Head of Department and Chair of the Board of Studies in the School of Education. He retired in 2020. His main research interests include monitoring, assessment, performance indicators, ADHD, reading and research methodology.

Dr Vijay Tymms, Imperial College London. He is a physics teacher, educational researcher and trade union activist. He joined the Department of Physics at Imperial College in a teaching-focused role, and has since completed a Master's in Education (looking at threshold concepts and liminal states during a physics undergraduate degree). In his educational research he is particularly interested in barriers to and facilitators of learning on physics degrees, and what happens during the periods of confusion one encounters when learning a new concept. He is a co-creator of the Physics Education Group at Imperial College.

Dr Elaine Vaughan, University of Limerick, Associate Professor Applied Linguistics & TESOL. Elaine Vaughan lectures in TESOL, corpus pragmatics, Irish English and (corpus-based) discourse analysis. Her research focuses on the exploration of naturally occurring language across different domains of discourse. She has published on teacher discourse in workplace meetings; professional communities of practice; humour and laughter in institutional discourse; higher education teaching and learning; the pragmatics of Irish English; the use of corpora and corpus-based methodologies for intra-varietal, pragmatic and sociolinguistic research; corpus-based critical discourse analysis; and media representations of Irish English.

Anna Vignoles, Director of The Leverhulme Trust, Fellow of the British Academy and formerly Professor of Education at the Faculty of Education, University of Cambridge. She has extensive experience of using large-scale administrative data to study factors relating to pupil achievement and students' outcomes from education. She has published widely on widening participation in higher education and on the socio-economic gap in pupil achievement. Her research interests include issues pertaining to equity in education, school choice, school efficiency and finance, higher education and the economic value of schooling.

Rob Walker, University of East Anglia, Emeritus Professor of Education. Rob has spent much of his working life in educational research, curriculum development and evaluation – at universities in the UK, the USA and Australia. In the 1960s, after a first degree in sociology, then a research post in science education and as a student of Basil Bernstein, he became involved in qualitative research, including using film and photography to study life in school classrooms.

New to this Edition

This fourth edition has been thoroughly updated and includes:

- **Four new chapters: (**Chapter 6) *Doing a literature review*, by Laura Day Ashley; (Chapter 9) *Data transparency, reproducibility and replicability*, by Larry V. Hedges; (Chapter 31) *Using R with RStudio and Tidyverse*, by Arend M. Kuyper; and (Chapter 37) *Measurement and validity*, by Robert Coe.
- **Commentary on AI and educational research:** across the book, chapter authors have discussed the emergent use of generative AI tools as part of the educational research process.
- **A more logical book structure:** the table of contents has been reordered to better reflect the research process. Qualitative- and quantitative-focused chapters are clustered together to reflect commonalities between these methodological approaches and tools.

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List of Abbreviations

AI	artificial intelligence
AIDS	acquired immune deficiency syndrome
ANCOVA	analysis of covariance
ANOVA	analysis of variance
AoIR	Association of Internet Researchers
AR	action research
ASC	Annual Schools Census
Becta	British Educational Communications and Technology Agency
BERA	British Educational Research Association
CA	conversation analysis
CAQDAS	computer-assisted/aided qualitative data analysis software
CLASS	Classroom Assessment Scoring System – Secondary
CLOSER	Cohort and Longitudinal Studies Enhancement Resources
CMC	computer-mediated communication
CONSORT	Consolidated Standards of Reporting Trials
CS	Collegial Support
CSDP	Comer's School Development Program
DfE	Department for Education
DfES	Department for Education and Skills
ECLS	Early Childhood Longitudinal Study
ELESIG	Evaluation of Learners' Experiences of e-learning Special Interest Group
ERIC	Education Resources Information Center
ESL	English as a second language
ESRC	Economic and Social Research Council
FbF	Facebook Friends
FSM	free school meals
GCSE	General Certificate of Secondary Education
GTM	grounded theory method
HE	higher education
HESA	Higher Education Statistical Agency
HIV	human immunodeficiency virus
HSB	High School and Beyond
ICC	intra-class correlation
IMA	Integrative Mathematics Assessment
IRB	Institutional Review Board
IRF	initiation, response, feedback/ follow-up

