New Deal for the Education Workforce

Llywodraeth Cymru
Welsh Government

Effective use of data and research evidence

PHOTO REDACTED DUE TO THIRD PARTY RIGHTS OR OTHER LEGAL ISSUES

Leading, learning, inspiring

Audience

Educational practitioners working with learners from ages 3 to 19, including teachers, support staff, leaders and further education lecturers.

Overview

This booklet supports practitioners to develop their skills in the effective use of data and research evidence. It explores a variety of different approaches of how to effectively use data and research and describes how these approaches can be used to improve learner outcomes and contribute to whole-school improvement. It also provides examples and case studies and supports practitioners to assess their own abilities in and identify the next steps in developing their own skills in this area.

Action required

None – for information only.

Further information

Further enquires about this document should be direct to:

Teaching and Learning Improvement Branch
Practitioner Standards and Professional Development Division
Department for Education and Skills
Welsh Government
Cathays Park
Cardiff
CF10 3NQ

Additional copies

This document can be accessed on the Welsh Government's Learning Wales website at
gov.wales/learning

Related documents

Coaching and mentoring (Welsh Government, 2015); *Reflective practice*
(Welsh Government, 2015)

Contents

1. Introduction

This booklet forms part of a set of resources to support the Welsh Government's 'New Deal' for the education workforce, and its professional learning model (PLM) for educational practitioners in Wales. This key initiative emphasises the need for practitioners to learn and develop throughout their careers so that they can do the very best for their learners. It is linked to other education improvement developments including *Qualified for life* and school development plans.

This resource focuses on the effective use of data and research evidence and is a key component of the PLM, as indicated in Figure 1. It explains the nature of educational research, why it matters to practitioners, the kind of evidence available and how this can be located, interpreted and used to improve practice.

Figure 1: Diagram summarising the key components of the PLM

All studies, reports and other evidence mentioned in this booklet, are listed in Section 12 (page 33) so that you can read more about them if you wish. You can explore PLM topics further within the module on professional learning on the Learning Wales website.

2. What is educational research?

Research has been defined as 'systematic enquiry made public' (Stenhouse, 1975: 142–165). In education, one of its core aims is to improve understanding of learning and teaching. In recent years there have been concerted efforts to make research accessible to busy practitioners, so that they are able to make wise decisions.

Educational research has been going on for a long time. Surveys of what learners like and dislike about school, for example, were conducted in the 1920s. In more recent times, some academics have felt confident enough to talk about the 'science of how we learn' (Hattie and Yates, 2014). They base this confidence on extensive studies in different contexts around the world, creating a solid knowledge base around learning and teaching.

There is certainly no shortage of subjects to research in education, from the teaching of specific subjects to broader skills such as questioning, classroom management and assessment (see Figure 2).

Figure 2: Examples to illustrate the scope of educational research

Places

Home learning, playgrounds, community learning, galleries, museums, hospitals, schools, virtual worlds, workplace, comparative studies, e.g. across schools and countries.

Themes

Assessment, attendance, behaviour, curriculum, learning and teaching, leadership, parental engagement, professional development, social justice, well-being.

Opportunities for educational research

People

Academics, advisers, assistants, governors, learners, leaders, managers, parents, carers, teachers.

Phases

Pre-school, nursery, primary, secondary, transitions, further and higher education.

Source: Grigg and Lewis (2015)

Whatever research you do, or read about, should be conducted in an ethical way. Put simply, it should seek to benefit others and avoid harm. Moreover, educational research needs to be accessible and have an impact if it is to be taken seriously by practitioners – in short, they need to 'get it' and see its value. The example in Figure 3 draws on research by Cardiff University into the effectiveness of an anti-smoking programme.

Figure 3: An example of research having impact

Smoking is the largest single cause of preventable illness in the UK. Over the last decade although the number of adult smokers has fallen, the number of teenage smokers has risen. While many schools undertake anti-smoking programmes, there has been no strong evidence to show their effectiveness.

The DECIPHer-ASSIST trial recruited peer-nominated students aged 12–13 as 'peer supporters'. They were taught how to intervene with their Year 8 peers in everyday situations to discourage them from smoking. Training was given outside of the school environment. Fifty-nine schools in South Wales and Bristol were randomly allocated either to continue with their normal smoking education programme, or to do so with additional peer supporter training. The trial followed the students for two years to see whether smoking prevalence in the intervention schools was lower than in the schools that did not receive the training. It demonstrated that the programme reduced the prevalence of smoking by 10 per cent – and that it is cost-effective.

Since 2010, over 60,000 Year 8 students have taken part in the trial. The evidence-based research suggests that approximately 1,650 young people will not go on to take up smoking as a result.

Source: www.cardiff.ac.uk/research/impact-and-innovation/research-impact/decipher-assist

---

Points for reflection

- Review the case study in Figure 3. What was the impact of this academic research in changing young people's lives?

- Why do you think impact is a key criterion for judging the quality of research?

3. Who does educational research and how do you view it?

The educational research community is a broad one (see Figure 4). It includes learners following different courses, university staff, organisations, specialists and practitioners (e.g. lecturers, classroom teachers, vocational education trainers). Learners themselves not only participate as subjects in research, they are also capable of undertaking their own enquiries. So educational research is not only for academics.

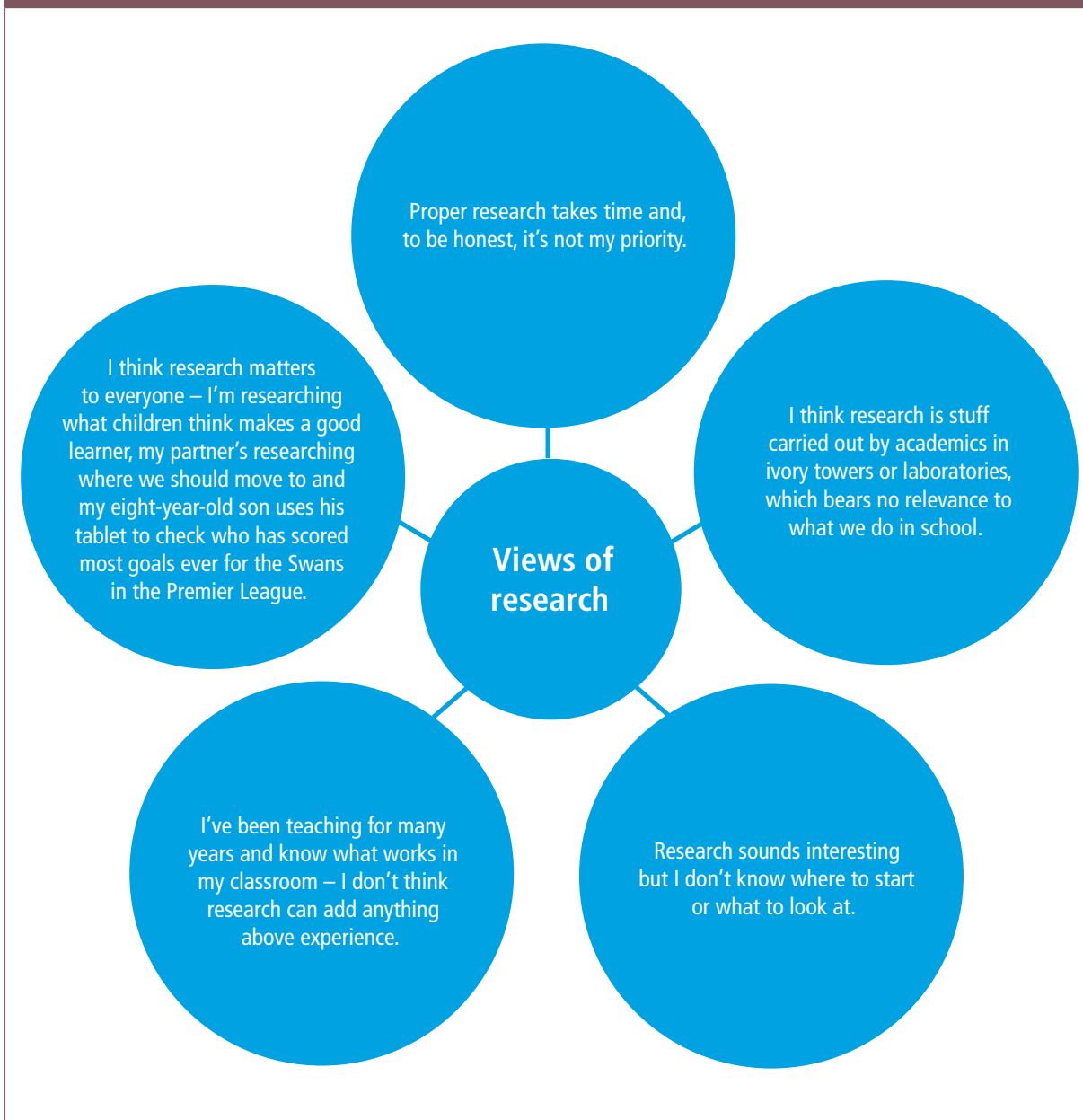**Figure 4: The educational research community**

PHOTO REDACTED DUE TO THIRD PARTY RIGHTS OR OTHER LEGAL ISSUES

Source: Grigg (Wales Centre for Equity in Education)

How do you see research? It's fair to say that there are varying views on the subject as Figure 5 suggests. Research might seem irrelevant to what goes on in the classroom. Perhaps you agree with Professor David Hargreaves who once said that much educational research simply 'clutters up academic journals which virtually nobody reads' (*The Independent*, 9 April 1998). Or do you recognise the value of research but lack the confidence, time or knowledge of how to start?

