Investigation into How Best to Disseminate Research Evidence to Teachers

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Thesis submitted in partial fulfilment of the qualification of
Doctor of Philosophy in Education

School of Education
Durham University
January 2023

Abstract

Recent decades have witnessed world-wide recognition of the value of using research evidence in education contexts. However, despite extensive efforts and progress made to date, teachers' use of research evidence in practice remains limited in the majority of countries, including the UK. Consequently, there has been a surge of interest in how best to promote teachers' use of research evidence in schools. In particular, the issue of how to effectively disseminate research evidence to educators to facilitate the utilisation of research evidence has received considerable attention in recent years. Although the literature is replete with suggestions on various routes of dissemination, insufficient attention has been directed towards causal evidence concerning how to best disseminate research evidence to teachers.

Therefore, this study set out to investigate how to resolve this challenge by evaluating a promising dissemination approach to getting evidence into use in schools. The study first considered existing evidence on the most effective ways of disseminating research evidence to teachers. To achieve this, a large-scale systematic review was conducted. The review initially identified 68,817 records, 24 of which were eventually included in the analysis. However, only a few studies in the review generated high-quality evidence. Descriptive and narrative analyses were performed to present the findings. The results from the review support the rationale of the current study, and demonstrate a lack of robust research evidence on the various approaches for disseminating research evidence to teachers. The review findings indicated that passive dissemination approaches, such as simply making research summaries and evidence-based resources available to teachers, were not an effective means to get evidence into use and improve student attainment. Compared to other approaches in the review, embedding evidence in the curriculum, technology-supported routes and active multi-component approaches were found to be more promising.

For the impact evaluation component of the study, workshop training with supporting evidence-based resources, classified as an active multi-component dissemination approach in the review, was chosen as an intervention to disseminate research evidence to teachers. A randomised controlled trial (RCT) was conducted to investigate the impact of this intervention on teachers' attitudes towards research evidence, and their use of research evidence in practice. The researcher recruited nine primary schools located in England, to be randomly allocated for the treatment (n=4) and a control group (n=5). A total of 46 teachers (treatment 25, control 21) from these schools participated in the evaluation at the outset. Data

was collected via a pre- and post-survey consisting of 15 questions regarding attitudes and 18 questions regarding research use. The survey also involved additional questions about the teachers' demographic characteristics to ascertain whether the results differed by subgroup. All teachers (n=46) completed a pre-survey at the outset. The evaluation was then unexpectedly subject to considerable dropout between the pre-survey and post-survey phases due to the onset of the Covid-19 pandemic and resulting lockdowns. Of the original 46 teachers, 25 completed both the pre- and post-surveys. Therefore, readers should interpret the trial results with caution, particularly in relation to the subgroups. The data from the pre-post survey was analysed item by item. The study presented gain scores for each item, based on changes in the pre- to post-survey mean scores. The differences in the changes between the treatment and control groups are shown as effect sizes.

The study also examined teachers' attitudes towards research evidence, and their (self-reported) use of research evidence in practice prior to the intervention. Analysis of the pre-survey results was undertaken for all 46 teachers. The results from the pre-survey demonstrated that although teachers' general attitudes towards research evidence may be considered positive, their (self-reported) use of research evidence was comparatively limited. The results provided by the subgroups indicated that headteachers/principals were more likely than classroom teachers to report using research evidence in schools in all areas.

The results of the impact evaluation were not encouraging in terms of teachers' attitudes towards research evidence. After the treatment, teachers made positive improvements in their (self-reported) use of research in some respects. From an overall perspective, however, there was no convincing evidence of any beneficial impact on teachers (self-reported) use of research evidence following the intervention. The training undertaken by the intervention groups emphasised the importance of judging the quality of research evidence, which may have led the teachers to be increasingly sceptical of all research evidence, rather than encouraging discrimination between robust and weak evidence. The training might be better on how to use robust research evidence rather than how to identify it. The intervention approach should ideally be evaluated by further studies involving a large-scale RCT, with lower dropout.

The results of the impact evaluation among the small subgroups were found to be mixed. However, the results by experience and age were stronger, compared to the other subgroups. The intervention improved less experienced teachers' attitudes towards research evidence in some respects. In terms of research use, the intervention had a bigger harmful, or less beneficial impact on older teachers than younger teachers in most respects. This shows that the effectiveness of a dissemination approach may differ according to teachers' demographic characteristics. Given this finding, and the pre-survey results indicating that teachers' use of research evidence in practice may differ according to subgroups, researchers and educators should account for teachers' demographic characteristics more than happens currently, while addressing issues in evidence-based practice.

Overall, there is a need for further research on how best to disseminate research evidence to teachers. Further studies may benefit from the findings of the current study, particularly the systematic review. They should test the effectiveness of the following dissemination approaches: embedding evidence in curriculum, technology-supported routes, and active multi-component approaches.

In conclusion, this thesis demonstrates that educators should be aware that getting research evidence into use is not a straightforward process. Research providers and funders should focus on more comprehensive and advanced dissemination approaches, such as embedding evidence into curriculum and technology-supported routes. Educators may also address whether we can reasonably ask teachers to judge the quality of the research evidence provided. Teachers may instead be given evidence whose quality has already been judged, perhaps by research centres or intermediates, and found to be robust, and then implement these.

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Declaration

I declare that this thesis is my own work and has not previously been submitted elsewhere for any other qualification or degree. The initial findings of the systematic review have been published in Imagining Better Education: Conference Proceedings (peer-reviewed) (Erkan, 2021). And the impact evaluation including the systematic review appeared in Erkan (2022). This thesis presents the final and most comprehensive analysis of the systematic review and impact evaluation.

List of abbreviations

Abbreviation	*Explanation*
CPD	Continuing Professional Development
EEF	Education Endowment Foundation
ES	Effect Size
EBPP	Evidence-Based Policy and Practice
EBP	Evidence-Based Practice
EIPP	Evidence-Informed Policy and Practice
EIP	Evidence-Informed Practice
EPPI-Centre	Evidence for Policy and Practice Information Centre
PD	Professional Development
RCT	Randomised Controlled Trial
SD	Standard Deviation
WWC	What Works Clearinghouse

Acknowledgments

First, I would like to acknowledge that this research project would not have been possible without funding from the Ministry of National Education, Republic of Türkiye. I will forever be grateful for this support.

I would like to express my deepest gratitude to Prof. Stephen Gorard and Assoc. Prof. Nadia Siddiqui for their academic supervision. I must extend my sincere appreciation for their continued support and patience. They always made the time to help me, and this was so valuable throughout my doctoral study, especially during the Covid-19 pandemic. In particular, the impact evaluation in this thesis would not have been possible without their help and assistance. Their friendly guidance and excellent feedback were central to my ability to improve and complete my work. I am grateful, and feel privileged beyond words that they were my supervisors.

I would also like to give special thanks to Prof. Steve Higgins for his valuable suggestions on my study. His expert advice contributed to the development of my study.

Last but not least, I would like to thank my parents, Meryem and Nesat, my brother, Alper, and my sister, Seyma for their endless support and care. I would not have been able to afford to undertake this endeavour without their continued encouragement.

SECTION 1

INTRODUCTION AND LITERATURE REVIEW

This section comprises four chapters. Chapter 1 offers a brief introduction to the study. It presents the rationale, research questions, design and methods. Chapter 2 provides detailed background information regarding the evidence-based policy and practice (EBPP) movement. Chapter 3 addresses issues in EBPP and offers possible solutions to improve the use of research evidence in practice. Chapter 4 focuses on how best to disseminate research evidence to teachers.

CHAPTER 1
Introduction

1.1 Rationale for the study

In recent years, the value of introducing research evidence into policy and practice across multiple fields, including education, has attracted attention from researchers and policy makers (Hammersley-Fletcher et al., 2015; Hoylman, 2017; Siddiqui, 2020; Wollscheid et al., 2019), particularly in the UK and USA (Pellegrini & Vivanet, 2021). There have been efforts to improve the use of research evidence in decision making. This has led to the establishment of new research centres and foundations to generate and summarise research evidence, including the Evidence for Policy and Practice Information Centre (EPPI-Centre), and the Education Endowment Foundation (EEF), in the UK, and Institute of Education Science (IES), and the What Works Clearinghouse (WWC), in the USA.

In the literature pertaining to educational practice, there has been strong consensus on the value of informing practice with evidence to improve teaching quality in schools (see Bennet, n.d.; Brown et al., 2018; Scott & McNeish, 2013; Slavin, 2002). Increasing emphasis has been placed on the use of evidence in education since the Thatcher era in the UK (Wiltshier, 2007). Successive governments have ostensibly encouraged and supported the use of evidence in schools to improve teaching quality (See, 2020). The governments aimed specifically to support disadvantaged students to improve their attainment levels (Siddiqui, 2020). As a result of numerous efforts and initiatives to promote the use of research evidence in education (See et al., 2016), there has been some progress in employing high-quality evaluations and generating robust and secure research evidence (Gorard et al., 2020a). However, thus far, the empirical evidence in the literature demonstrates that educators' use of research evidence in schools remains limited (see Judkins et al., 2014; Mahoney, 2013; Nelson et al., 2017; Procter, 2013; Walker et al., 2019; Williams & Coles, 2007). It has been suggested that teachers are inclined to apply their own personal opinions and experiences when adopting teaching approaches and strategies (Ogunleye, 2014). Such decision making has the potential to damage education in some respects.

Even though the best way to facilitate the use of evidence in practice remains unclear (Dagenais et al., 2012; Wentworth et al., 2017), many researchers have addressed a variety of issues and barriers preventing the use of research evidence in practice. Some of these barriers have been associated with lack of timely readily available research evidence (Fraser et al., 2018), the relevance of evidence (Avey & Desch, 2014; Eurydice, 2017), the quality of evidence (Dixon et al., 2020), and users' skills and knowledge (Jackson et al., 2018). One issue currently debated is how best to disseminate research evidence to users to facilitate utilisation of research evidence in practice. It is now widely accepted that research evidence needs to be disseminated to teachers effectively to ensure its use (see Campbell & Levin, 2012; Cooper et al., 2009; Goldacre, 2013; Higgins, 2020; Langer et al., 2016; Lord et al., 2017b; See et al., 2016). In this respect, there have been a wide range of suggestions regarding how best to disseminate research evidence to practitioners. However, as Gorard et al. (2020a) noted that these suggestions are, ironically, not themselves based on robust research evidence. The authors suggested that little attention has been directed towards generating equivalently robust evidence concerning the effectiveness of dissemination approaches, compared to others issues in the EBPP movement.

Given that teachers' use of research evidence may play a crucial role in improving teaching (see CUREE, n.d.), and that their use of research evidence remains limited in practice, how best to disseminate research evidence to teachers should be addressed. The current thesis offers a new contribution to the literature, investigating how best to disseminate research evidence to teachers.