ITT	initial teacher training
IWB	interactive whiteboard
LTE	language-teacher education
ML	machine learning
MOOC	massive open online course
NFER	National Foundation for Educational Research
NHST	null hypothesis significance testing
NPD	National Pupil Database
OECD	Organisation for Economic Co-operation and Development
Ofsted	Office for Standards in Education, Children's Services and Skills
OLS	ordinary least squares
ONS	Office for National Statistics
PAR	participatory action research
PICOS	participants, interventions, outcomes, study designs
PIRLS	Progress in International Reading Literacy Study
PISA	Programme for International Student Assessment
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses Statement
RCT	randomised controlled trial
SDQ	Strengths and Difficulties Questionnaire
SEN	special educational need
SES	socio-economic status
SETT	Self-Evaluation of Teacher Talk
SMD	standardised mean difference
SNA	social network analysis
STEM	science, technology, engineering and mathematics
TESL	Teaching English as a second language
TIMSS	Trends in International Maths and Science Study
TLRP	Teaching and Learning Research Programme
TM	Transition Mathematics
VSFG	very small focus group
WEA	Workers' Education Association

Finding Your Theoretical Position

3

Michael Waring

Introduction

This chapter highlights the relationship between the four 'building blocks' of research (ontology, epistemology, methodology and methods) (Grix, 2002, 2018). It begins with an exploration of the nature of educational research, presenting various ways in which the researcher might see the world. It then links those assumptions with how the researcher sees what is possible with knowledge of that world. The text then explores how this relates to certain procedures or logic to be followed in association with the researcher's views of the world and notions of knowledge within it. Having linked the first three building blocks of research, the relationship with the final block is made: the process of selecting and using appropriate techniques to collect data is outlined.

Fundamentally, research is about disciplined, balanced enquiry, conducted in a critical spirit (Thomas, 2023). However, the nature of educational enquiry and subsequently those attempts to define educational research have been and continue to be problematic (Phillips, 2005, 2006, 2011; Morrison, 2007; Lingard and Gale, 2010; Whitty, 2016; Mertler, 2018; Biesta, 2020, 2024). The debate revolves around a number of issues but mainly relates to the complexity of the educational context, conceptual confusion, inappropriate adoption of positivistic interpretations of 'scientific' method and notions of rigour, as well as the dichotomy between practice and theory. Cohen et al.'s (2018: 1) definition of educational research is an acceptable one in that it acknowledges and accommodates many of the contentious issues: 'the systematic and scholarly application of the principles of a science of behaviour to the problems of teaching and learning within education and the clarification of issues having a direct and indirect bearing on those concepts'. Importantly, the use of the term 'science' here is taken to imply both normative and interpretive perspectives.

Over recent decades there have been a debate and a competition over the set of beliefs which will inform and guide enquiry over and above all others (Entman, 1993; Guba and Lincoln, 1994; Lincoln et al., 2023). The debate will not be continued or reiterated to any great extent here – others offer more comprehensive accounts of this (McNamara, 1979; Bradley and Sutton, 1993; Denzin and Lincoln, 2013). The purpose here is to identify the fundamental set of assumptions that underpins all research and to make clear the assumptions' interrelationships and implications.

Ontology, epistemology, methodology and methods

All researchers need to understand that their research is framed by a series of related assumptions. These assumptions can be framed around four key questions, as identified in a simplistic fashion in Figure 3.1. These questions have an order.

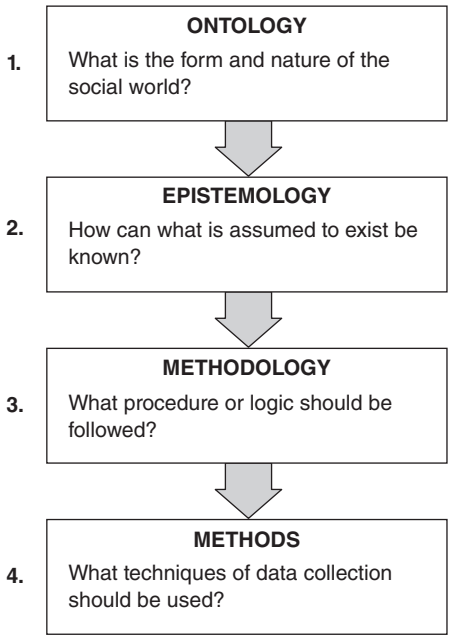

Figure 3.1 The relationship between ontology, epistemology, methodology and methods

Question 1

The first question that a researcher needs to ask relates to 'ontology'. That is, 'What is the nature or form of the social world?' These assumptions will form the starting point for all research. Ontological positions can be seen to exist in a simplistic fashion along a continuum from left to right from realism to constructivism. In realism there is a singular objective reality that exists independently of individuals' perceptions of it. At the other end of the continuum, under constructivism, reality is neither objective nor singular, but multiple realities constructed by individuals. It is on the basis of the answers to the ontological question that the epistemological question can be asked and assumptions are made.