Figure 5: Views of research

Proper research takes time and, to be honest, it's not my priority.

I think research matters to everyone – I'm researching what children think makes a good learner, my partner's researching where we should move to and my eight-year-old son uses his tablet to check who has scored most goals ever for the Swans in the Premier League.

Views of research

I think research is stuff carried out by academics in ivory towers or laboratories, which bears no relevance to what we do in school.

I've been teaching for many years and know what works in my classroom – I don't think research can add anything above experience.

Research sounds interesting but I don't know where to start or what to look at.

Source: Grigg (Wales Centre for Equity in Education)

The way researchers approach a topic depends on their world view or what academics call a **paradigm**. This includes the knowledge, beliefs, values and assumptions they hold about the social world and what they think are the best ways of exploring what is happening around them.

Points for reflection

- Which of the responses in Figure 5 are most similar to how you feel? Why?

- Do you think it is possible for a researcher to remain detached, neutral and objective when conducting research? Why?

4. Why does educational research matter?

We know that research has a central role in the professional development of teachers in the world's leading educational systems (Schleicher, 2012; Tabberer, 2013). In Singapore, for instance, all teachers gain a good grounding in school-based inquiry or research methods. When schools make effective use of data and other research evidence this adds authority to what they do and say. It not only raises the status of the profession but, most significantly, informs decision making about how to meet the needs of learners, which interventions to adopt and the deployment of resources.

Over the past twenty or so years the UK government has supported a number of important developments in educational research. Although some of these bodies and programmes no longer operate, it is possible to access their research findings. The Teaching and Learning Research Programme (TLRP, 2000–2012), for example, was the largest research programme in the UK and worked across all phases, from pre-school settings to work-based learning. Around 700 researchers worked on 100 projects (BERA, 2013). Its findings are available on its website and culminated in support materials for schools, including the drawing up of 10 principles for effective pedagogy (www.tlrp.org).

The value of **evidence-based practice** in education has been increasingly recognised in recent years, at a time when serious questions are being asked about the underperformance of 15-year-olds in Wales and the rest of the UK when compared to their international peers. The Organisation for Economic Co-operation and Development (OECD) (2014) report *Improving Schools in Wales* recommends:

> Research should be considered during – or even before – the design of the new policy rather than being an afterthought.

The UK government has established a 'What Works' network comprising centres of excellence, including the Education Endowment Foundation focusing on tackling social disadvantage in education. One of its most popular resources, in partnership with the Sutton Trust, is the Teaching and Learning Toolkit based on a synthesis of around 5,500 pieces of educational research into what works well. The Toolkit is arranged by topics (such as feedback, mentoring and homework) and shows the average impact of strategies on attainment, the strength of the evidence supporting them and their cost (http://educationendowmentfoundation.org.uk/toolkit). It is essential to read the accompanying guidance to avoid taking the findings out of context. For instance, the Foundation stresses that the average impact for each factor may not necessarily be the impact of this approach in each school.

There have also been numerous educational research-led developments in Wales over recent years. The Centre for Evidence Based Early Intervention (CEBEI) based at Bangor University undertakes research in areas such as parenting, school readiness and anti-bullying (www.centreforearlyinterventionwales.co.uk). WISERD Education is part of the Wales Institute of Social and Economic Research, Data and Methods (WISERD), funded by the Higher Education Funding Council. Among its longitudinal studies, it has tracked 1,200 primary and secondary learners aged five to 17 over three years (2012–15) as they progressed through their education (http://wiserd.ac.uk/wiserd-education/en). It has also conducted an independent evaluation of the Foundation Phase early years education policy in Wales (2011–14) using a range of methodologies such as case studies, snapshot classroom observations, comparison of attainment data, surveys of head teachers and interviews with key policy makers. Also based in Cardiff, the Wales Centre for Equity in Education (part of the University of Wales) focuses on **applied research** relating to inequities in Welsh education (www.uwtsd.ac.uk/wcee). Among its recent publications, for instance, is *The Good News... What schools in Wales are doing to reduce the impact of poverty on pupils' achievement* (Grigg et al., 2014).

Point for reflection

Visit the Education Endowment Foundation's website and select a topic to explore, perhaps one that aligns to a priority within your school development plan. What is the evidence for the effectiveness of the intervention and how does it compare to your own setting's experience? http://educationendowmentfoundation.org.uk/toolkit
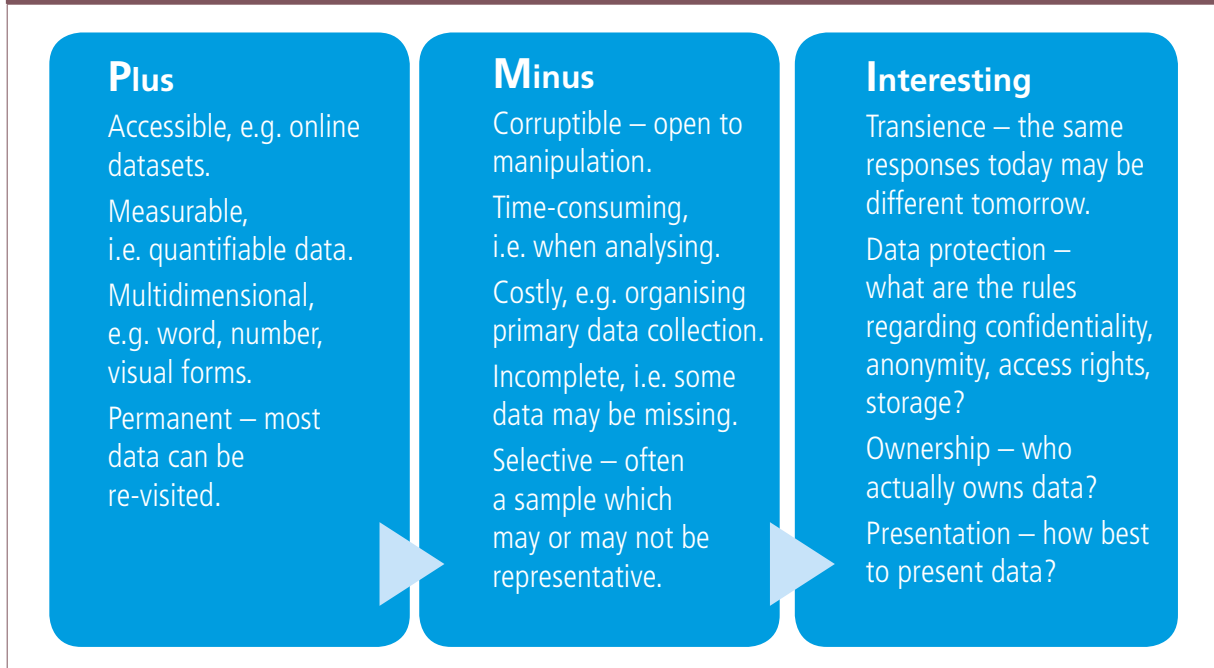
5. What kind of data and evidence is available and how should it be used?

Over recent years, a drive for greater accountability has put pressures on school leaders in many countries to become 'data driven' when reporting on the performance of its learners. It is important to recognise that data (plural of datum) is not limited to statistics or numbers, but includes words, pictures and sounds. This data needs to be prioritised, collected, sorted and put in context to become useful information.

Data, in all its forms, can be used for several purposes. It can support effective self-evaluation processes to gain an overall sense of how a school is performing. It can be used instrumentally to track learners, target resources, and make adjustments to the curriculum or timetable. Practitioners can use data formatively to make changes to their pedagogy. In the most effective schools, data feeds lines of enquiry about learning, for instance whether particular learners or groups are not performing as well as they should.