1.2 The purpose of the study

The objective of the current thesis is to identify securely, and robustly evaluate a promising approach to disseminating research evidence to teachers. The study begins by systematically reviewing the literature to reveal existing evidence regarding the most effective routes for disseminating research evidence to teachers, and then evaluates one of the promising dissemination approaches according to the review findings. Based on the review findings, workshop training with supporting evidence-based resources was chosen as an intervention. The outcome measures adopted in the evaluation included teachers' attitudes towards research evidence and their utilisation of it in practice. Both intervention and outcome measures were chosen considering the findings of the review and additional factors, such as time and budget. The study also aimed to investigate teachers' attitudes towards use of research evidence, and their use of research evidence prior to the intervention.

1.3 Research Questions

The research questions are as follows:

RQ1: What is the existing evidence on the most effective ways of disseminating research evidence to teachers?
RQ2: What are teachers' attitudes towards the use of research evidence in schools?
RQ3: To what extent do teachers use research evidence in practice?
RQ4: Do teachers' attitudes towards the use of research evidence differ according to their demographic characteristics (gender, age, job, experience and degree)?
RQ5: Does teachers' use of research evidence differ according to their demographic characteristics (gender, age, job, experience and degree)?
RQ6: What is the impact of disseminating research evidence through workshop training with supporting evidence-based resources on teachers' attitudes towards the use of research evidence?
RQ7: What is the impact of disseminating research evidence through workshop training with supporting evidence-based resources on teachers' use of research evidence in schools?
RQ8: Does the impact of disseminating research evidence through workshop training with supporting evidence-based resources on teachers' attitudes towards the use of research evidence differ according to their demographic characteristics (gender, age, job, experience and degree)?
RQ9: Does the impact of disseminating research evidence through workshop training with supporting evidence-based resources on teachers' use of research evidence differ according to their demographic characteristics (gender, age, job, experience and degree)?

1.4 Overview of the study design and methods

Table 1.1 presents an overview of the research designs and methods employed to answer each of the research questions. The study first attempted to reveal existing evidence concerning the most effective ways of disseminating research evidence to teachers via a systematic review. The purpose of the subsequent primary research was to evaluate a promising dissemination approach using a randomised controlled trial (RCT). A pre-survey for the impact evaluation was used to investigate teachers' attitudes towards research evidence and their (self-reported) use of it before the intervention. The research design and methods used for the data collection and analysis are explained in detail in Chapter 5 for the systematic review, and in Chapter 6 for the impact evaluation and research questions related to the pre-survey for the impact evaluation.

Table 1.1 Overview of research design, methods and data analysis for each of the research questions

Secondary Research - Systematic Review	
Research questions	RQ1: What is the existing evidence on the most effective ways of disseminating research evidence to teachers?
Research design, methods and analysis	A large-scale systematic review was performed covering 68,817 records. 24 studies were included in the analysis. Various resources (e.g., books, tools) were used for the stages of the systematic review: For searching and screening see Gough et al. (2017), Torgerson (2003) and PRISMA (n.d.), and to assess the trustworthiness of the research findings see Gorard et al. (2017). Descriptive and narrative analyses were employed.
Primary Research - Survey	
Research questions	RQ2: What are teachers' attitudes towards the use of research evidence in schools? RQ3: To what extent do teachers use research evidence in practice? RQ4: Do teachers' attitudes towards the use of research evidence differ according to their demographic characteristics (gender, age, job, experience and degree)? RQ5: Does teachers' use of research evidence differ according to their demographic characteristics (gender, age, job, experience and degree)?
Research design, methods and analysis	Data was collected via a survey. A total of 46 teachers completed the pre-survey as part of the evaluation. These results were used to answer the research questions about teachers' attitudes towards research evidence and their use of research evidence. Mean scores and standard deviation (SD) were presented for the each survey question.
Primary Research- A Randomised Controlled Trial (RCT)	
Research questions	RQ6: What is the impact of disseminating research evidence through workshop training with supporting evidence-based resources on teachers' attitudes towards the use of research evidence? RQ7: What is the impact of disseminating research evidence through workshop training with supporting evidence-based resources on teachers'

	use of research evidence in schools? RQ8: Does the impact of disseminating research evidence through workshop training with supporting evidence-based resources on teachers' attitudes towards the use of research evidence differ according to their demographic characteristics (gender, age, job, experience and degree)? RQ9: Does the impact of disseminating research evidence through workshop training with supporting evidence-based resources on teachers' use of research evidence differ according to their demographic characteristics (gender, age, job, experience and degree)?
Research design, methods and analysis	An RCT was conducted. The data was obtained from the pre- and post-survey. 25 teachers completed both the pre- and post-survey. The changes from pre- to post mean scores (gain) and the difference in the changes between treatment and control group (effect size) were presented to answer the primary research questions.

1.6 Outline of the thesis

This thesis consists of four main sections.

Section 1 comprises four chapters (Chapters 1, 2, 3 and 4). Chapter 1 offers a brief introduction to the study. It presents the study rationale and research questions posed. Chapter 2 addresses the EBPP movement, providing detailed background information. It mainly presents information relating to the rise of the movement, the limited use of evidence in policy and practice, the role of educational research and teachers in EBPP. Chapter 3 discusses issues in the EBPP movement and possible solutions to improve the use of research evidence in practice. Chapter 4 focuses on how to best disseminate research evidence to teachers.

Section 2 consists of two chapters (Chapters 5 and 6). Chapter 5 introduces the design and methods used in the systematic review, which includes search strategies, selection and screening, data extraction and quality appraisal. Chapter 6 presents the methods and procedure for the RCT, involving the sampling strategy, intervention, outcome measures, missing data, and ethical issues. This chapter also explains the procedure undertaken for the pre-survey results.

Section 3 is the results section (Chapters 7, 8 and 9). Chapter 7 presents the findings for the systematic review. It involves a descriptive and narrative analysis. Chapter 8 summarises the results of the pre-survey in relation to teachers' attitudes towards research evidence and their use of research evidence in practice. Chapter 9 addresses the results of the impact evaluation (RCT).

Section 4 is the concluding section. It consists of two chapters (Chapters 10 and 11). Chapter 10 summarises and discusses the key findings of the study. Chapter 11 addresses the implications, limitations and conclusions of the study.

CHAPTER 2
Evidence-based policy and practice

This chapter presents background information on the evidence-based policy and practice (EBPP) movement. First, it addresses the rise of the movement worldwide and the limited use of research evidence in policy and practice. It then discusses why education has lagged behind medicine in the adoption of the EBPP movement and explains the role of educational research and teachers in the movement.

2.1 A brief history of evidence-based policy and practice

In many spheres of life, people have to make choices and decisions, some of which are informed by evidence and some by other factors such as experience (Morris, 2009). Decisions that affect other people, such as ones relating to public policy and practice are even more difficult to make. How knowledge that influences decisions in policy making and practice should be taken into account has been the subject of considerable discussion in research spheres. Some of the factors and knowledge influencing decisions were listed by Davies (2004) as follows:

- experience, expertise and judgement
- resources
- values
- habit and tradition
- lobbyists, pressure groups and consultants
- pragmatics and contingencies (pp.4-7).

Many researchers from different fields and countries have expressed their concern about the lack of use of research evidence in decision making. Some have pointed out that, until recently, decisions in policy and practice have been largely driven by opinion and political ideology rather than research evidence (Kania-Lachance et al., 2006; Pirrie, 2001), particularly within the field of education (Torgerson & Torgerson, 2020). Even the health sector, where one may assume that its policies and practices are heavily based on research evidence (Davies et al., 1999), was not overtly evidence-based until at least the1990s (Sackett, 2002; Smith, 1995). In 1995, a British Medical Journal (BMC) editorial pointed out that "ineffective treatments have been widely used, and medicine has been opinion rather than evidence based" (Smith, 1995, p.961).

Opinion-based decision making in policy and practice began to be questioned and criticised for several reasons (Davies et al., 2000). The type and quantity of available information has increased dramatically in recent years, with users having immediate access to information through the internet (Dobrow et al., 2004; Morago, 2006). Burns and Schuller (2007) stated that the increased availability and accessibility of information has enhanced the importance of quality control for all available information. According to Burns and Schuller, the decentralisation of decision making across most OECD countries has also given more authority and responsibility to local authorities in decision making, particularly in education. The authors suggest that the proliferation of unclear information and the increasing number of decision makers at various levels of the education system have given rise to the need to find reliable evidence to inform decisions.

Davies et al. (2000) list a number of other factors that have led to increased criticism of opinion-based decision making and to a growing interest in using reliable evidence in policy and practice. Among these are a rise in the number of well-educated people in society, a growing emphasis on international competitiveness, improvements in research communities, and an increasing emphasis on accountability in decision making. Davies et al. point out that, at the beginning of the 20th Century, there was an assumption that professionals delivering public services, such as doctors and teachers, were accepted experts whose decisions were to be trusted. The authors note that towards the end of the century, a more informed and educated society began to question how their taxes were being spent and whether professionals were carrying out their duties diligently. As a result of increasing public and political scepticism towards the decisions made by decision makers or professionals (Dobrow et al., 2004), there has been increased emphasis on using evidence in decision making. This has led to the notion of evidence-based practice (EBP) (Davies et al., 2000) or, more broadly, evidence-based policy and practice (EBPP) (White, 2020).

The movement that has the aim to promote the use of evidence in practice probably emerged in medicine in the 1990s (Every-Palmer & Howick, 2014; Sackett et al., 1996). Morris (2009) suggests that the use of evidence in policy and practice has provided important gains in some sectors, such as health and transportation, thus motivating other sectors to adopt this movement. In medicine, for example, robust trials of various treatments have improved practice and saved lives. In the transport sector, research evidence has been used to improve road safety. The Netherlands government, for example, significantly decreased child road deaths by adopting evidence-based approaches in this area. Consequently, the movement has gained increased attention in many other fields (Rickinson et al., 2020), such as education (Hammersley, 2013; Cooper et al., 2009) and social work (Ekeland et al., 2019; Morago, 2006).

Using evidence in education, particularly in schools, has been considered an important factor in terms of improving teaching and meeting educational goals (Scott & McNeish, 2013). This has led to a growing interest in promoting the use of evidence in education worldwide (Brown et al., 2016; Cooper et al., 2009; Hammersley et al., 2015; Siddiqui, 2020; Wollscheid et al., 2019). Governments' policies have apparently changed to encourage and support the use of evidence in decision making in education, particularly in the USA and the UK (Pellegrini & Vivanet, 2021).

Though not a new concept in England, the use of evidence in decision making has gained more popularity since the 1990s (Bache, 2019). In the general election of 1997, a Labour government was elected with slogans such as 'what matters is what works', signalling a shift from using political ideology to using evidence in decision making (Davies et al., 2000; Nutley & Webb, 2000). A key moment was probably the publication of the *Modernising Government White Paper* in 1999, which emphasised that decisions in policy making should be based on evidence (Bache, 2019). A subsequent publication, *Professional Policy Making* (Cabinet Office, 1999), addressed the modernising of policy making, answering the question of how modernised policy making could be achieved (Nutley & Webb, 2000). The Cabinet Office (1999) identified the following nine core competencies related to professional policy making:

- Forward looking – takes a long term view, based on statistical trends and informed predictions, of the likely impact of policy
- Outward looking – takes account of factors in the national, European and international situation and communicates policy effectively
- Innovative and creative – questions established ways of dealing with things and encourages new ideas; open to comments and suggestions of others
- Using evidence – uses best available evidence from a wide range of sources and involves key stakeholders at an early stage

- Inclusive – takes account of the impact on the needs of all those directly or indirectly affected by the policy
- Joined up – looks beyond institutional boundaries to the Government's strategic objectives; establishes the ethical and legal base for policy
- Evaluates – builds systematic evaluation of early outcomes into the policy process
- Reviews – keeps established policy under review to ensure it continues to deal with the problems it was designed to tackle, taking account of associated effects elsewhere
- Learns lessons – learns from experience of what works and what doesn't (p.13).