Question 2

Epistemology relates to knowledge, and the researcher should ask the question 'How can what is assumed to exist be known?' Taking the same continuum and extreme positions as identified above, the corresponding epistemological positions to realism and constructivism are positivism and interpretivism respectively. Under a realist ontology, positivism sees it as possible to achieve direct knowledge of the world through direct observation or measurement of the phenomena being investigated. At the other end of the continuum, under a constructivist ontology, interpretivism does not see direct knowledge as possible; it is the accounts and observations of the world that provide indirect indications of phenomena, and thus knowledge is developed through a process of interpretation.

Question 3

Methodological assumptions are a reflection of the ontological and epistemological assumptions. Methodology asks 'What procedures or logic should be followed?' Developing the notion of the continuum, to the left (under realist ontology/positivist epistemology) the answer 'is nomothetic and experimental in nature'. To the right (under constructivist ontology/interpretivist epistemology) it is 'ideographic, dialectical and hermeneutical in nature'.

Question 4

The fourth question is associated with methods. Methods are the techniques or procedures used to gather data. The question to be asked is 'What data collection techniques or procedures should be used?' Simply answered, it is those techniques and procedures which allow the researcher to gather data that are appropriate to answer the research question(s). The kinds of methods can take various forms such as surveys, questionnaires, interviews, observations, video and still images, etc. Grix's (2002: 179) illustration of the interrelationship between the building blocks of research reinforces the fact that the method(s) are closely linked with the research question(s) posed and the sources of data collected. In other words, the methods which are used should be ethical and able effectively to collect appropriate qualitative and/or quantitative data from relevant and readily accessible sources, which can then be analysed to help the researcher address the research question(s). The researcher needs to consider carefully not just what methods can be employed to gather appropriate data, but also whether it is ethical to collect those data and practical to do so.

All researchers should fully appreciate the research process and so should be able to understand and acknowledge in their decisions and choices the fundamental relationship between the ontological, epistemological and methodological assumptions that underpin their research and inform their choice of methods. In the research literature, methods are often inappropriately used interchangeably with the term 'methodology'. Grix (2002: 176), in his paper about the need for clarity in the use of generic research terminology, reinforces this when he says that:

> a clear and transparent knowledge of the ontological and epistemological assumptions that underpin research is necessary in order: (1) to understand the interrelationship of the key components of research (including methodology and methods); (2) to avoid confusion when discussing theoretical debates and approaches to social phenomena; and (3) to be able to recognise others', and defend our own, positions.

The nature of paradigms: making sense of reality

Kuhn (1962) is commonly associated with the notion of the paradigm and believed it to be a set of interrelated assumptions about the social world which provided a philosophical and conceptual framework for the organised study of that world. Over time numerous authors have similarly defined it as a set of 'belief systems' (Guba and Lincoln, 1989), a 'world view' (Patton, 1978; Guba and Lincoln, 1994) and a particular 'lens for seeing and making sense of the world' (Sparkes, 1992).

A paradigm represents a person's conception of the world, its nature and their position in it, as well as a multitude of potential relationships with that world and its constituent parts. Therefore, as that person brings along with them the 'baggage' of their previous life experiences and knowledge base to any research context, this very amalgamation constructs their competence and credibility as a member of a given research community, as well as their answers to certain fundamental questions which will determine acceptance in and of that community. Proponents of any given paradigm can summarise their beliefs relative to their responses to those ontological, epistemological, methodological and methods questions identified.

Table 3.1 outlines those basic responses which proponents located at either end of a continuum of paradigms (from positivist to interpretivist) would make in reaction to those fundamental questions. This table is intended to be a basic framework/continuum which offers extreme positions (responses) to assist readers in their discussion to locate themselves.