How you view data is undoubtedly influenced by your experience, confidence and skill set as an individual practitioner. In some results-driven cultures, numerical data is seen as the key to justifying learner (and teacher) performance. As with all sources, performance data has strengths and limitations. We know the forensic use of data is one of the factors behind the most successful school leadership, for instance as noted in the evaluation of the City Challenge programme that has raised standards significantly in London (Hutchings et al., 2010). But numerical data can be incomplete, open to interpretation and selective – in short, it is fallible (see Figure 6). It is easy to forget about the fallibility of the person who entered the data. But used alongside other sources, performance data can make an important contribution to support schools in their drive to improve standards.

Figure 6: General advantages and limitations of data expressed as a PMI grid

Plus

Accessible, e.g. online datasets.

Measurable, i.e. quantifiable data.

Multidimensional, e.g. word, number, visual forms.

Permanent – most data can be re-visited.

Minus

Corruptible – open to manipulation.

Time-consuming, i.e. when analysing.

Costly, e.g. organising primary data collection.

Incomplete, i.e. some data may be missing.

Selective – often a sample which may or may not be representative.

Interesting

Transience – the same responses today may be different tomorrow.

Data protection – what are the rules regarding confidentiality, anonymity, access rights, storage?

Ownership – who actually owns data?

Presentation – how best to present data?

Source: Grigg (Wales Centre for Equity in Education, 2016)

Sources

In order to build up a background picture, all research studies depend upon **secondary sources**, which are those produced by others after the events they are describing. Popular secondary sources are books, journal articles and web pages. Researchers also use first-hand **primary sources** extracted from the time of study such as observations, interviews and documents. The division is not always clear-cut. Newspapers, for example, can be both a primary and secondary source depending upon when they were produced and how they are being used. **Tertiary sources** are summaries of primary and secondary sources, such as encyclopedias, almanacs, dictionaries and indexes. All three types of source have their role in educational research. Primary sources are generally more reliable than secondary ones – hence reading accounts of teaching a challenging class are less likely to make a lasting impression as teaching the class yourself, although secondary accounts and interpretations often provide a wider context. All sources need to be evaluated.

Educational research can draw upon a wide range of sources and approaches, including:

- statistical data, e.g. teacher assessments, test scores, databases, census returns, attendance figures
- official documents, e.g. HMI and government reports, trade union publications
- visual sources, e.g. children's drawings, photographs, audio-video materials, artefacts, maps
- books and journals, e.g. academic articles, e-journals, magazines
- discussions, e.g. with learners, teaching assistants and parents/carers
- observations, e.g. of sessions, the playground, during educational visits
- websites and online catalogues, e.g. subject association websites, online archives, Google Scholar, digital library catalogues.

Researchers can combine both **qualitative** (text) and **quantitative** (number) elements in a mixed-method approach. For instance, a practitioner who wants to explore young children's use of mobile technologies might talk to them directly and observe them using the technology in the classroom and outdoors (qualitative), as well as circulate surveys to parents/carers to get their opinions (quantitative).

Qualitative approaches can include the use of **ethnography** where the researcher seeks to understand the cultural experiences of a particular individual, group or organisation, through strategies such as casual conversations, life histories, case studies and semi-structured interviews. **Action research** puts practitioners in the role of researcher and focuses on improving their practice by exploring the particular setting, how they teach and how well learners learn.

Quantitative data

The Welsh Government publishes a range of statistics that are significant to practitioners, school leaders and educational researchers. In particular, schools are expected to use the All Wales Core Data Sets (AWCDS), introduced in 2009, to inform their self-evaluation and target-setting processes. The AWCDS enables schools to compare their performance against that of other similar schools and to share good practice. The AWCDS contain a range of different graphs, charts and tables illustrating:

- a school's results against local and national performance

- the difference in performance between girls and boys and between those learners who are entitled to free school meals and those who are not

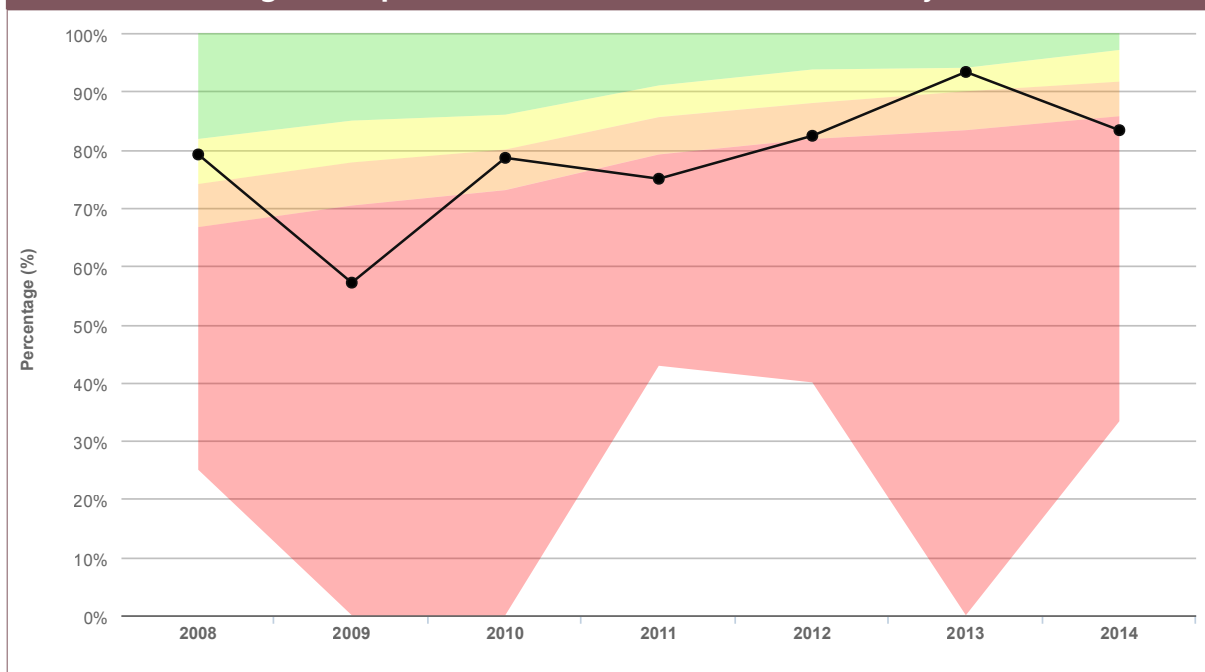- comparisons against the performance of the school 'family'.

The latter allows a school to compare its performance against its 'family' of contextually similar schools (usually comprising 11 schools). 'Families' of schools are grouped by language, size (primary schools only) and according to their level of challenge, which is determined by factors including the percentage of learners entitled to free school meals (eFSM) and the percentage living in the 20 per cent most deprived areas in Wales according to the Welsh Index of Multiple Deprivation (WIMD). These are both taken as the common indicators of social deprivation in schools. You can find out more about AWCDS, along with a summary of some of the key data collections and performance information releases by the Welsh Government from the *A teacher's guide to school self-evaluation* packs (http://learning.wales.gov.uk/resources/browse-all/teachers-guide-to-school-self-evaluation/?lang=en).

Additional statistical bulletins and data releases by the Welsh Government can be found by by visiting the Welsh Government school statistics webpage (http://gov.wales/statistics-and-research/?topic=Education+and+skills&lang=en) or the StatsWales website (https://statswales.wales.gov.uk/Catalogue?lang=en).

Figure 7 gives an anonymised example of attainment data for a primary school. It is from 'My Local School', a Welsh Government website designed to open up access to schools' data to parents/carers (http://mylocalschool.wales.gov.uk). Benchmarking charts similar to this are also found in the AWCDS. The green section represents the highest performing 25 per cent of schools with similar levels of free school meals to this school. Therefore if the data point for the school is in the green area, its attainment levels are higher than many other schools with similar levels of learners from deprived backgrounds.

The red section represents the lowest performing 25 per cent of schools with similar levels of free school meals to this school. Hence if the data point for the school is in the red area, its attainment levels are lower than many other schools with similar levels of learners from deprived backgrounds.

Figure 7: Attainment data from a primary school showing percentage of learners reaching the expected level in Year 6 in the core subject indicator (CSI)

Source: My Local School website

Sometimes attainment data does not tell the whole story. Can you think of occasions where the attainment data may not reflect the progress learners make in class? Perhaps a new teacher or senior leader has recently arrived and is beginning to make an impact but this is not yet reflected in the performance data (which is historical); or, the attainment data is skewed by a high proportion of learners with additional learning needs (ALN). A context could arise where a school's attainment data appears strong but learners are 'coasting' and not achieving their potential, given their high starting points. Hence it is important to consider value-added data when analysing learners' progress from one point in time to the next. Value added typically measures the extent to which learners have made 'additional progress' over and above what they would 'normally' be expected or estimated to achieve given prior attainment and contextual factors. Taking into account contextual factors allows for fairer comparison between contextually different schools of the progress they have helped learners make. **Standardised tests** are also sometimes used to measure progress over time.