According to the Cabinet Office (1999), using the best available evidence is one of the key competencies of effective policy making. Subsequent governments and stakeholders have attempted to implement the evidence-based model across sectors. There have been initiatives not only in England but also widely in the UK. One example might be Welsh Government's National Strategy for Educational Research and Enquiry (NSERE). According to this policy initiative, "educational policy and practice in Wales should be informed by the best available research evidence and disciplined enquiry undertaken by educational professionals" (Welsh Government, 2021, p.10).

The first initiatives focused on generating robust research evidence on issues in education and other sectors. The Economic and Social Research Council (ESRC) tried to play an active role in funding research that meets the needs of policymakers and practitioners (Nutley & Webb, 2000). Nutley and Webb note, however, since generating research evidence, particularly through single studies, has not been sufficient to ensure evidence-based model in education, further efforts have been made to synthesise robust evidence and get such evidence into practice. Various research centres, among them the 'What Works Centres' have been established in the UK (Bache, 2019) to help generate evidence or summarise existing evidence and then disseminate the research evidence to users (Pellegrini & Vivanet, 2021).

The EBPP movement has been the subject of considerable and critical discussion among researchers (see Biesta, 2010; Morago, 2006; Simons, 2003), practitioners and policymakers, particularly within the field of education. Some of the more frequently asked questions have included:

- Is the practitioners' use of evidence limited in reality?

- What are the consequences of adopting opinion/ideology-based or evidence-based policies and practices?
- Should decisions in practice and policy be based on research evidence?
- How can educational research be used in education?

These questions are also related to the rationale of the EBPP movement, and are addressed later in this chapter.

It is important to note that this study has benefited from the literature on the EBPP movement in health sector. The EBPP movement is seen as more effectively established in medicine (White, 2020) and, thus, most of the literature on using evidence in policy and practice in education is based on knowledge developed in the area of medicine. This is not surprising considering that the main principles of using evidence in medicine are similar to those of education (Siddiqui, 2020). Therefore, it is sensible to build on experience and knowledge from the health sector while addressing evidence-based practice in education (Diery et al., 2020).

The first issue to consider here is whether practitioners' use of research evidence is limited. While addressing this issue, the consequences of opinion-based and evidence-based policies and practices are discussed with some examples.

2.2 The limited use of research evidence in policy and practice

Ineffective practices have widespread implementation in the area of education (Cook et al., 2012) and other sectors such as health, leading to wasted time and resources as a minimum and causing harm in worse cases (Haines et al., 2004). This issue is, therefore, addressed with reference to education and other fields such as medicine where the movement emerged.

In the health sector there has been considerable progress in EBP since the 1990s (Engels et al., 2020) and many lives have been saved/improved using research evidence in practice (Greenhalgh et al., 2014). Recently, however, many researchers around the world have suggested that the use of research evidence by health professionals is still limited (see Harding et al., 2014; Engels et al., 2020; Hilal et al., 2020; Leeman et al., 2013). Proponents of the EBP movement in particular have claimed that the health sector has suffered from the limited use of research evidence (e.g., Sackett, 2002; Chalmers, 2005). They note that treatments based on opinion or experience rather than robust research evidence might lead to a harmful impact in practice even if the intention of the person suggesting the treatment is good. Chalmers (2005) gives as an example of an ineffective technique that was used in practice and recommended by him and other physicians the therapeutic principle of placing babies to sleep on their stomachs. This was an inadequately evaluated theory that was taught at medical school and that caused “tens of thousands of avoidable sudden infant deaths” (Chalmers 2005, p.229).

Practitioners in other fields have adopted similar failed policies and practices that were not based on robust research evidence. Petrosino et al. (2004) give an account of the failed policy that was known as the ‘Scared Straight’ programme in social interventions in the USA. The programme aimed to “deter participants from future offending through first-hand observation of prison life and interaction with adult inmates” (Petrosino et al., 2004, p.7). The main assumption behind the programme was that the unpleasant experience of the intervention would dissuade youths from future criminal activity. However, the meta-analysis carried out by Petrosino et al. indicated that the group that had visited the prisons showed higher crime rates than the comparison group that had not visited the prisons. Promoters of the EBP movement have often referred to such examples and suggested that, even if the intention is good, treatments not based on robust research evidence might not work and may even be harmful in practice.

Another main supportive argument for the EBP movement is considered the beneficial impact of evidence-based practices and policies. Cooper et al. (2009) claim that it has long been known that the replacement of policies and practices based on opinion and ideology with those based on research evidence leads to a beneficial impact in practice. They cite, for example, the beneficial impact of washing hands to avert infection, the importance of drinking clean water, and the ability of children with disability to benefit from public education. Such claims of the beneficial impact of using evidence in policy and practice were supported by empirical evidence years ago. For example, a meta-analysis carried out by Heater et al. (1988) indicated that practices based on evidence in health led to better outcomes compared to traditional approaches. Morago (2006) notes that the avoidance of policies and practices that might have a harmful effect in practice is an ethical obligation. This is one of the main arguments made by the proponents of EBP to support the expansion of the movement.

Many writers in education have argued that practitioners' use of research evidence in schools is still limited (e.g., Cooper & Levin, 2010; Dagenais et al., 2012; Segedin, 2017; Walker et al., 2019). A number of authors have expressed their concern about insufficient evidence use in education (e.g. Cook et al., 2012; Dagenais et al., 2012; Livingstone, 2005; Williams & Coles, 2007). Ogunleye (2014) argues that teachers' use of teaching strategies and practices are rarely based on research evidence. According to Gorard et al. (2020a), teachers' decisions are, in reality, more likely to be based on their experience and data derived from the classroom than on high-quality research evidence. Such claims, of course, still need to be addressed with empirical data. In this respect, some empirical studies examining educators' (particularly teachers') use of research evidence in practice have been identified through the literature review and are summarised here. Most of the studies reviewed also involved data on users' attitudes to research evidence. This is perhaps not surprising considering a study by Nelson and Steele (2007) indicating that practitioners' attitudes to the use of research evidence may play a major role in adopting evidence-based treatments.

Williams and Coles (2007) examined teachers' use of research evidence in practice. The study involved a survey (312 teachers and 78 headteachers from schools in England, Scotland and Wales), interviews (28 teachers) and group exercises (15 teachers). The study found that although teachers had positive attitudes to research evidence, their use of research evidence was limited.

Another study carried out in the U.S. by Mahoney (2013) obtained data through an online survey that was completed by 400 teachers. The study demonstrated that teachers accepted the fact that educational research aims to improve teaching in schools and, thus, they placed high value on research evidence. When it came to the practice of teaching, however, teachers did not often use research evidence in their teaching.

Procter (2013) examined the value-practice gaps regarding the use of research, with a questionnaire that was completed by 156 teachers. The teachers reported many value-practice gaps related to research-based practices, indicating that they were unable to use them. However, although the teachers admitted that they were unable to use research-based strategies and techniques sufficiently in their practice, they had a positive attitude towards such evidence-based practices.

Judkins et al. (2014) carried out 56 interviews with educators in the UK. They found that, while they recognised the potential of evidence-based practices, the teachers' use of research evidence was rather limited.

In contrast to the findings of the studies reported above, in a study by Penuel et al. (2017) involving 733 schools and some district leaders in the USA, it was found that both school and district leaders reported that they often use research evidence and that they mostly perceive it as being valuable. Although the study involved school and district leaders, its results were deemed relevant to this study as they demonstrated the (self-reported) use of research evidence in practice.

Nelson et al. (2017) carried out a study across 256 schools in England that provided some important findings (based on 509 responses). The teachers in this study reported positive attitudes to the use of research evidence and considered themselves to be engaged in evidence. However, it was established that the impact of research evidence on teachers' practice was rather negligible. Moreover, the teachers' knowledge regarding research evidence was considered inadequate. On the other hand, the study found that classroom teachers were less likely than senior and middle leaders to engage in research evidence as were teachers in primary schools when compared to secondary school teachers.

In a more recent study, Walker et al. (2019) adopted a new version of the survey used by Nelson et al. (2017) with a larger sample size. This study involved 1,670 teachers in England and found similar results. Whereas the teachers' attitude to research evidence was positive, their use of research evidence was limited in practice. The study indicates that teachers rely mostly on their experience and own expertise or that of their colleagues to inform their decisions with respect to teaching. However, in contrast with the results of Nelson et al. (2017), this study found that secondary school teachers were less likely than primary school teachers to report that they informed their decisions about teaching strategies and approaches with research evidence. Walker et al. referred to the difference in the sample sizes of the two studies and suggested that the second study (see Walker et al., 2019) provided more reliable findings.

Fraser et al. (2018) conducted interviews with 12 elementary school principals or vice-principals in Canada. Although the participants stated that they found research evidence from reports to be valuable, they were inclined to rely on local educators when they needed to judge educational programmes in terms of their effectiveness.

Taken together, almost all of the studies summarised above demonstrate that teachers and school leaders or, more broadly, educators had a positive attitude to research evidence and placed a high value on evidence to inform their practice (see Fraser et al., 2018; Penuel et al., 2017; Procter, 2013; Walker et al., 2019; Williams & Coles, 2007). In reality, however, they did not much use evidence derived from research (see Judkins et al., 2014; Mahoney 2013; Nelson et al., 2017; Procter, 2013; Walker et al., 2019; Williams & Coles, 2007). Almost all of the empirical studies presented above support the claims made by the researchers that the teachers' use of research evidence is limited in practice. These results show that attitudes to research evidence may be considered to be an issue that should be addressed but indicate that positive attitudes to research evidence do not guarantee the uptake of research evidence.

White (2020) claims that, in spite of the increased efforts in recent years to promote the use of research evidence in education, the education field is still lagging behind medicine in terms of establishing the movement. White also compares medicine and education in terms of the translation of evidence and indicates that education lags behind in EBPP. (This issue is addressed in detail in Chapter 4). In addition, the studies presented above, including the empirical ones, have indicated that there is limited use of research evidence in education. The failure of education in EBPP and its consequences are discussed below.

2.3 The failure of education in evidence-based policy and practice and its consequences

First, it is important to address why education has lagged behind medicine in the establishment of EBPP. It is assumed that both education and social services and sciences have lagged behind medicine in EBPP due to factors which may be sector-specific.