It is important to note that while the identification of paradigms at either end of a continuum is convenient in terms of clarifying the relationship between the fundamental assumptions and allows for familiarisation with key terminology, such a simple and clinical distinction is an incomplete and artificial one. As Silverman (2014: 27) highlights, dichotomies or polarities of this fashion can be dangerous if they are allowed to create a siloed mentality of 'armed camps'. Therefore, when considering Table 3.1 and the many others like it that you will come across in the research methods literature

Table 3.1 Basic assumptions fundamental to the positivist and interpretive paradigms

Assumptions	Positivism		Interpretivism[1]	
Ontology	**External realist**	Basic posture is reductionist and deterministic. Knowledge of 'the way things are' is conventionally summarised in the form of time- and context-free generalisations, some of which take the form of cause-and-effect laws	**Internal–idealist, relativist (local and specific constructed realities, holistic and dynamic)**	Realities are apprehendable and mind-dependent.[2] There are multiple realities with the mind playing a central role by determining categories and shaping or constructing realities. We cannot see the world outside of our place in it. There is no separation of mind and objective since the two are inextricably linked together – the knower and the process of knowing cannot be separated from what is known and the facts cannot be separated from values
Epistemology	**Dualist objectivist**	The investigator and investigated 'object' are assumed to be independent entities; enquiry takes place as if in a one-way mirror. Investigator does not influence or is not influenced by the object. Replicable findings are 'true'	**Subjectivist, transactional, interactive**	The investigator and the object of the investigation are assumed to be interactively linked so that the 'findings' are literally created as the investigation proceeds. Therefore, the conventional distinction between ontology and epistemology dissolves[3]
Methodology	**Nomothetic, experimental, manipulative: verification of hypotheses**	Questions and/or hypotheses are stated in proportional form and subjected to empirical test to verify them; possible confounding conditions are carefully controlled (manipulated) to prevent the outcome from being improperly influenced	**Ideographic, dialectical, hermeneutical**	The variable and personal nature of social constructions suggests that individual constructions can be elicited and refined only through interaction between and among investigator(s) and respondent(s). Conventional hermeneutical techniques are used in interpretations and compared and contrasted through a dialectical interchange. It is not a matter of eliminating conflicting or previous interpretations but of distilling a more sophisticated and informed consensus construction
Enquiry aim	**Explanation, prediction and control**	Over time one attempts increasingly to explain so that ultimately one can predict phenomena, be they human or physical	**Understanding, interpretation and reconstruction**	Over time, everyone formulates more informed and sophisticated constructions and becomes more aware of the content and meaning of competing constructions

Notes:

1. *The term 'interpretivism' has been chosen because, as Sparkes (1992) has identified, it refers to a whole family of approaches which are in direct contrast to a positivist sense of social reality.*
2. *Mind-dependence here does not mean that the mind 'creates' what people say and do, but rather how we interpret their movements and utterances; the meaning we assign to the intentions, motivations and so on of ourselves and others becomes social reality as it is for us. In other words, social reality is the interpretation (Smith, 1989, in Sparkes, 1992: 27).*
3. *The dashed line represents the challenge which such a posture represents between ontology and epistemology; what can be known is inextricably linked with the interaction between a particular investigator and a particular object or group.*

Source: Based on Guba and Lincoln (1994) and Sparkes (1987, 1992)

(Lincoln et al., 2023: 208; Cresswell and Poth, 2024), it is important to focus on the process of enquiry and not to isolate thoughts to just one paradigm or another. Instead be prepared to question and explore those 'shady' areas between research paradigms where the boundaries shift (Grix, 2010: 62). Lincoln et al. (2023: 207) identify how those who are 'familiar with several theoretical and paradigmatic strands of research will find that echoes of many streams of thought come together' and create dialogue and the dynamic shifting and blurring of paradigms. However, such evolution has to be set within a research methodologies landscape in which there has and continues to be contestation and confrontation over what research is valued and what criteria are used in judgement of its quality.

Hammersley (1992: 131) commented that: 'There is no doubt that the 1980s and early 1990s have seen growing debates among educational researchers about methodology, sometimes taking the form of conflicts between incommensurable paradigms in which philosophical terms have been used as weapons.' Sparkes (2023) also highlights this by recounting Sage's (1989) description of what was named the 'paradigm wars' of the 1980s and Denzin's (2009) contention of the continuation of such wars, the associated conflict between quantitative and qualitative researchers and the need to be mindful that such a dialogue and the blurring of paradigms are challenged and confined by methodological fundamentalism, as well as notions of power and politics on many different levels. Lincoln et al. (2023: 257) also recognise the dynamic and tensions between the 'positivist and new-paradigm forms of enquiry' as well as within and between new and emergent paradigms as they 'either look for common ground or to find ways in which to distinguish their forms of enquiry from others'.