Key questions to consider include the following.

- Are learners making better or worse than expected rates of progress by the end of their time in school and in the intervening years?

- If so, why, and what strategies are in place to sustain and share good practice and bring about improvements?

- Are some individuals and groups of learners and some subjects making better progress than others (e.g. looked after children, boys, girls, ethnic groups, each group of learners with special education needs (SEN), more able and talented (MAT) learners)?

- If so, why, and what strategies are in place to sustain and share good practice and bring about improvements?
(Governors' Wales, 2012, p.9).

There are commercial management information systems available to assist practitioners in tracking the skill-by-skill development of learners. Welsh Government guidance on the use of All Wales Core Data Sets (2012, p.3) points out:

> Data alone are unlikely to provide solutions to identified issues. Instead, they raise questions – the answers to which might provide a solution.
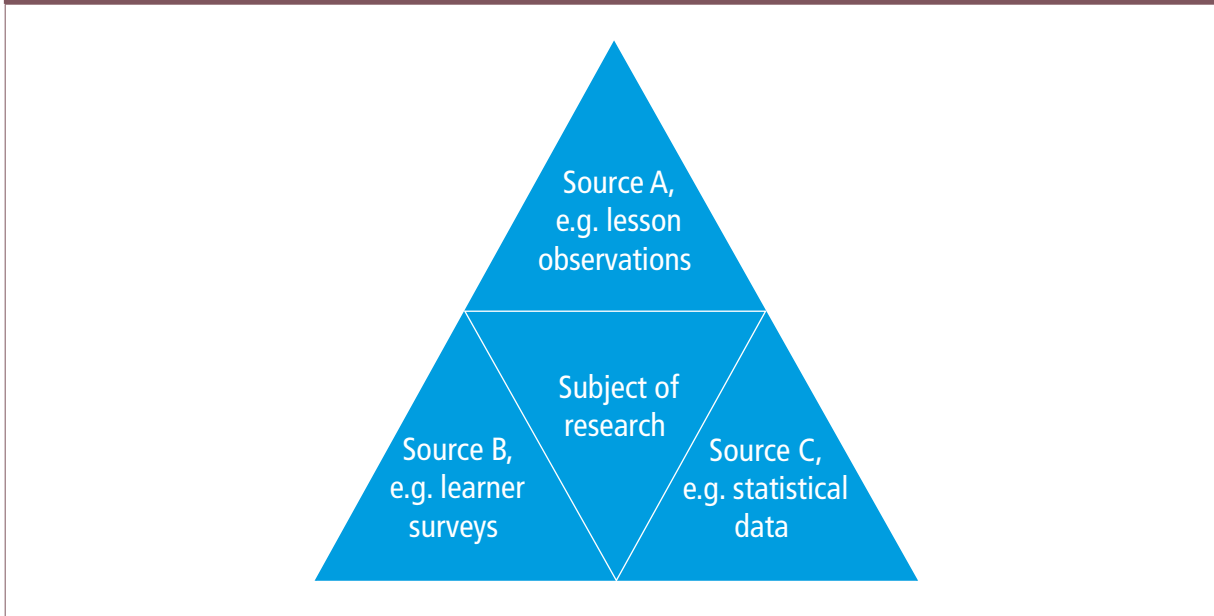
The National School Categorisation System for both primary and secondary schools was launched in January 2015. Schools are categorised as highly effective (green), effective (yellow), in need of improvement (amber) and in need of greatest improvement (red). The system assesses both a school's performance across a range of indicators (e.g. achievement in English and mathematics, attendance, performance of learners entitled to free school meals) and its ability to improve, measured by planning for improvement. It is not purely driven by data, but takes into account the quality of leadership and learning and teaching. Estyn (2012, p.6) state that where schools make effective use of AWCDS, leaders identify differences in the performance of groups of learners and compare performance across and beyond the school.

Activities

1. Study the graph in Figure 7. The school in question has less than 130 learners and 30 per cent of them are entitled to free school meals (a common indicator of social deprivation) over the years 2011–14. What questions arise in terms of the data? What other questions might you want to explore?

2. Consider the benchmarking charts within the AWCDS for your school. What are the main questions arising from these in terms of learner performance?

3. Visit the Estyn website, choose a recent inspection report and read Appendix 1 'Commentary on performance data'. What does this tell you about how well the school is doing?

4. Read further about the performance measures which are used in the National School Categorisation System (http://wales.gov.uk/about/cabinet/cabinetstatements/2014/schoolcategorisation/?lang=en). Why was this introduced and how is it different to the former banding system for secondary schools?

When analysing data it is important to step back and think about the wider picture. The data needs to be verified by considering what other sources reveal, a process researchers call **triangulation** (Figure 8). Where data sources conflict, this lends weight to the need for further enquiry and the need to be cautious in reaching definitive conclusions. Even when datum is in agreement, further research may be necessary because of factors such as the sample size.

Figure 8: Triangulation of data

Source: Grigg (Wales Centre for Equity in Education)

For more advanced analysis of data, researchers use statistical tests of significance to estimate the probability that two or more variables are connected. Computer software is able to take the drudgery out of such analyses. Figure 9 gives some pointers when analysing statistical data.

Figure 9: Aide-memoire when analysing statistical data

1. Check the sample size, e.g. small numbers in a cohort mean that each learner carries a high percentage weighting. Individual learners within these cohorts are likely to vary in gender, age and ability. Moreover, there may be few or no girls or boys for some cohorts. Outcomes and trends can be distorted by these factors, making firm conclusions impossible.

2. Look for trends in data and take care when interpreting results for a particular year – cohorts vary in ability and so it is more reliable to track their progress from year to year and analyse trends over time.

3. Look for anomalies within the data, e.g. internal consistency between responses to survey questions.

4. Always seek to verify the data – compare findings with other external sources.

5. Try to explore the wider contextual information – what do you know about **when** and **how** the data were collected, **who** inputted and moderated it, and what actions have been taken **since** the data were collected and reported.

6. Try to establish how the data are generally viewed – their credibility or reliability among informed commentators, e.g. search online to see whether there are any comments by reviewers.

Qualitative data

There is a wide range of qualitative sources available to educational researchers, offering insight into the 'natural' contexts within which teachers and learners operate. These can include interviews (and their transcripts), observations and reflective diaries. In the case of the latter, researchers need to know why the diaries were compiled, the intended audience and whether the authors (learners or teachers) still hold to the views expressed. Hence diary interviews, where the subjects talk about their diaries, are a useful means for checking accuracy.

Official documents include government reports and enquiries, inspection reports, policy documents, files and papers. Important questions to consider include the following.

- How and why are the documents written?

- For whom are the documents written?

- What might have been left out?

- How does the content compare to other sources on the topic?

Educational research sometimes makes use of a range of visual sources, including photographs, artefacts, drawings, cartoons and films. Examples of producing images for research purposes include asking children to draw a teacher and inviting girls to make a short film of their experience of technology. Ewald (2000) invited children to suggest subject matter, poses and props that she could feature in her role as researcher-photographer.

6. Where can I find research evidence?

Although there are specialist repositories containing educational records, such as the Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI-Centre), based at London's Institute of Education (http://eppi.ioe.ac.uk/cms), many educational researchers are likely to begin their research using the internet. The benefits of accessibility and speed generally outweigh the challenges of sifting through, finding and evaluating the relevant internet material.

There is a wide range of websites relevant to educational research, pitched at different audiences. The Learning Wales website is the obvious starting point for those seeking more information about educational research in Wales (gov.wales/learning). During 2013–14 alone, nearly 100 reports were published on a wide range of educational issues, from the Foundation Phase to the Welsh-medium Education Strategy. Its 'Resource library' provides access to the latest official publications while there are a number of e-learning packs aimed at those following the Masters in Educational Practice (MEP) programme. For those pursuing Masters-level programmes, most university websites offer appropriate guidance on how to conduct research. Plymouth University, for example, has a very comprehensive Research in Education (RESINED) website which includes information on different approaches and writing up research (www.edu.plymouth.ac.uk/resined/resedhme.htm).