One issue to consider is the methodological assumption about what counts as evidence or best evidence. (This is addressed in detail in the discussion on the quality of evidence in the next chapter). Researchers tend to prioritise knowledge driven by research over other sources of knowledge such as experience (Rycroft-Malone et al., 2004). This hierarchy of superiority has also been applied to research methods, where RCTs are accepted as the 'gold standard' in terms of providing causal evidence compared to other single studies (Gray et al., 2014, p.26). This hierarchy has been questioned by some authors, particularly those operating in social fields such as education (see Biesta, 2010; Rycroft-Malone et al., 2004; Simons, 2003;

Vandenbroeck et al., 2012) and social work (see Gray et al., 2014). These authors query whether the principles of EBP in medicine can be applied to their field. Vandenbroeck et al. (2012) raised pedagogical and methodological concerns about the EBP movement. They consider this paradigm to be undemocratic when it focuses only on what works and on experimental research. Writing in the same vein, Simons (2003) claims that the context, factors, and the nature of educational practice differ from medicine and, thus, the assumptions of the EBP paradigm do not fit in the field of education.

Davies et al. (1999) suggest that medicine is a more appropriate field in which to adopt the EBP model as it often requires rigorous experimental studies such as RCTs. According to Davies et al., there is far less consensus on the appropriate methodology to use in educational research among researchers. This is one of the reasons given why education has lagged behind medicine in terms of adopting experimental studies. The authors claim that this marks a lost opportunity to address educational issues through the identification of the most effective approaches as determined by assessing existing practices in teaching. They have also compared education and health care in terms of their goals to explain the failure of education in EBP. Health care policies and practices are based on relatively explicit goals, such as saving lives and increasing life expectancy, which has made assessing "what works" more straightforward. The goals of education and educational polices are said to be more complex and encompass various competing and questionable objectives the importance of which changes over the years. In addition, there is a wide variety of inputs, such as expediencies, the public view, experiences and ideologies that can influence educational policies and practices (Hillage et al., 1998; Nutley & Webb, 2000; Power, 2007) and the relative weight of such inputs may vary across different fields (Davies et al., 1999).

According to Morris (2009), as we have all undergone some form of education, we all feel that we can make judgements on the education system and this undermines the role of research evidence in education. Morris suggests that making judgements on the basis of personal experience has two main limitations. First, the personal experience we draw upon most likely dates to when we were young, while educational policies and practices would have evolved since then. Second, people have a limited and particular experience of schooling (e.g., a rural vs an urban school) encompassing only some specific circumstances of education. It is unrealistic to use such limited experience as a basis for generalisation.

Another reason why education has lagged behind medicine in this sphere might be that the effects of decisions taken in the education field are likely not visible in the short term. Also, as Fitz-Gibbon (2000) notes: “Usually the failures of education research are not thought to be as life- threatening or expensive as failures in medicine.” (p.84). As aforementioned, the use of research evidence in medicine has been proven to have saved lives (Greenhalgh et al., 2014). The impact is not as visible in education. Also, some may think that failures in education do not compare to failures in medicine and could be tolerated. Yet, as Fitz-Gibbon continues to argue, education is universal and has widespread effects worldwide. Thus, in education, even small failures may cause substantial costs for the world. Moreover, education shapes lives and the long-term consequences of education can be crucial for individuals and society (Fitz-Gibbon, 2000).

The importance of education and why we need to improve the use of evidence in education policy and practice are concerns that are addressed throughout this study. The discussion so far has focused on how education lags behind medicine in the implementation of EBP. It has been highlighted that one of the reasons behind this is that bad education does not directly result in death as could be the case with bad decisions in the medical field. Having said this, however, one cannot overlook the fact that bad decisions in education can have grave repercussions in the long-term. This highlights the importance of using research evidence in education.

As mentioned above, policymakers and practitioners in education have often made decisions without considering existing research evidence (Torgerson & Torgerson, 2020). Or they have neglected reliable research evidence on policies and practices that they have introduced. Some examples of such policies and practices are addressed here.

Kauffman (1996) compared the desired and actual use of research evidence in practice in 1996 in the U.S. (See Figure 2.1). According to Kauffman, whereas “facilitated communication (FC) and the whole language (WL) approach to reading instruction”, which are not based on robust research evidence, were frequently used by educators, “direct observation and analysis of behaviour (DOAB) and direct instruction (Dl)”, which are supported by reliable evidence, were rarely implemented in practice (p.56-58).

More recent practices and policies that were introduced in education without taking account of robust research evidence include using Learning Styles and Brain Gym (Gorard et al., 2020a), making students repeat a year of schooling (this is relatively common in some countries such as the USA (EEF, 2021), school selection of students on the basis of their academic potential (Gorard & Siddiqui, 2018), the use of interactive white-boards (IWBs) in Italy, class size reduction in France (Pellegrini & Vivanet; 2021), and the Pupil Premium in England (Gorard et al., 2021). Some of these practices and policies are explained in detail here to address some questions such as:

- Why have policymakers or practitioners adopted such approaches and policies?
- What were the consequences?
- Do policies and practices not based on research evidence always damage education?

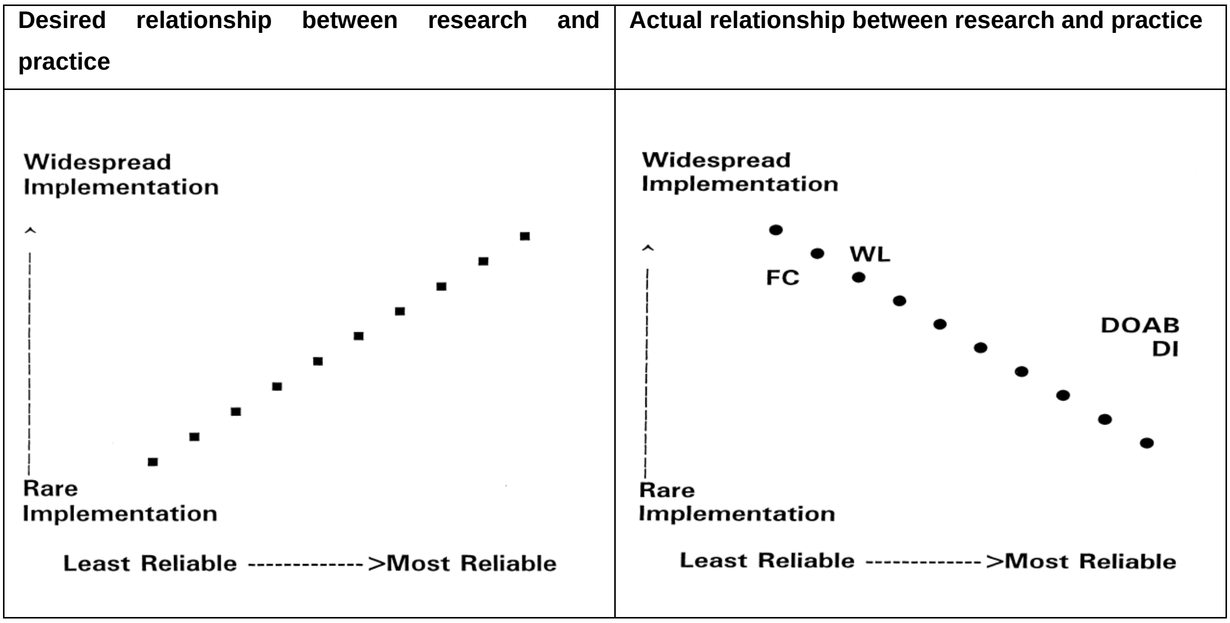

Figure 2.1 Desired and actual relationship between research and practice
Source: (Kauffman, 1996, p.57-58)

In 2000, the UK introduced the concept of Academies - a new type of secondary school. The first schools opened in 2002 with the aim of replacing existing poorly performing schools. These schools were independent of local authority control so that were free to draw up their own plans (e.g., curriculum, staff or school days) to improve school standards. In 2010, the programme was expanded through the Academies Act 2010, to allow more types of schools to register as an Academy, including primary and special schools. This increased the number of Academies. As a consequence, the original aim of the Academies, which was to improve pupil outcomes by replacing disadvantaged schools, was lost. According to Gorard (2014), the move to allow almost all types of school to become an Academy removed the focus on disadvantaged schools. The author notes that although the programme was not originally seen to be contributing to any socio-economic segregation between schools, the prevalence of Academies is now associated with higher social segregation between schools. Furthermore, in his research, he did not find any evidence that the Academies differed in substance from the schools they were in competition with or had replaced. He found that the schools that had more recently been converted into Academies were much more strongly associated with local levels of social segregation. This study suggests that the Academies failed in their aim to reduce social segregation and improve pupil outcomes.

Pellegrini and Vivanet (2021) present a similar critique of two policy decisions in Europe, namely, the introduction of interactive white-boards (IWBs) in Italy and the reduction of class size in France. Italy's Ministry of Education (MIUR) has long emphasised the importance of using technology-based approaches in schools, particularly innovative ones. Therefore, many schools were provided with IWBs and teachers were trained how to use them in class at great cost to the country. Pellegrini and Vivanet point out that, although innovative technologies should perhaps be adopted by schools, as societies are becoming more technology-based, their integration in the classroom should be based on research evidence. A systematic review conducted by Kyriakou and Higgins (2016) involving 16 studies found that neither the pupils' achievements nor the quality of teaching were improved by the use of IWBs in practice even if there have been general assumptions that using IWBs can facilitate learning.

In France, the decision to reduce class size was partially based on evidence. The French Ministry of Education attempted to reduce the class size from 24 to 12 pupils in the first and second grade class in disadvantaged areas. The intention was to bridge the achievement gap between students from a poor background and pupils with wealthier backgrounds. This decision required additional teachers and a great deal of investment to implement. The French Ministry attempted to collate evidence on the effectiveness of class size reduction prior to implementing the policy. Although initial studies achieved some positive results, the positive impact of a reduced class size was not supported by recent studies in the literature. Given that the initiative was rather expensive to implement and that the literature provided weak or inconclusive evidence on its effectiveness to bridge the gap between advantaged and disadvantaged students, it could be argued that it would have been wiser to adopt more effective and less expensive approaches supported by research evidence.

Gorard and Siddiqui (2018) argue that expanding the existing English grammar schools are another failure in education. As aforementioned, decisions in the field of education have tended to be influenced by political ideologies and personal views. The expansion of grammar schools was one of the main education proposals in the Conservative political manifesto of the UK 2017 election. The Conservative Party's proposal was to expand the number of grammar schools, and increase the number of pupils at such schools in England (Gorard et al., 2020b). Gorard and Siddiqui note that this proposal was mainly based on the following three assumptions:

- Pupils generally perform better at grammar schools than they do at non-selective schools.
- The poorest children attending grammar schools do even better so that such schools actually reduce the poverty attainment gap and promote social mobility.
- There is little or no harmful consequence for the other pupils in the rest of the schools (p.911).

However, in line with a more general literature Gorard and Siddiqui (2018) found that grammar schools performed neither better nor worse than other schools in the overall results considering their privileged and selected intake, and their disadvantaged students did not get any significantly higher results than comparable students in other schools. In addition, the study noted that such selection process led to social segregation, which could be dangerous for society. In the study, the authors recommended phasing out existing grammar schools given that the underlying assumptions of such schools were not supported by research evidence and that they damaged education and society. Notwithstanding, the proposal made by the Conservative Party was to increase the number of selective schools not decrease them.