As part of the broader paradigmatical debate being rehearsed here it is important to acknowledge the increasingly popular and influential use of mixed-methods research (Johnson and Onwuegbuzie, 2004; Bryman, 2008, 2016). Biesta (Chapter 29) provides a very useful account of mixing methods in education in which he outlines the context and nature of mixed-methods research, and different mixed designs. In relation to the paradigm debate it is helpful here to highlight the fact that the combination of qualitative and quantitative research approaches which basically defines mixed-methods research and its pragmatic approach can create confusion and problems in terms of meaning and application. In response to the ambiguity of what is actually being mixed, Biesta (2010) provides seven dimensions at which mixing might take place: data, methods, designs, epistemologies, ontologies, research purposes and practical orientations. The questions asked particularly in relation to the last four of these dimensions (epistemologies, ontologies, research purposes and practical orientations), their relationship with each other and the associated implications are seen as complicated and potentially controversial. For example, how does considering if it is possible to combine different ontological and epistemological views inform the possibility of combining an intent to generate interpretive understanding and causal explanation, and then ultimately how does all this connect with the researcher's intended achievements for the research and its contribution to the field and practice, which are associated with the potential for combining a critical understanding and analysis with the production of solutions? As part of considering your response to the potential of such combinations and understanding your theoretical location, see Coe (Chapter 2), who highlights dimensions of difference and paradigms, along with the reconciliation of different views and different ways of dealing with the existence of different paradigms. Hammersley (2012) is also helpful, with a succinct outline of key divisions, issues and debates in educational research and the place of paradigms.

It is disconcerting while at the same time encouraging to know that many researchers experience and acknowledge confusion over the terminology employed in this whole paradigmatical debate (Cohen et al., 2018). A host of authors (Smith, 1989; Guba, 1990; Tesch, 1990; Blaikie, 2007; Grix, 2010; Hammersley, 2011; Weed, 2013; Denzin et al., 2023) have identified a multiplicity of labels which have been attached to research, resulting in a confusion over their meaning and conceptual level: 'Sometimes it is difficult to distinguish clearly labels that denote an epistemological stance and those that refer to method' (Tesch, 1990: 58). One other point on terminology relates to the use of the terms 'qualitative' and 'quantitative research'. These do not actually exist. 'Qualitative' and 'quantitative' refer to data which can be gathered and used in combination or singularly in any form of research.

Conclusion

Educational research is complex and there continue to be a host of debates about the nature of educational enquiry and associated terminology. However, regardless of the definition of educational enquiry adopted, all researchers should appreciate how the research process and their research are framed by a series of fundamental questions associated with ontology, epistemology, methodology and methods. Having ownership of the process of generating assumptions allows researchers to be informed about the interrelationship between the key components of research, to minimise confusion and to enhance their ability to critique and appreciate their own research position and those of others. This promotes understanding and in so doing the potential for 'intellectual, theoretical and practical space for dialogue, consensus, and confluence to occur' (Lincoln et al., 2023: 207), and a transparency in what research is done and why it is done.

Questions for further investigation

1. Where do you stand as an educational researcher between the different paradigms? What philosophical standpoints inform your position?
2. Why are research paradigms relevant in thinking about research processes and methods in education?
3. With regard to epistemological and ontological assumptions, what differences and commonalities underpin various research paradigms?

Suggested further reading

Denzin, N.K., Lincoln, Y., Giardina, M.D. and Cannella, G.S. (eds) (2023) *The SAGE Handbook of Qualitative Research*, 6th edn. Thousand Oaks, CA: Sage. This latest edition of the book has been substantially updated. It rehearses at length the paradigm debate, offering the reader an illustration of critical issues associated with a host of differing research perspectives. Importantly, it deals with the ongoing transitional nature of qualitative research and inquiry, and how this is informing the very interesting developments around the debate.

Flick, U. (2023) *An Introduction to Qualitative Research*, 7th edn. London: Sage. This is a comprehensive text that offers the reader the opportunity to consider the theory underpinning qualitative research, as well as the process of how it can be put into practice.

Thomas, G. (2023) *How to Do Your Research Project: A Guide for Students*, 4th edn. London: Sage. This latest edition of the book continues to offer an accessible text which addresses many of the fundamental questions and issues facing the researcher conducting a research project. It provides an engaging and practical source of information for any researcher.

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