There are a number of leading organisations that specialise in educational research each with their own website. CUREE (Centre for the Use of Research and Evidence in Education) is an internationally recognised centre of expertise in the field. The resources section of its website offers examples of research projects in schools, as well as 'research tasters' based around questions such as 'How can we guide group discussion effectively?' (www.curee.co.uk). The Education Resources Information Center (ERIC), based in America, provides a gateway into education research journals (http://eric.ed.gov). The National Foundation for Educational Research (NFER) is the UK's largest independent provider of research, assessment and information services for education, training and children's services (www.nfer.ac.uk). Among its regular publications is the *Teacher Voice Omnibus Survey*, which appears three times a year, shedding light on what teachers think about particular issues. Its website allows searching by subject (e.g. Teaching and Pedagogy, Early Years, and Leadership and Management) and includes many free downloadable publications, such as *Teachers' Use of Research Evidence: A case study of United Learning schools* (Judkins et al., 2014). NFER Cymru conducts specific research projects relating to Wales. These have included reviews of 14–19 education and training in Pembrokeshire and Ceredigion, development of classroom materials to promote the countryside code and review of school breakfast clubs (www.nfer.ac.uk/about-nfer/contact-us/swansea-office.cfm).

Libraries, museums and archives

These are generally equipped with high-level search catalogues to assist enquiries. These include access to e-books, e-journals and e-newspapers. Inter-library loans are also available when a local library does not hold the resource required. The Institute of Education (IoE) in London holds a copy of every book on education published in the UK, and a substantial range from elsewhere (www.ioe.ac.uk/services/4389. html). Local libraries usually have reference sections holding local materials, while the National Library of Wales has growing online collections mainly of historic value. The National Museum of Wales supports research in museum learning (www.museumwales.ac.uk/rhagor/research). The Arts Council of Wales sponsors research in the development of new ideas, for instance in theatre and dance (www.artswales.org.uk). The National Screen and Sound Archive of Wales holds a large collection of films, television programmes, videos, sound recordings and music relating to Wales and the Welsh (http://archif.com). The National Archives is the UK government's official archive and holds historical records for Welsh education (www.nationalarchives.gov.uk) as well as past records of the Department for Children, Schools and Families. Derek Gillard's website includes a comprehensive set of documents relating to the history of education to the present day, including legislation and policies relating to Wales (www.educationengland.org.uk).

Most libraries hold access to a range of databases relevant to educational research, such as:

- Australian Education Index
- British Education Index (BEI)
- Education Research Information Center (ERIC)
- House of Commons Parliamentary Papers
- Index to Theses
- JSTOR
- Sage Premier
- Times Digital Archive 1785–1985
- Welsh Journals Online
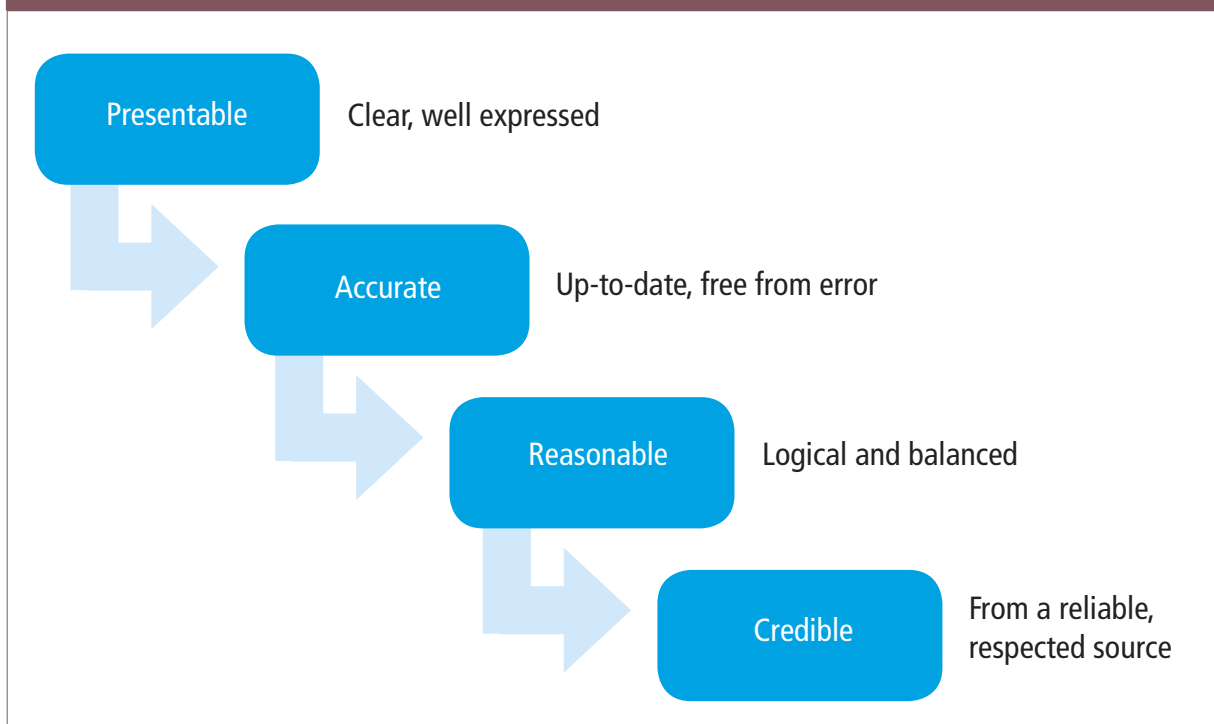- Welsh Newspapers Online.

The BEI's Education-line collection offers access to over 6,000 texts, mostly conference papers (www.leeds.ac.uk/bei/COLN/COLN_default.html).

7. How do you know which research to trust?

It is something of a cliché to say that we live in a data-rich society, with conservative suggestions that the amount of information in the world doubles every two years (Gantz and Reinsel, 2011). Given the volume of information available online, it is understandably challenging to work out what to believe and accept as reliable.

There are a number of factors to consider when evaluating research evidence. Grigg (2016) suggests the following model to evaluate research and other evidence (see Figure 10).

Figure 10: PARC model

Presentable — Clear, well expressed

Accurate — Up-to-date, free from error

Reasonable — Logical and balanced

Credible — From a reliable, respected source

Source: Grigg (Wales Centre for Equity in Education, 2016)

The overall quality of the material needs to be **presentable**, in a clear easy-to-follow style, with arguments or findings well expressed. While the evidence may be presented in many forms (websites, articles, oral presentations), it needs to be accessible. The author(s) should take into account the audience through: the choice of language (use of standard punctuation), structure (introduction, main body, methods, results, discussion), format (use of titles, subheadings, paragraphs, figures, tables and lists), consistent citations and references, engaging quotations and illustrations, summary and glossary (if presenting technical terms).

Evidence needs to be **accurate** – for instance, there needs to be internal consistency within the data. Supporting references need to be clearly identified without any obvious gaps. The accuracy of details such as dates, numbers and people, is sensitive to change. Hence it is important to check the currency of information presented; for instance, when the source was published and whether the details referred to are up to date. Numerical data may be inaccurate or misleading. When reporting the outcomes of interviews, interviewees may give a slanted version of events, at odds with other evidence. Surveys may be based on a very small sample and low response rate. This may mean that the results are not representative of the population.

There needs to be a sense of **reasonableness** within the arguments expressed. This does not rule out the place for passionate argument, but any case put forward should draw on sound evidence and avoid sweeping generalisations such as 'boys do not have the same level of concentration as girls', or 'children from ethnic minorities underachieve'. Are the views one-sided, or advocating a particular cause and, if so, how does this compare with other views?

Researchers need to be reassured that information is **credible**, emanating from an authoritative source. Materials produced by reputable educational publishers, peer-reviewed journals and official sources (e.g. government reports or websites with suffixes .gov and .ac.uk) are generally credible because they are subject to rigorous internal quality assurance processes. Most reliable sources indicate the background, remit and the author's credentials, while most credible websites include 'About us' sections. Anonymous sources need to be treated with caution, although these are not necessarily unreliable because the lack of names might simply reflect the policy of an organisation.

8. What are the ethical considerations and values of educational research?

Every stage of the research process should be conducted in an ethical manner. In practice, this means conducting research fairly, honestly and without the intention of harming others. It means continually asking questions such as: 'Is this research in the subject's interests?', 'What are the possible benefits, risks and costs?', 'What might be the impact of this research on policy and practice?'

Universities have their own ethics committees, which approve research activity under their name including any projects undertaken by staff and registered learners. BERA publishes *Ethical Guidance for Educational Researchers* (BERA, 2011), which is free to download from its website. The BERA guidance covers four main responsibilities for researchers.

- Responsibility to participants.
- Responsibility to sponsors of research.
- Responsibilities to the community of educational researchers.
- Responsibilities to educational professionals, policy makers and the general public.

Among the key principles is ensuring that all participants understand the research process including the aims and how the intended outcomes will be used. Gaining voluntary informed consent, before research begins, is considered the norm while respecting privacy and confidentiality, and working with data protection legislation, is essential.