It is not reasonable to argue that all non-evidenced policies and practices lead to negative impact and damage to education. Some such policies and practices may have a beneficial impact, sometimes by chance. One example may be the Pupil Premium funding programme in England. Pupil Premium funding was introduced in 2011 to improve education outcomes for underprivileged pupils in schools. Through this programme, schools received extra funding so that they could provide extra support to disadvantaged pupils who often have to face additional barriers and challenges to reach their potential. Gorard et al. (2021) investigated the impact of the Pupil Premium since it was introduced in 2011 and the results were promising. The study indicated that the funding had helped to decrease socio-economic segregation between schools and bridge the attainment gap. However, the problem in terms of EBPP was the way the funding was introduced. The authors suggest that the funding was introduced nationally overnight without robust trials, or even a pilot, which is a problem from a research perspective. If the funding had not had the desired outcomes, it would have constituted a wasted investment and may even have damaged education in England. The positive results obtained do not justify that this initiative can be put forward as a successful example of evidence-based policy making.

To sum up, the aforementioned reforms and policies (e.g., IWBs, the Academies, grammar schools) were introduced or implemented without using robust research evidence. Education has been damaged by some of these policies; for example, the setting up of the Academies caused a social segregation problem or they led to wasted time and investment with no positive result. The Pupil Premium funding initiative, although successful, was also introduced without robust evidence. Many other policies or approaches can be presented here as examples of failed policies. For example, evidence gathered by the EEF (2021) demonstrates that having students repeat a year comes at a high cost and the impact is negative. Although rare in the UK, students may still be required to repeat a year in some countries, particularly in the USA. Gorard et al. (2020a) suggest that new policies and practices should not be introduced overnight without robust research evidence and that they be evaluated independently in the process of implementation.

So far, this thesis has focused on the limited use of evidence in policy and practice and its possible consequences. However, the question remains whether policies and practices based on research evidence are actually successful in reality. This issue is addressed in the discussion on the role and impact of educational research.

2.4 The purpose, role and impact of educational research

Educational research aims to inform decisions in policy and practice (See et al., 2016). At the national level, research provides evidence to help policymakers understand educational issues and make better decisions (Powers, 2013; Scott & McNeish, 2013). In practice, research identifies what works and what does not work in teaching practice (Lord et al., 2017b; Ogunleye, 2014). Slavin (2002) notes that: “Education is an applied field. Research in education should ultimately have something to do with improving outcomes for children” (p.20). Some writers or educators may only address academic achievement when they refer to student outcomes. But educational research may, or should, deal with a wide variety of issues related to education. Therefore, the outcomes may encompass various goals including cognitive goals (e.g., learning outcomes), attitudinal goals (e.g., being happy or developing a good attitude) or behavioural goals (e.g., related to issues such as drug-taking or missing lessons) (Fitz-Gibbon, 2000). Having said this, since improving student achievement has been at the heart of many education systems across the world, the main focus in EBP has been on students' academic progress. Consequently, it could be argued that the main purpose of EBP in education is to improve the quality of teaching (Siddiqui, 2020; Procter, 2013) and, ultimately, student outcomes (Brown et al., 2018; Campbell & Levin 2012; Cooper et al., 2009; Goldacre, 2013; Hollands et al., 2019; Slavin, 2002).

On the other hand, the effectiveness of evidence use in education is still being debated by many researchers and practitioners, which makes it necessary to address the concept of 'impact'. According to Lingard (2013), impact can be assessed in two different ways: academic impact, often determined by citations, and the impact of research on policy and practice. The impact of research on policy and practice is not linear and this makes it ambiguous and complicated to measure (Cohen et al., 2007; Lingard, 2013; Powers, 2013). Gorard et al. (2020a) caution that some researchers may tend to exaggerate the impact of their work, claiming that their research has had an impact on policy or practice even if there has been little such impact. A series of efforts made by Gorard et al. (2020b) can be considered a good example of how research evidence makes a real impact on policy and practice. Not only have the authors generated research evidence on specific issues, such as the Academies, grammar schools and the Pupil Premium, they have also had a possible impact on policy and practice by discouraging the changing of schools into Academies and the expansion of grammar schools in England. But even here the causal link is not fully established.

Making and measuring impact on education policy and practice is a complex process. Improving student outcomes, which is the ultimate purpose of educational research, usually requires the handling of a whole series of factors that may vary depending on circumstances. As previously discussed, one of the main issues in education is lack of use of research evidence in decision making. If existing robust research evidence is overlooked by policymakers and practitioners, there will, of course, not be a real impact made. Therefore, ensuring that research evidence is used to affect student outcomes is a must. For example, Rose et al. (2017) attempted to improve teaching and student attainment by promoting the use of research evidence by teachers. The study involved an RCT to evaluate the impact of disseminating research evidence on student outcomes through Research Learning Communities (RLC) to teachers. Following the intervention, however, it was found that there was no positive impact on student outcomes. In the case of this study, we cannot simply conclude that the use of research evidence does not have any impact on student attainment as we do not know whether the teachers actually did use the research evidence provided in reality. There may have been a problem with the way the research evidence was disseminated to the teachers or the way the users used evidence-based approaches. Another reason for the finding may be that the duration of the intervention was not sufficient to create a positive impact on student outcomes. Any number of issues may have affected the impact of research evidence on certain student outcomes.

There are studies that have demonstrated that evidence derived from research can have a positive impact on teaching practices and ultimately student outcomes (see Abbott et al., 2002; Clarke et al., 2011; Maheady et al., 2004). Of course, there might be other empirical studies that have indicated a negative or inconclusive impact on student outcomes after using evidence. It may be better to look at more robust evidence, perhaps a systematic review summarising the existing evidence, to see how promising using research evidence is in practice.

CUREE (n.d.) conducted a systematic review to summarise robust research evidence related to the impact of practitioners' use of research evidence on their learners. The review included 25 studies in education, and concluded that engagement with research evidence led to considerable changes in practice, thereby improving student outcomes including various improvements in attitudes, knowledge, and behaviours. Consequently, it can be suggested that the use of research evidence in education has the potential to improve student outcomes, although various factors and circumstances may lead to different results.

As aforementioned, some policies and practices in education have been introduced or implemented without research evidence that indicated that they worked. Such policies have generally yielded no clear improvement at best, and have damaged education at worst. One issue to consider when assessing such approaches is the fact that education has tended to adopt reforms and approaches that had been applied elsewhere. For example, the Department for Education (DfE) in England adopted the south Asian 'mastery' approach and schools were supported in their use of it (DfE, 2016). The DfE had noted that the approach was used by some countries with high levels of performance in math, among them Singapore and Hong Kong. The transfer of a teaching approach is common in education, but such transfers are often not based on robust research evidence, either in the country where they are to be implemented, or in the country where they have been applied. Due to such transfers, policy makers and practitioners generally neglect to test the approaches being used first, often leading to a waste of time and money. Gorard et al. (2020a) state that, even in cases where an approach has been robustly tested under many circumstances and found to be effective in the past, the results in the present might still be negative or inconclusive, as the approach can be found to be promising but cannot be 'proven'. As the authors suggest, this is not, however, an argument for not adopting the strategy that has the best chance of success.

In conclusion, most of the criticism and concerns surrounding EBP in literature have been about how educators perceive the movement. As mentioned before, some authors argue that not all educational issues can be solved through the EBP model, particularly if the model relies only on research evidence from RCTs or quasi-experimental studies (see Biesta, 2010; Rycroft-Malone et al., 2004; Simons, 2003; Vandenbroeck et al., 2012). As noted by Davies (1999), "Evidence-based education, like evidence-based health care, is not a panacea, a quick fix, cookbook practice or the provider of ready-made solutions to the demands of modern education" (p.118). But "the rationale for the use of evidence is obvious" (Cooper et al., 2009, p.160), considering the potential to improve student outcomes using research evidence. Moreover, the benefits of using research evidence are not limited to knowing what works. According to Gorard et al. (2020a), even if there is often no visible direct impact of research evidence on policy and practice, the evidence can highlight what does not work, which is also crucial to avoid implementing ineffective approaches that waste time and money. However, the authors claim that, despite its importance, this aspect of evidence use has been mostly ignored.

In this respect, this thesis perceives EBP as a model that may help improve outcomes in education using policies and practices that are more likely to be effective. Given the considerable benefits of using research evidence and the importance of teaching (Bennet, n.d.), it is crucial that more research evidence should be used in schools to adopt more effective practices and make progress in education (Bennet, n.d.; Slavin, 2002).

2.5 Teachers' role and its boundaries in evidence-based practice

The literature review indicates that the use of research evidence is considered crucial in medicine as it can help save lives (Chalmers, 2005; Greenhalgh et al., 2014). As frontline staff in the health sector, being professional and using research evidence can be considered as being important or necessary for a doctor. Although some people, particularly those who consider education to be less important than medicine and other fields, may underestimate the role of teachers in society, the importance of education for society makes the role of teachers and their use of research evidence rather crucial. The concepts and terminologies of EBP are explained below, followed by a discussion on the role of teachers in EBP.

Although the literature on EBP has increased considerably in the past few decades, there is still a degree of uncertainty surrounding the terminology. There are still terms and phrases being used interchangeably and imprecisely, for example, evidence-based practice or evidence-informed practice and evidence-based education or evidence-informed education. In particular, the terms "informed" and "based" should be addressed. Although there have been debates about the meaning of "evidence-informed" and "evidence-based" policy and practice in the literature (Burns & Schuller, 2007), it is widely accepted that the movement emphasises the use of evidence in decision making, particularly the best available research evidence (Davies, 1999), which differs from opinion-based decision making that relies on opinions, prejudices or ideologies (Davies, 2004; Pellegrini & Vivanet, 2021). Most of the studies identified in the literature review have used the terms "evidence-based" or "evidence-informed" interchangeably. However, "evidence-informed" is relatively new, and some authors (e.g., Miles & Loughlin, 2011; Siddiqui, 2020; WHO, 2021) have highlighted the distinction between these terms, often preferring to use one form over the other.

According to the World Health Organisation (WHO) (2021), evidence-informed practice (EIP) aims to use research evidence to inform decision making but combines evidence with practitioners' experience and other factors; it does not claim that the decision-making process should be based solely on research evidence. On the other hand, Siddiqui (2020) has drawn a specific distinction for education. According to this author, users' knowledge in evidence-based practice does not matter as they apply evidence already embedded in a product, perhaps the curriculum or any other content. However, users of evidence-informed practice make more informed decisions as they do not solely apply evidence to their practice. The distinction between the EBP and EIP models might also be explained addressing the terms 'accurate use of evidence' and 'quality use of evidence', which are often used while explaining how effectively research evidence should be used in practice. From the EBP perspective, researchers or educators may tend to focus on how teachers 'accurately' use research evidence in practice. However, the EIP may be more related to 'quality use of evidence', addressed by Rickinson et al. (2020) and explained in detail in Chapter 3, involving users' enquiry while adopting and using evidence. The proponents of the EIP models or 'quality use of evidence' mostly argue that teachers or educators should critically engage with the evidence.