Values shape each stage of the research process, from deciding what is worth (and not worth) researching to considering the impact of the findings presented. The important thing is to recognise this and to seek ways of ensuring that values enrich rather than hinder research. So, for example, if you value openness and want to find out what learners really think about something then you should be mindful that they probably want to please you and seek your approval. When interviewing, by asking leading questions (e.g. 'You like mathematics, don't you?') or through body language (e.g. simply nodding when they speak) there is a danger of straying away from what you value and creating a barrier to finding out what learners genuinely feel. Avoiding bias is challenging when there is a need to create positive relationships and empathy for others. However, there are techniques that generally draw out accurate information and build rapport, such as:

- seeking clarification ('Can you say a bit more about ...?')
- asking for examples ('Which ones?')
- asking for explanations ('Why do you say ...?')
- playing on personal ignorance ('Can you help me understand ...?')

- inviting opinions ('Do you really believe that?')

- playing devil's advocate ('On the other hand, what if ...?')

- expressing disbelief ('Really?')

- checking possible contradictions ('Yes, but I thought you said…')
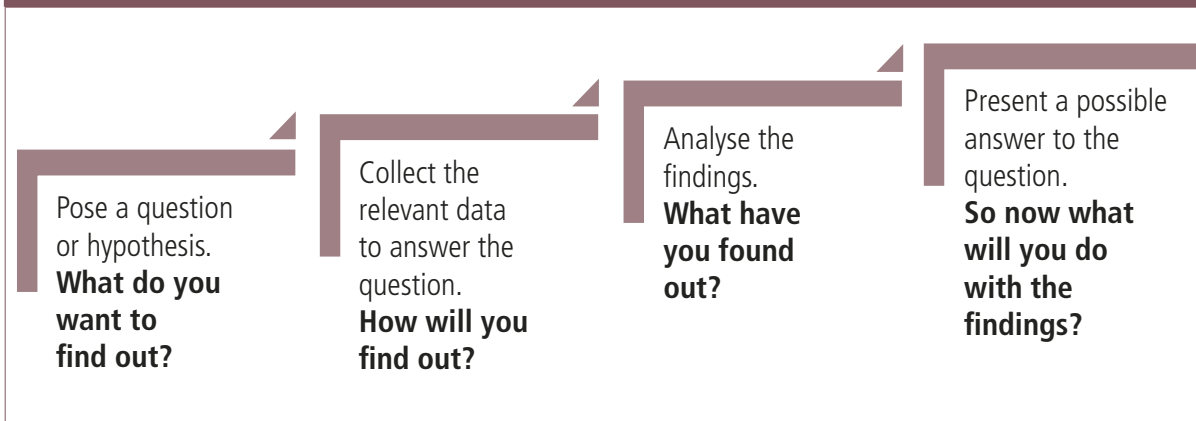
> ## Points for reflection
>
> - Would you tell colleagues either formally or informally what an individual participant has said to you as part of your research?
>
> - How might a researcher discern whether very young children could consent to research?

9. How do you carry out educational research?

This section offers guidance on how to conduct your own research. Practitioner-led research was first introduced in the 1940s to bridge the gap between theory and practice. Today it has a strong international following. Action research is not without its difficulties – all action and no research, according to some critics. But there is plenty of helpful guidance on how to conduct purposeful action research (McNiff, 2005; McNiff and Whitehead, 2012; see also http://teachersnetwork.org/tnli/Action_Research_Booklet.pdf). The Collaborative Action Research Network (CARN) and Expansive Education Network (eednET) are two examples of organisations designed to support teacher enquiry (see websites). When conducting small-scale research, the Education Endowment Foundation has produced useful guidance in *The DIY Evaluation Toolkit* (Coe et al., 2013). This includes examples of school research projects, tips on framing questions, how to measure impact (e.g. through pre- and post-tests), technical guidance on calculating **effect sizes** and how to analyse results.

Many models of research are represented as a cycle of planning, doing and reviewing. Planning involves choosing a topic, asking a relevant question, background reading and deciding upon how to collect data. The 'doing' stage covers the practical matter of deploying resources to collect the data, while reviewing brings together the outcomes and next steps. Research is best seen as a series of small, manageable steps rather than a large, formidable task. Essentially, the research process addresses four questions to build up knowledge and understanding (see Figure 11).

Figure 11: A simplified four-step research process

Pose a question or hypothesis. **What do you want to find out?**

Collect the relevant data to answer the question. **How will you find out?**

Analyse the findings. **What have you found out?**

Present a possible answer to the question. **So now what will you do with the findings?**

Source: Grigg (Wales Centre for Equity in Education, 2016)

In reality, rarely do educational researchers offer a definitive answer to a question because of the complex nature of education and the difficulty of establishing a direct causal relationship between two events or issues. But every research project or activity, no matter what the scale, needs to consider these four questions.

Step 1: What do you want to find out?

The initial hunch or research question might be triggered by what you have read or heard in the news, something that has happened in your setting, a 'professional itch' about how to improve teaching or learning (e.g. 'I wonder what might happen if I …?'), or a reaction to test results. For instance, you might decide to look into absenteeism (research area), focus on the absenteeism of a particular year group (topic) and ask 'Why are absenteeism rates higher in Year 10 than Year 7?' (research question). The question determines whether to pursue a predominantly qualitative or quantitative approach or a mixed methodology. Some researchers decide to move deductively from general to specific questions, while others work back to more general questions. The overarching question is 'What are you trying to find out?'

Research questions matter because they give shape, focus and direction to projects. Good ones are clearly expressed, concise and answerable within the time and resources available. The question asked depends upon the research aim, for example:

- what is the relationship between …? (seeks to explain)
- what happens if …? (seeks to experiment)
- what and how? (seeks to describe)
- why? (seeks to explain or critique)
- how can we understand …? (seeks to interpret or understand).

Before planning in detail, conducting a **literature review** is useful in order to find out what has been already said on the topic. This should represent an overview of key theories, findings from previous studies and possible evidence gaps, justifying the proposed research. Invariably, a literature review contrasts the views of different authors.

Step 2: How will you find out?

Once research questions have been clearly framed, researchers need to choose appropriate methods to capture data. Quantitative data is acquired through counting and measuring activities using tools such as surveys and questionnaires. One of the key principles of quantitative approaches is how to control **variables** (something that varies). In recent years, there have been calls for researchers to make greater use of fair tests or **randomised control trials** (RCTs) to find out what works best in education, as is the case in medicine (Goldacre, 2013). RCTs are very good at showing where something works well although it is often less clear why things worked out as they did. Examples of RCTs in education can be seen on the Education Endowment Foundation website.

Figure 12 outlines the most common research tools, which can take different forms. For example, interviews can be conducted on a one-to-one basis, in groups or online; they can be very formal with pre-set questions, semi-structured or open-ended. Observations can be systematic using schedules and pre-coded questions, or more informal where the researcher participates in lessons alongside learners or the practitioner.

Figure 12: Overview of research methodologies		
Research method	**Advantage**	**Disadvantage**
Case studies	• Provides in-depth information. • Captures intricacies of complex situations. • Draws upon multiple sources adding credibility.	• Difficult to generalise and may not be representative. • Practically difficult to negotiate access in some cases. • Individual memories are selective and may be inaccurate.
Questionnaires	• Potential to reach large audience quickly, e.g. via group e-mail or online questionnaire websites. • Low cost if completed online. • Pre-coded questions elicit standardised answers which are easier to analyse.	• Return rates may be low. • Questionnaires can be incomplete. • No guarantee that the correct person is answering the questions. • Difficult to validate truthfulness of answers.
Surveys	• Clear focus on empirical data based on real-world observations. • Can generate large amounts of data fairly quickly. • Potential to appeal to a wide audience. • Can be easy to administer and complete, e.g. using online tools.	• Detail and depth is inevitably sacrificed for breadth. • Difficult for researchers to verify honesty or accuracy of responses.

Research method	Advantage	Disadvantage
Tests	• Generally quick and easy to administer. • Tests can be trialled to establish reliability and supply objective benchmarks. • Standardised 'off-the-shelf' tests offer comparisons within groups, between groups and over time. • Tests allow for generalisations.	• Can be expensive to generate and purchase. • Tests only reveal in-the-moment responses and may not reflect true ability. • Tests are stressful and this can affect performance. • Tests can be poorly administered and results manipulated.
Interviews	• In-depth information gleaned. • Highly flexible: conversation can be adjusted according to the responses. • High response rates when interviews are pre-arranged. • Interviewees can say if they are unsure or do not understand. • Personal nature means that respondents have a strong say. • Body language and other cues can be considered.	• 'Interviewer effect' means that data is based on what people say rather than what they do. • Interviews can be time-consuming and resource heavy, e.g. travelling, equipment. • Consistency and objectivity are difficult to achieve because context is so specific. • Some groups may be reluctant to be interviewed, e.g. Gypsy/Traveller children. • Danger of asking leading questions, e.g. 'Isn't it the case that …?'