Siddiqui (2020) suggests that both the EBP and EIP can be applied in schools. Therefore, this study embraces both forms of decision making (and evidence-led). In the literature, however, there is little agreement on the distinction between these two models and many researchers prefer to use only one term in their work. This thesis accepts the distinction between "based" and "informed", but prefers to use evidence-based practice (EBP) as an umbrella model with the aim of promoting the use of research evidence in practice in the literature review. Having said this, this study refers to the two models separately when it is necessary to highlight the distinction. This distinction could be useful in addressing the teachers' role and boundaries when using evidence. Two more issues also need to be considered to understand the teachers' role and boundaries in the EBP and the EIP - how evidence is transferred to users and whether the education system is centralised or decentralised.

According to Gorard et al. (2020a), evidence might be plain, modified or engineered and can be transferred through three ways: passive transfer, engagement in transfer, and (inter) active transfer, which is also addressed in Chapter 4. In this case, the role of the teachers may depend on the type of dissemination and whether the evidence-based or evidence-informed model is adopted.

As noted by Siddiqui (2020), teachers are more passive in the evidence-based model, and they use any content, such as the curriculum in which evidence is embedded. In this model, engineering and embedding evidence in lesson plans might be a good way to get evidence into use. This more passive role for teachers in the EBP model may be used more commonly in countries whose education systems are centralised and where teachers are restricted in terms of decision-making and have to rely heavily on policies and practices that are decided at national levels. If there is a standard and detailed national curriculum involving most of the educational pedagogies and practices that all teachers should or have to apply, the teachers' role and boundaries are limited in terms of using evidence in practice. In such a system, whether educational practice is evidence-based may depend on the decisions made at the national level.

Whether decisions made by teachers are based on evidence or are informed with evidence might be a more important distinction in decentralised systems as teachers have more authority to decide upon their practice. When more authority is given to local authorities to decide their policies and practices, their responsibilities in terms of using evidence, particularly reliable evidence, is increased. This is the case for most OECD countries, including England where there has been a transition to decentralised decision making in education (Burns & Schuller, 2007). In decentralised systems, teachers and school leaders may have more time for both the evidence-informed model and the evidence-based model. EIP may be adopted in England in addition to EBP, thus, allowing teachers to be more active in getting evidence into use. In doing so, they might inform their decisions after an inquiry rather than solely applying content in which evidence embedded. Moreover, they have more freedom to take other factors that might affect their decisions, such as their budget and knowledge, into account. However, this flexibility may lead to decisions that are heavily based on opinions rather than evidence, or decrease the impact of any evidence-based approach due to ineffective use.

Perhaps a more active way for teachers to participate in evidence-based models is for them to generate research evidence by conducting their own research in teaching practice, thus, increasing their role in evidence use (Leuverink & Aarts, 2021; Siddiqui, 2020). This approach increases the role of teachers not only in implementation, but also in generating evidence. However, in comparison with the health sector, where research is often designed and conducted by practitioners, the teachers' engagement in research design and implementation is quite limited in schools (Burns &Schuller, 2007). In their study, Siddiqui et al. (2018) and Siddiqui (2020) addressed the question of whether a teacher can lead research effectively in education. In these studies, the school staff were involved in designing and conducting their own research. The findings were promising. If teachers more often engage in generating evidence through their own research, they may be looked upon as being as professional as the staff in the health sector, and this might increase the use of research evidence in educational practice.

Another issue to consider is how teachers can benefit from research evidence. Perhaps most of the efforts to generate and disseminate research evidence in education have involved teaching approaches and strategies that can be applied in the classroom in order to promote further learning. As the literature suggests, evidence can show what works and what does not work in practice, which can help teachers adopt effective approaches or avoid ineffective interventions, thereby preventing wasting time and money. A good example of the role that evidence plays can be explained through the EEF (2022) Teaching and Learning Toolkit developed to help teachers and school leaders make effective decisions in order to improve learning outcomes (which is also addressed in Chapter 4). Briefly, the Toolkit shows evidence on certain approaches, including the strength of evidence and the cost of using it. For example, according to the Toolkit, there is extensive evidence that feedback is quite low cost and has very high impact in practice. However, repeating a year leads to negative impact for a very high cost, and reducing class size has a low impact for the high cost required based on quite limited evidence. Teachers and school leaders may take account of various factors, such as cost and the strength of evidence, while adopting an approach rather than only looking at the impact. In this respect, practitioners may adopt approaches based on high impact for low cost based on high evidence such as feedback. However, they may find it difficult to distinguish between these various factors.

According to Masters (2018), the role of evidence in educational practice is often defined with a narrow perspective that focuses only on academic outcomes. Of course, improving policy and practice in education is not only about teaching for academic achievement. However, even the improvement of teaching through evidence has often referred to progress in certain subjects, such as maths and reading. This is perhaps not surprising considering that policymakers, parents, practitioners and almost all other actors in education tend to be most interested in academic achievement as a result of various factors such as competition at the local, national and international level. However, it should be noted that teachers might benefit from evidence in a wide range of ways in the classroom. For example, they can use evidence on behaviour problems to minimise challenging and disruptive behaviours in classrooms (see Parsonson, 2012). Evidence to be used could also be about the students' physical and psychological well-being (White, 2020) or be in regard of the size of schools or classrooms (Morris, 2009). All of these end uses can be linked to teaching and learning in some ways. Teachers may also use pedagogic evidence. For example, they might use evidence to know when and how they can introduce a topic effectively or integrate it with previous knowledge

(Morris, 2009). Evidence can also indicate how to best deliver evidence-based approaches in the classroom (see Kretlow et al., 2012).

Prior to a discussion of how to best disseminate research evidence to practitioners (Chapter 4), the current issues of the EBP movement are addressed with some possible solutions to facilitate the use of research evidence in practice.

CHAPTER 3
Issues and possible solutions

Despite its widely accepted value in theory, the literature demonstrates that the use of research evidence in educational practice is limited around the world. Given the value of using research evidence and its limited application in practice, it is important to discuss the barriers to using research evidence. This chapter gives a brief overview of the issues, challenges and some possible solutions relating to EBPP, with a focus on educational practice.

3.1 Issues and barriers in getting evidence into practice

The barriers to using research evidence in practice are generally universal (Campbell & Levin, 2012). Writers often categorise issues in the EBPP into two: "research/provider-related issues" and "user-related issues". The current study similarly addresses issues in the EBPP with the same categories: research/provider-related issues and user-related issues. Such classification was found reasonable in the current study to address issues in the EBPP as this study mainly focuses on how to get 'external research evidence' into use. However, it should be noted that the EBPP can be considered a narrow concept if researchers or educators only address it with two separate dimensions/worlds (researchers/providers and users/teachers), without considering teachers' enquiry and school generated research evidence. For example, teachers or educators in schools can also be research providers by conducting their own research in practice (see Siddiqui et al., 2018; Siddiqui, 2020).

Perhaps, from the EBPP perspective, there has been more focus on initiatives to get external research evidence into use. Many researchers, particularly proponents of the EBPP, attempted to generate and disseminate research evidence on what works in teaching. These researchers and educators even focused on certain forms of inquiry and evidence such as research evidence based on systematic reviews and RCTs (Thomas, 2016). A model only addressing the issue of what works in teaching, focusing on (allegedly) high-quality evidence generated by researchers through systematic reviews or RCTs and getting such evidence into use might be a limited aspect of the EBPP movement. Indeed, such EBPP model has been the subject of critical discussion among some educators and researchers (see Biesta, 2010; Cartwright, 2007; Morago, 2006; Simons, 2003; Thomas, 2016; Vandenbroeck et al., 2012). In particular, there has been considerable discussion on what counts as evidence and high-quality evidence, which is addressed in detail in the following pages.

As mentioned above, the current study mainly focuses on getting external research evidence into use and addresses issues in the EBPP with the following two categories: "research/provider-related issues" and "user-related issues". Some writers may classify these issues differently or address them without categorising, as most issues are interconnected. For example, the accessibility and comprehensibility of research evidence may be considered to be a supply side problem, but it may also be associated with issues about users' workload and skills.

The providers in the current study are the people who generate research evidence, mostly researchers at universities and research centres. The users are the policymakers and practitioners (and the public), specifically teachers for this study. Access to research evidence is often categorised as a provider issue but, as this study focuses on how to best disseminate research evidence, which is closely related to the issue of access, it is discussed separately. Moreover, the question of how to disseminate research evidence to teachers might be considered an umbrella issue as it is often associated with most of the problems that arise in getting evidence into practice.

3.1.1 Research/provider-related issues

The issues addressed here are availability, quality, relevancy, timelines and accessibility of evidence. Generating high-quality evidence is considered to be the responsibility of the providers but what counts as evidence or best evidence and how to identify best evidence has been a matter of ongoing discussion among researchers across different fields (Sohn, 2017), particularly those who criticise the EBP movement in education. Having said this, there is now a relative consensus on how to judge to quality of evidence from the EBP perspective.

EBP in education is defined by Procter (2013) as "the idea that within the field of education the practice of teachers should be based on evidence from research" (p.31). This definition includes the term "evidence" with its source being "research". Some writers use the term research instead of evidence when they are referring to research evidence. Many writers neither use the term research nor explain the source of evidence when they refer to the term evidence, which may lead to uncertainty for readers. Pawson et al. (2003) refer to five types of knowledge in social care that, according to Scott and McNeish (2013), can also be applied to education, namely:

- Organisational knowledge
- Practitioner knowledge
- User knowledge
- Research knowledge
- Policy community knowledge (Pawson et al., 2003, p.VIII).

According to Sohn (2017), whereas researchers often refer to evidence derived from research, practitioners and policymakers tend to adopt "a wide spectrum of evidence" that might include other types of knowledge (p.17). To avoid confusion, it is necessary to note here that this study focusses on evidence derived from research.

Another distinction should be made between "data" and "research evidence". There is a wide range of data and data use in education (Neal et al., 2019) and there is an ongoing debate on what data should be collected and used to improve education (see Hess, 2022). Educational data consists mainly of system inputs (e.g., expenditure), outputs (e.g., attendance) and outcomes (e.g., employability) (Ward, 2022). Specifically, teachers may use data obtained from classroom observation or assessments to determine their students' learning needs and organise their teaching to take such needs into consideration (Schildkamp et al., 2017). School level data related to the monitoring and assessments of students could be used to improve student outcomes. In the literature, evidence often refers to evidence from research perhaps due to the fact that studies rely mostly on knowledge created by academics (Scott & McNeish, 2013). Although there are some similarities between data and research evidence, research evidence mostly refers to knowledge created through scientific methods used to collect and analyse data to answer a pre- determined question (Neal et al., 2019).

According to Davies (1999), "evidence-based education means integrating individual teaching and learning expertise with the best available external evidence from systematic research" (p.117), indicating that the quality of the research evidence used in policy and practice matters in evidence-based education. In the EBP model, hence, it is widely accepted that users should adopt best evidence (Cooper et al., 2009; Davies, 1999; Hollands et al., 2019; Sacket et al., 1996; Slavin, 2002) or, as it is often called, high-quality evidence or robust evidence (e.g., Cooper et al., 2009; Engels et al., 2020). Notwithstanding the debate on what counts as high-quality evidence (e.g., Gray et al., 2014; Freeman et al., 2007; Spencer et al., 2003; Nutley et al., 2013; Vandenbroeck et al., 2012), evidence-based models tend to use evidence hierarchies to judge the quality of evidence. An example of such a hierarchy is presented in Figure 3.1 below that is used by the Centre for Evidence Based Intervention (CEBI) at the University of Oxford (CEBI, n.d.).

Figure 3.1 Quality of evidence
Source: (CEBI, n.d., p.1)

Different hierarchies generally agree that systematic reviews (meta-analysis and systematic review) followed by RCTs generate more high-quality evidence than other research methods (see Bagshaw & Bellomo, 2003; Evans, 2003; Petticrew & Roberts, 2003). Some writers do not distinguish between systematic review and meta-analysis. According to Gorard et al. (2020a), “A meta-analysis is a particular kind of systematic review that combines the ‘effect’ sizes of all of the studies in the review to provide an aggregate ‘effect’ size, or an overall single answer to an effectiveness question.” (p.585). From the EBPP perspective, not only the RCTs, but also some single studies involving different research designs may provide high-quality evidence depending on various factors/issues such as research questions. For example, some quasi-experimental designs might be used for specialised interventions or where a control group may be challenging to identify. Effectiveness and implementation studies based on earlier efficacy studies might also provide robust evidence. Figure 3.2 shows a similar, but slightly more detailed, ranking of methods that is used in health care (Evans, 2003, p.79).

	Effectiveness	Appropriateness	Feasibility
Excellent	• Systematic review • Multi-centre studies	• Systematic review • Multi-centre studies	• Systematic review • Multi-centre studies
Good	• RCT • Observational studies	• RCT • Observational studies • Interpretive studies	• RCT • Observational studies • Interpretive studies
Fair	• Uncontrolled trials with dramatic results • Before and after studies • Non-randomized controlled trials	• Descriptive studies • Focus groups	• Descriptive studies • Action research • Before and after studies • Focus groups
Poor	• Descriptive studies • Case studies • Expert opinion • Studies of poor methodological quality	• Expert opinion • Case studies • Studies of poor methodological quality	• Expert opinion • Case studies • Studies of poor methodological quality

Figure 3.2 Hierarchy of evidence: ranking of research evidence evaluating health care interventions
Source: (Evans, 2003, p.79)

As shown in the figure above, the RCT, as a single study, ranks highly as evidence but is less secure than the systematic review. Although the RCT is regarded by some as the 'gold standard' for evaluations (Torgerson & Torgerson, 2020), "It would be unusual for a single study to provide a useful or definitive answer to a real-life question by itself. It is more appropriate to look at all of the relevant evidence on any issue" (Gorard et al., 2020a, p.585). As Gorard et al. state, direct replication is rare in educational studies. Even if there is a robust single study, its results are not conclusive in education and, thus, evidence summaries such as systematic reviews and meta-analysis are considered important as they are able to provide more conclusive evidence (Higgins, 2020). Therefore, it is widely accepted that systematic review studies (meta-analysis and systematic reviews) can be effective in overcoming some of the limitations and issues of single studies (see Gough et al., 2012; Hammersley, 2013; Leigh, 2009; Uman, 2011; Townsend & Kunimoto, 2009).

Most of the assumptions about the quality of evidence have been developed in the fields of medicine and health care, but the hierarchy has been applied in many other fields, including education. Proponents of EBP, in particular, are inclined to support such quality rankings. As mentioned before, the alleged superiority of some methods, such as RCTs, has been questioned and criticised by some researchers (see Gray et al., 2014, Biesta, 2010; Cartwright

2007; Rycroft-Malone et al., 2004; Scriven, 2008; Simons, 2003; Thomas, 2016; Vandenbroeck et al., 2012).

According to Thomas (2016), many researchers and educators, unfortunately, have embraced the idea that educational research needs ‘certain special forms of evidence and inquiry’ in order to be useful, which introduced a widely used term: ‘gold standard of evidence’ (p.391). The author advocates ‘heterogeneity’ in educational research and notes that educators and researchers “need multiple forms of inquiry—descriptive, correlative, interpretative, experimental—using varied forms of design and analysis to address the multifactorial and many-directional issues involved in causing things to happen the way they do in the messy worlds they study” (p. 395). Cartwright (2007) and Scriven (2008) argue that RCTs or experiments may play an important role to address some educational issues, but these designs, indeed any design, should not be seen as gold standard. Thomas (2021) claims that worrying too much about control and allocation bias has undermined diversity in educational inquiry and research designs/methods, and thus ‘heterogeneity’ needs to return to education inquiry and research designs.

Indeed, even some promoters of the EBP model suggest that there are various things that have to be considered to gauge evidence as being robust or high-quality for education or other fields rather than relying only on RCTs. Even, for example, systematic reviews can be poorly conducted, leading to weak evidence or even wrong conclusions (Gorard et al., 2020a). Also, Gorard (2020) suggests that the findings and quality of studies included in the review may differ and, thus, it is important to focus on the more robust and trustworthy studies in such reviews.

Another issue is how to judge the quality of evidence generated by a single study. Gorard et al. (2017) note that the process of assessing the quality and trustworthiness of any research is not straightforward and that judging research requires taking a wide range of issues into consideration rather than merely relying on the types of methods used. The authors developed a “sieve” approach, which is addressed in more detail in the methodology chapter, to judge the quality and trustworthiness of any research. The approach takes account of research design, scale, missing data, data quality and other threats to assess the quality of evidence.

In conclusion, although there has been a tendency to rely on systematic reviews and RCTs to provide robust evidence in EBP, not all RCTs and reviews should be accepted as being high-quality evidence providers without considering various factors that may affect the quality of the evidence.

Following the debate on what counts as evidence and best evidence in EBP, one of the most important issues has probably been the generation of evidence related to educational issues. Two main points may be considered at this stage: the availability and the quality of research evidence. In order to have more effective strategies in practice, there should be available high-quality research evidence (Dixon et al., 2020; Nutley et al., 2002). According to Fraser et al. (2018), in an ideal situation, when educators need to adopt an educational programme, they should find robust research evidence that is relevant to their needs. They remark that, in reality, there is often no such timely and readily available research evidence. Therefore, lack of available robust research evidence is an important issue arising in the first stages of getting high-quality evidence into practice (Gorard et al., 2020a).

Torgerson and Torgerson (2020) point out that, although there has been a slight transition from relying on opinion-led to evidence-led decision making, the research evidence that tends to be widely used is quite weak. In other words, ideology-based decision making has been replaced by weak-evidence based decision making. This issue is crucial as when weak evidence is widely adopted, which has often been the case in the UK, the quality of education may be damaged (Gorard et al., 2020a). The literature review in this thesis supports this claim, indicating that lack of robust evidence in educational decision making has led to defective or harmful policies and practices (e.g., Pellegrini & Vivane, 2021).

Relevant robust research evidence should be available on time so that teachers can inform their practices effectively. As relevant as research is to real life practice, its usefulness is diminished if it is not timely (Avey & Desch, 2014; Eurydice, 2017; Slavin, 2002) and, thus, does not meet the needs of users. The failure in meeting the needs of policy and practice is often referred to as a "gap" between research and policy/practice. It is generally accepted that there is a gap between educational research and practice as the former has been weak in terms of addressing educational issues effectively (Broekkamp & van Hout-Wolters, 2007; Ferguson, 2005; Hillage et al., 1998; Hirschkorn & Geelan, 2008; Klingner & Boardman, 2011; Schuller et al., 2006; Vanderlinde & Braak, 2010).

Although education is considered to be an applied field (Slavin, 2002), researchers might not have sufficient incentive to conduct applied research in this field (Campbell & Levin, 2012).

A possible explanation for this may be that researchers and users have different interests within the field of education (Higgins, 2020). According to Higgins, while researchers tend to address the issues more broadly, focusing on effectiveness and developing models or theories which can be used in different contexts, practitioners are more interested in how they can help their learners to meet their needs. Procter (2013) points out that research first needs to be relevant and address educational issues that are experienced in practice. At this point, some may raise a question as to whether educational research should be limited to the needs of practitioners. If educational researchers focused merely on the needs of practitioners and ignored other aspects of education, such as developing models or theories, they may undermine the benefits of educational research. From the EBP perspective, perhaps educational research should first meet the needs of its users and then address other issues of education.

In 1999, Davies (1999) stated that research evidence relating to educational problems was insufficiently robust because of the lack of controlled trials and quasi-experiments in the field. Gorard et al. (2020a) note that in the past few decades there has been a considerable progress in carrying out high-quality evaluations and producing secure research evidence that could be used to inform decisions about teaching. However, there have also been a wide range of not so high-quality studies (See, 2020), highlighting the importance of skills to judge the quality of research evidence and distinguish between better and weaker.

The literature shows that, although weak research evidence has been used in educational practice, considerable progress has been made in terms of generating robust research evidence. Procter (2013) suggests that there is no guarantee that teachers will use research evidence even if it is robust unless some effort is put into making it accessible to them. How to make research findings more accessible and disseminate evidence to users is discussed following the issues related to users.

3.1.2 User-related issues

Langer et al. (2016) claim that, even if there is available research evidence, users do not often utilise it in practice. This indicates that there may be issues in EBP that are related to users (Vanderlinde & Braak, 2010). Some researchers refer to these issues as “demand” side issues, but the term is often limited to the users’ attitudes to research evidence. In this study, the issues experienced by the users are addressed more broadly, embracing problems about users’ attitudes, capacity (skills, knowledge etc.), workload and time. However, it should be noted that the issues and challenges that practitioners face when they attempt to find and use research evidence are complicated (Dixon et al., 2020) and may involve a number of factors.

Users' attitudes to research evidence and their willingness to benefit from such evidence in practice may play a crucial role in EBP (Ellen et al., 2018). A study by Nelson and Steele (2007) found that attitudes to use of research evidence are likely to influence practitioners' use of evidence-based strategies in their practice. Therefore, some researchers within the field of education have attempted to affect teachers' attitudes to research evidence positively (see Ely et al., 2018; Griggs et al., 2016; Ogunleye, 2014; Purper, 2015; Speight et al., 2016). The main assumption behind these efforts was that teachers who have more positive attitudes to research evidence may be more likely to make effort to use research evidence in their teaching (or vice versa). Some studies tried to improve attitudes, addressing factors such as well-being, to try and implement evidence. For example, Cook et al. (2017) attempted to improve teachers' well-being, on the basis of the literature finding that issues relating to teachers' well-being, such as stress, can undermine their intentions and willingness to use research evidence in their teaching practice. The study evaluated a programme that focused on improving teachers' well-being through an RCT and found that the intervention promoted teachers' well-being and increased their intention to use research-based classroom practices. Brown et al. (2016) suggested that various other factors, such as school climate, could have an influence on teachers' uptake of research evidence. Procter (2013) showed that teachers placed a high value on research evidence if they had had previous research engagement in their post-graduate studies. Therefore, it can be argued that the degree of research engagement by users in various education stages may influence their attitude to the use of research evidence. However, this conclusion needs to be supported by more and better empirical evidence.