Research method	Advantage	Disadvantage
Observations	• Natural settings can afford a more realistic study. • Schedules can eliminate bias. • As participant observers, it's possible to see things from group's perspective. • Video recording observations can stimulate open discussion and reflection.	• As participant observers, it's difficult to take notes during observations. • As non-participant observers, more difficult to see things from the group's perspective. • The analysis of findings from the use of technologies, such as audio-visual recordings, is time-consuming.
Documents	• Easy access to most documents, increasingly available online. • Documents are available for public scrutiny. • Documentary data is generally permanent.	• The story behind documents needs to be teased out – who produced it, why and for whom, which can be time-consuming or unknown. • Documents are not usually produced for the purpose of research. • Certain documents are 'closed' to public access due to confidential nature.
Ethnography	• Provides first-hand contact with subjects (people and places) in natural contexts. • Rich, in-depth details can be revealed leading to new insights. • Opportunity to see the world from different cultures.	• Can result in storytelling rather than serious analytical research. • Potential difficulty in generalising from specific account. • Cultural tensions can surface between researcher and subjects. • Insider knowledge can lead to 'blind spots'.

Research method	Advantage	Disadvantage
Action research	• Direct link between theory and practice. • Gives practitioners increasing say in their professional development.	• Difficult to generalise from specific context. • Controlling variables generally not feasible. • Tensions can exist in the role of researcher-practitioner.
Experiments	• Can be repeated, adding credibility. • Precise form of measurement. • Convenient for researchers.	• Ethical issues when using control and experimental groups. • Questions as to whether the conditions in artificial settings such as laboratories can be replicated in the 'real world'.

Source: Grigg (Wales Centre for Equity in Education)

Step 3: What have you found out?

Once data are collected, it needs to be analysed. With performance data, it is useful to think about patterns and trends (for instance relating to the progress of groups of learners over at least three years). Key questions to consider include the following.

- What analysis have we done of learners' progress across a key stage and beyond?

- What are the characteristics of learners who make slow or accelerated progress across a given key stage in the core subjects?

- Are we clear which learners entitled to free school meals (eFSM) are making good progress and which are not?

- Are we using this analysis to:

  – inform early identification of eFSM learners who are likely to make slow progress?

  – set out the expected progress each year, supported by robust tracking?

  – provide high-quality teaching, challenge, support, and intervention where needed?

- Is every teacher in every class aware of eFSM learners whose progress is at risk, and accountable for effective action to understand the needs of these learners and accelerate their progress? (DCSF, 2009, p.8)

But it is equally important not to ignore data regarding individuals. One school manager who regularly analyses data suggested that 'if you look after the individuals, the groups will take care of themselves'. It is sometimes revealing to track an individual's typical

school day or week, seeing learning experiences through their eyes. This can often humanise interpretations of numerical data.

Preliminary analysis of documents, pictures or sounds (qualitative data) often requires reducing the data to a manageable amount. Scribbled field notes of lesson observations, for instance, need to be summarised focusing on the main issues. When dealing with a lot of data, for example arising from interviews, coding should be used (see Appendix, page 38) – computer software can automatically collate and code data. These tag notes or transcripts of interview allow the researcher easy retrieval of selected information from the mass collected. Data can also be classified using simple **typologies** to identify types or patterns of behaviour. For example, if researching the kinds of playground activities in a school, a typology might include: ball games, playing with toys, using computers, role play and singing.

Qualitative data can be analysed in different ways. Texts can be interrogated by inserting implied questions for which the text provides the answers; the idea is to see the world through the author's eyes and try to uncover the logic (or lack of it) in the author's argument, by answering who, what, where, when, how and why. Text can be 'redrawn' using decision trees to reveal consequences. **Matrices** can be used to show how different factors are connected; for instance, whether particular class teachers think differently about standards of behaviour in school.

How people communicate with each other can be analysed by studying their use of particular words, phrases and markers such as 'oh', 'well' and 'ok'. Discourse analysis tries to understand what speakers do in conversations, e.g. by examining how people take turns and their use of reframing, when they seek to interpret what they hear or read. This involves understanding the meaning beyond the words used, e.g. a teacher might describe a class as 'very busy' when they mean something else, i.e. noisy, easily distracted or poorly behaved.

Step 4: So what will you now do with the findings?

Findings can be shared in many ways, including dissertations, books, articles, reports, conference papers, PowerPoint presentations, staff meetings, posters, podcasts and blogs. Whatever the form, care should be taken in getting the structure and sequence right. At the outset, the intended audience should be kept in mind – so, for instance, while at an academic conference detailed explanation of chosen methodologies might be appropriate, at an informal workshop for practitioners the focus might shift towards the practical implications of the research. Universities and journal publishers provide guidance on writing styles and formal submission processes for research pieces such as theses and articles. Two very important elements are the title and summary or abstract, which are usually written at the end. Both should convey as much information about the research in as few words as possible. It is a good idea to read a range of existing abstracts and titles in respected journals, magazines and books.

10. What are the challenges with evidence-based practice and how can these be overcome?

While few would disagree that teachers should access the latest knowledge about learning and teaching, there are a number of barriers to the development of an evidence-based profession. This includes ensuring practitioners have ready access to jargon-free and robust evidence of what works well, to inform what they do. In recent years there have been steps in the right direction here with the publication of **systematic reviews** and research briefings (often called 'meta-studies' or just 'research reviews') offering concise overviews of the best evidence we have. For example, MESHGuides (Mapping Educational Specialist knowHow initiative), supported by the charity Education Futures Collaboration, are a useful starting point (www.meshguides.org).

Practitioners themselves have a key role to play in setting research priorities through their own practice (DfE, 2013). Conducting your own research, however, presents challenges but these are not insurmountable (see Figure 13).

Figure 13: Challenges when conducting research and possible solutions	
Challenge	**Possible solutions**
Selecting research topic	• Choose something that is of professional interest and likely to motivate you. • Think about linking research to a priority within the school development plan. • Focus on something that is doable within resources (time, finance, network) available. • Seek ideas from others and, possibly, explore a joint project with another practitioner/school. • Review examples of research topics and questions online.
Selecting the appropriate research methodologies	• Link the methodology to the research question. • The kinds of words used in the research aim or question will offer clues to the most appropriate approach, e.g. if you intend to 'explore' or 'understand', then qualitative approaches are best; if you intend to 'compare' or 'correlate' then a quantitative design is appropriate. A mixed methodology might also be deployed.

Challenge	Possible solutions
Sustaining interest and commitment	• Take one step at a time and set achievable goals. • Keep focused on the research questions. • Seek advice and guidance from colleagues, websites, discussion forums, libraries and professional networks.
Interpreting data	• Use computer software programmes, such as Statistical Package for the Social Sciences (SPSS). • Where possible seek advice from statisticians and specialists such as NFER. • Visit YouTube online tutorials.
Concern over validity	• Compare and contrast data (triangulate). • Look at alternative explanations and interpretations.
Concern over reliability	• Consider repeating research, retesting or see whether similar research has been conducted elsewhere. • Review internal consistency.
Handling ethical dilemmas	• Refer to guidance provided by BERA and any other appropriate organisations.

Source: Grigg (Wales Centre for Equity in Education)

Whatever the data, evidence or research study, it is important to bear in mind that there will be limitations. Identifying these is part of the research process. No analysis or study is 'perfect' but the research process develops enquiry skills that are key to professional development.

Points for reflection

• Listen to the speech by former education secretary Baroness Estelle Morris at the conference 'Research, Policy and Practice: Redrawing the Boundaries' which took place in May 2012, available at www.york.ac.uk/iee/coalition.htm. Do you agree with her views about the challenges facing education research and how these could be overcome?

• Visit the MESH guides website and explore topics and resources that interest you. Consider joining the MESH community www.meshguides.org

The professional learning model (PLM) offers practitioners in Wales the opportunity to access high-quality professional learning at every stage of their career. For their part, practitioners have a key role to play in sharing their knowledge and good practice with others so that the quality of learning and teaching improves.

11. Summary

- Educational research involves finding out about educational issues in a systematic way. It can support practitioners in their improvement agenda.

- Practitioners as well as academics can carry out educational research.

- Data comes in qualitative (word) and quantitative (numerical) forms.

- Judging the quality of educational research comes down to whether it is accepted as valid, reliable and authoritative, particularly by knowledgeable peers in the field.

- All research should be conducted in an ethical manner.

- Researchers use different methods. Each has strengths and limitations.

- The research process begins with a question or hypothesis, leading to a review of background literature and a plan to collect and analyse data and share findings.

- There are challenges when using data and other evidence, but these can be overcome, for instance through investment of time, training and professional support.

12. Where can I find out more?

References

British Educational Research Association (BERA, 2011) *Ethical Guidelines for Education Research*, London: BERA.

British Educational Research Association (BERA, 2013) *Why Does Educational Research Matter?* London: BERA.

British Educational Research Association (BERA, 2014) *Research and the Teaching Profession*, London: BERA.

Coe, R., Kime, S., Nevill, C. and Coleman, R. (2013) *The DIY Evaluation Toolkit*, London: Education Endowment Foundation, available at http://educationendowmentfoundation. org.uk/uploads/pdf/EEF_DIY_Evaluation_Guide_2013.pdf (accessed 21.2.15).

DCSF (2009) *Narrowing the Gaps: from data analysis to impact. A practical guide*, London: DCSF.

DfE (2013) *Research Priorities and Questions. Teachers and Teaching*, London: DfE.

Estyn (2012) *How well are the All-Wales Core Data Sets used to inform self-evaluation and planning for improvement?* Cardiff: Estyn.

Ewald, W. (2000) *Secret Games: Collaborative Works with Children, 1969–1999*, London: Scalo.

Gantz, J. and Reinsel, D. (2011) *Extracting Values from Chaos, IDC Iview*, available at www.emc.com/collateral/analyst-reports/idc-extracting-value-from-chaos-ar.pdf (accessed 26.1.15).

Goldacre, B. (2013) *Building Evidence into Education*, London: DfE.

Governors' Wales (2012) *Governors' Guide on the Use of Performance Data*, Cardiff: Governors Wales.

Grigg, R. (2016) *The Big Ideas in Education: what every teacher should know*, Carmarthen: Crown House, in press.

Grigg, R., Egan, D., McConnon, L. and Swaffield, L. (2014) *The Good News… What schools in Wales are doing to reduce the impact of poverty on pupils' achievement*, Cardiff: Wales Centre for Equity in Education.

Grigg, R. and Lewis, H. (2015) *An A to Z Guide to Out-of-class Learning (3–11): Literacy, Numeracy and Beyond!* London: Bloomsbury, in press.

Hattie, J. and Yates, G. (2014) *Visible Learning and the Science of How We Learn*, Abingdon: Routledge.

Hutchings, M., Greenwood, C., Hollingworth, S., Mansaray, A. Rose, A. (2010) *Evaluation of the City Challenge programme*, London: DfE.

OECD (2014) *Improving Schools in Wales: an OECD Perspective* [online]. Available at: www.oecd.org/edu/Improving-schools-in-Wales.pdf. [Accessed 2.1.15]

McNiff, J. (2005) *Action Research for Teachers: A Practical Guide*, London: David Fulton.

McNiff, J. and Whitehead, J. (2012) *All You Need to Know About Action Research*, London: Sage.

Schleicher, A. (2012), ed., *Preparing Teachers and Developing School Leaders for the 21st Century: Lessons from around the World*, Paris: OECD Publishing.

Stenhouse, L. (1975) *An introduction to Curriculum Research and Development*, London: Heineman.

Tabberrer, R. (2013) *A Review of Initial Teacher Training in Wales*, Cardiff: Welsh Government.

Welsh Government (2012) *A teacher's guide to school self-evaluation. Key Stage 2 pack. F. All Wales Core Data Sets guidance notes*, Cardiff: Welsh Government.

Further reading

Adey, P. and Dillon, J. (2012) *Bad Education*, Maidenhead: Open University Press.

Collins. K. (2013) 'What Works? Towards an evidence-based education system' in *Teaching Leaders Quarterly* | Q2/13, 4–5.

Cohen, L., Manion, L. and Morrison, K. (2011) *Research Methods in Education*, Abingdon: Routledge.

Earl, L. M. and Katz, S. (2006) *Leading Schools in a Data-Rich World: Harnessing Data for School Improvement*, Thousand Oaks: Corwin Press.

Hammersley, M. (2007) 'The issue of quality in qualitative research' in *International Journal of Research & Method in Education*, Vol. 30, No. 3, November 2007, 287–305.

Hutchinson, D. and Styles, B. (2010) *A guide to running randomised controlled trials for educational researchers*, Slough: NFER.

Lahman, M. (2008) 'Always othered: ethical research with children', in *Journal of Early Childhood Research*, 6(3), 281–300.

Mukherji, P. and Albon, D. (2010) *Research Methods in Early Childhood*, London: Sage.

Punch, K. (2009) *Introduction to Research Methods in Education*, London: Sage.

Walliman, N. (2010) *Research Methods: The Basics*, Abingdon: Routledge.

Websites

British Educational Research Association (BERA) – www.bera.ac.uk

Centre for the Use of Research and Evidence in Education (CUREE) – www.curee.co.uk

Collaborative Action Research Network (CARN) – www.esri.mmu.ac.uk/carnnew/index.php

Education Endowment Foundation – http://educationendowmentfoundation.org.uk

Expansive Education Network (eedNET) – www.expansiveeducation.net

Learning Wales – http://learning.wales.gov.uk/news/sitenews/education-statistics-and-research-2013-2014/?lang=en

National Foundation for Educational Research (NFER) – www.nfer.ac.uk/research

Wales Institute of Social and Economic Research, Data and Methods (WISERD) – www.wiserd.ac.uk and www.wiserd.ac.uk/wiserd-education/en

Wales Centre for Equity in Education – www.uwtsd.ac.uk/wcee

13. Glossary

Action research involves practitioners exploring small-scale issues affecting their own setting with a view to improving their practice.

Applied research is research designed to acquire and apply knowledge to address specific issues or needs.

Core subject indicator (CSI) relates to the expected performance in the core subjects of the national curriculum (English or Welsh first language, mathematics and science).

Effect sizes measure the size and consistency of the impact of a treatment or intervention.

Ethnography is a qualitative approach to the study of a cultural group's shared behaviour, beliefs and languages that develop over time.

Evidence-based practice occurs when practitioners make decisions based on reliable and valid research.

Hypotheses are declarative statements in which the researcher makes a prediction about the outcomes of a relationship.

Quantitative data focuses on numbers and is collected mainly through methods such as surveys, experiments and questionnaires.

Qualitative data focuses on words, pictures and/or sounds and is collected mainly through interviews and observations.

Literature reviews describe key theories and research in a selected field.

Matrices are two-dimensional arrangements of rows and columns used to summarise information.

Paradigms are ways of looking at the world drawing on theoretical knowledge, values and beliefs.

Primary sources are first-hand, original materials from the time of study.

Randomised control trials (RCTs) are fair tests in which two groups are split at random; one is a control group receiving no intervention or the standard practice, the other receives the intervention. The performance of the two groups is then compared and measured.

Reliability describes the consistency and dependability of methods, data and/or questions so that if repeated the same results would follow on different occasions.

Secondary sources are interpretations of primary sources and are generally written after the time with the benefit of hindsight.

Standardised tests are administered and scored in a consistent, predetermined manner, for example in terms of questions and format.

Systematic reviews map out the available evidence, critically appraising it and synthesising the results.

Tertiary sources are often a combination of primary and secondary sources.

Typologies are classification systems according to types.

Validity describes the accuracy of data.

Value-added data describes the measured contribution schools make to learners' progress, given their starting points and circumstances.

Variables are characteristics or attributes that can be measured or observed and that vary among individuals or organisations studied.

Appendix: Coding data

Computer software can automatically collate and code data arising from online surveys and questionnaires. In Figure 14, we can see that the responses of Learner A stand out from other learners. This raises questions as to whether there are specific issues or a more general sense of discontent felt by this learner. Biographical information about each learner (e.g. gender, ethnicity, age) should be considered in the analysis to see whether there are any particular correlations; for instance, are the views of females generally the same as males?

Coding can be applied when using qualitative sources, such as discourse analysis where language is deconstructed to see how it is used and understood. Again computer software is available which enables researchers to organise and analyse content from interviews, focus group discussions, surveys, audio (speech/sound analysis), social media, videos and web pages.

Figure 14: An example of a coding system for data analysis				
Learner questionnaires				
	Q1	**Q2**	**Q3**	**Q4**
Learner A	4	4	5	5
Learner B	1	2	1	1
Learner C	1	1	1	2
Learner D	1	2	1	1

1 – Strongly agree.

2 – Agree.

3 – Neither agree nor disagree.

4 – Disagree.

5 – Strongly disagree.