It is important to note that users do not necessarily have to have a positive attitude to research evidence in order to implement it. This study does not argue that research evidence will not be used in practice unless teachers have a positive attitude to research evidence. How important teachers' attitudes to research evidence in getting evidence into use may depend on how to disseminate research evidence. For example, teachers may need to access journals and find reliable evidence themselves, which may increase the importance of "attitudes" to research evidence as this requires considerable time and effort for them. On the other hand, if we ask teachers to use an evidence-based lesson plan required by law, their attitudes may not matter much.

Another consideration should be that a positive attitude to research evidence does not ensure that teachers will use research evidence in practice. Most of the studies summarised in the literature review demonstrated that although educators had a positive attitude to the use of research evidence, their (self-reported) use of research evidence was limited in practice (see Judkins et al., 2014; Mahoney, 2013; Nelson et al., 2017; Walker et al., 2019; Williams & Coles, 2007).

Overcoming the issues of availability, quality, relevancy and timeliness of research evidence, and improving teachers' attitude to research evidence does not ensure that teachers will use research evidence in their practice. Educators may have difficulty accessing research evidence or interpreting it. Or they may use weak invalid evidence. In conclusion, it could be said that having a positive attitude to research evidence may help in ensuring that research evidence is used in practice, but is neither necessary nor sufficient alone.

In addition to having a positive attitude to the use of research evidence, users may need to have the skills and knowledge to look for, interpret and use the research evidence (Jackson et al., 2018). In particular, educators will need to be able to read and interpret scientific information and assess the trustworthiness of single studies when they attempt to use plain evidence from journals (See, 2020). If they lack the necessary skills, knowledge or resources to engage in research evidence, they may have to rely on their colleagues' or their own practical expertise and experience (Campbell & Levin, 2012). Fraser et al. (2018) found that, although teachers reported that they found research evidence to be valuable, they were likely to rely on the local educators' judgement of the effectiveness of educational programmes. Campbell and Levin argue that the educators' skills and training may not have sufficiently equipped them to be able to interpret and use the research evidence. See (2020) states that, even if teachers and school leaders had the time to look for and interpret evidence, most do not have the skills to judge the quality of the research and ensure that the evidence that they would be relying on was trustworthy. Campbell and Levin (2012), on the other hand, argue that teachers may have the necessary skills, but lack the time to implement the evidence in practice. These issues were also reported by users in empirical studies.

In a study by Mahoney (2013), teachers ranked lack of time as the most important barrier to finding and reading a research study, followed by lack of literacy and subject knowledge.

Another study by Williams and Coles (2007) (for a more detailed version see Williams & Coles (2003)) showed that teachers had a reasonably positive attitude to research evidence, but did not often use it in practice due to lack of time and access. The teachers also reported various concerns regarding lack of necessary knowledge and skills to look for and assess research evidence effectively. Therefore, the teachers suggested that research be presented to users in a more attractive and clearer format with brief research summaries which would encourage the teachers to read the research findings. This indicates that the teachers feel that they do not have the time to look for and read through research evidence. This is consistent with the current study's claim that some of the issues in EBP are interconnected and, thus, a possible solution for a specific issue may overcome another, connected barrier. If research evidence is disseminated to teachers in a more effective format, teachers may not report time or workload restrictions as major barriers. As noted by Slavin (2019), research evidence can be in a format that educators may not necessarily read, judge and understand evaluations in journals.

In a more recent study by Nelson et al. (2017), teachers reported the following sources of information as being the easiest to access - colleagues in their or other schools, student performance data, and continuing professional development (CPD) information. Teachers reported that information derived from academic research was more difficult to understand. Teachers also had variable but weak knowledge about evidence derived from academic research.

There is often a wide variety of factors influencing the decision-making process (Davies, 2004; Hillage et al., 1998; Power, 2007; Sutcliffe & Court, 2005), specifically the budget, the views of other key players (UNICEF, the World Bank etc.) and the positions of stakeholders and political parties (Power, 2007). For example, Zussman (2003) argues that one would think that because cigarettes lead to more deaths annually than marijuana, it would be marijuana that is legal not cigarettes, which is just one example where other factors come into play in decision-making. Such examples may be more common in the world of policy-making, but practitioners also consider a myriad of factors in the decision-making process. Users may give relatively reasonable explanations for their decisions, but flexibility in decision making can sometimes lead to decisions being heavily based on inputs other than research evidence.

Another issue to consider, which is not often highlighted in the literature, is how well research evidence is used in practice. Users may use high-quality evidence derived from research inefficiently or ineffectively (Gorard, 2020), which can negate the actual impact of evidence. Given that promoting the accurate use of research evidence in schools is crucial (Kretlow et al., 2012), there is a need to focus on the best ways to use the best research evidence (Gorard et al., 2020a).

Assessing whether research evidence is used accurately may not be the same as assessing the "quality use of research evidence". While assessing the quality use of research evidence may be complicated (Rickinson et al., 2020), assessing the accuracy of use of the research evidence mostly concerns fidelity. The investigation of intervention fidelity is important as lack of fidelity is a crucial issue in terms of achieving the accurate use of research evidence-based practices in classrooms (Kutash et al., 2009). An evaluation may investigate how accurately users are implementing the practices and procedures required by the research evidence, thereby bringing about the actual impact of that evidence. This is much easier to do in cases of specific evidence translation than when practitioners are trying to implement general evidence. This is why most of the studies measuring fidelity to promote the use of research evidence by educators involve an intervention based on specific research evidence (e.g., instructional behaviours) rather than on general evidence (see Kretlow et al., 2012; Kutash et al., 2009; Sawyer, 2015).

Rickinson et al. (2020) addressed the quality use of research evidence in education and suggested a conceptual framework. Their framework (see Figure 3.3) consists of two main inter-connected components: "appropriate evidence" and "thoughtful use" (p.223).

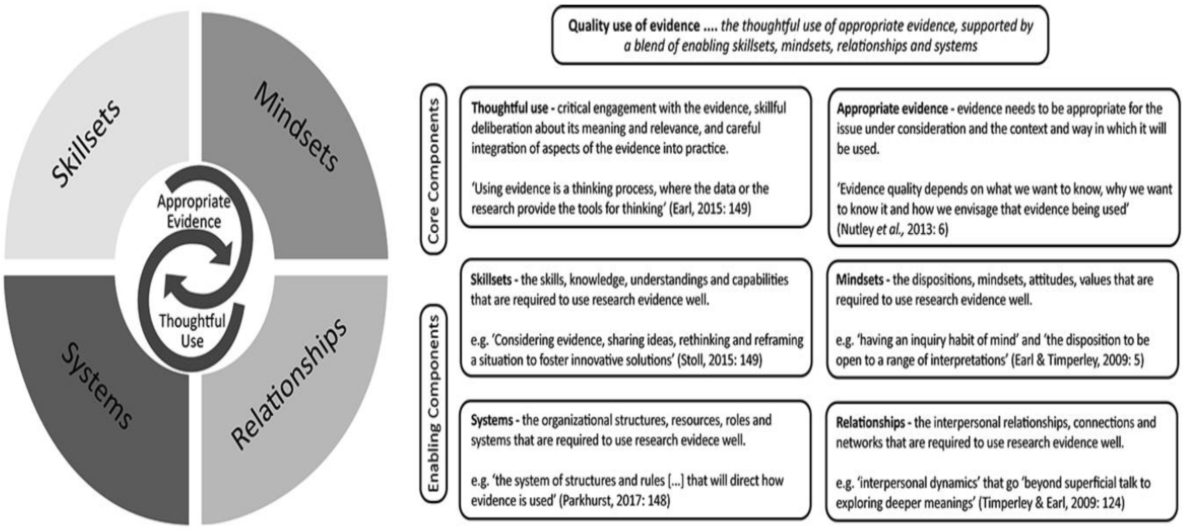

Figure 3.3 Components of high-quality use of research evidence
Source: (Rickinson et al., 2020, p.223)

"Appropriate evidence", the first main component in this framework, addresses the quality issue of evidence by involving both "methodological rigour" and "appropriateness" and claiming that research use differs from a research perspective focusing mainly on "methodological rigour". Thus, evidence should also be "appropriate for the issue under consideration; appropriate for the context in which it will be used; and appropriate for the use to which it is going to be put." (Rickinson et al., 2020, p.224). "Thoughtful use", the second main component, is more concerned with the effectiveness and nature of the relationship between evidence, users and their way of using the research. The authors argue that users need to be considered as active recipients using cognitive process and skills, such as critical engagement, when using research evidence.

As mentioned above, assessing the quality use of the evidence is a more complicated process than assessing the accuracy of the use of research evidence which is often done through a fidelity check. This thesis specifically addresses the dissemination issue to facilitate the use of research evidence by teachers. The quality use of the research evidence is not the focus of this study. However, this study embraces studies that transfer research evidence to practice and promote the accurate use of research evidence by users. This is explained in Chapter 5 which describes the processes used in the systematic review.

3.1.3 The issue of access to research evidence

The accessibility of research evidence to users is addressed with the issue of disseminating research evidence to teachers. How to best disseminate research evidence to teachers is addressed in detail in the next chapter as it is the main focus of this study. Prior to the dissemination issue, however, a brief summary of the accessibility problem and possible solutions in EBP are presented here.

In order to inform policy and practice with research evidence, the findings of research need to be made accessible to the users so that they can utilise such evidence in their work (Procter, 2013; See et al., 2016). Users, however, may face difficulties and barriers when they attempted to access research evidence (Campbell & Levin, 2012; Cooper et al., 2009). Available research evidence is often written in scientific format and published in academic journals which makes it difficult for educators to access and comprehend (Procter, 2013).

For example, in a study by Williams and Coles (2003), teachers reported that they faced difficulties when they wanted to find readily accessible research evidence within a limited timeframe regardless of whether it was printed or electronic-based. In a similar study, although teachers perceived research evidence in research journals as being the most reliable and trustworthy, they found it the most difficult in terms of access (see Mahoney, 2013). Another study by Procter (2013) indicated that teachers wanted to use research evidence, but they were unable to find evidence that could easily be applied in practice.

3.3 How to facilitate the use of research evidence by teachers in practice

There are still many ongoing debates on how to improve the use of research evidence in schools. Although how to best facilitate the use of research evidence remains unclear (Dagenais et al., 2012; Wentworth et al., 2017), some possible solutions have been suggested to date. According to See (2020), researchers should make research evidence accessible to users by presenting it in simple and clear language that can be understood. Mahoney (2013) agrees that research evidence should be readily available, and effective links should be made between classroom strategies and research evidence through professional development. Higgins (2020, p.2) puts forward a model that could facilitate the adoption and implementation of research evidence, showing responsibilities from researcher and practice perspectives (see Figure 3.4). According to this model, there are six criteria to be met that are related to research: being accurate, accessible, actionable, appropriate, acceptable, and applicable.

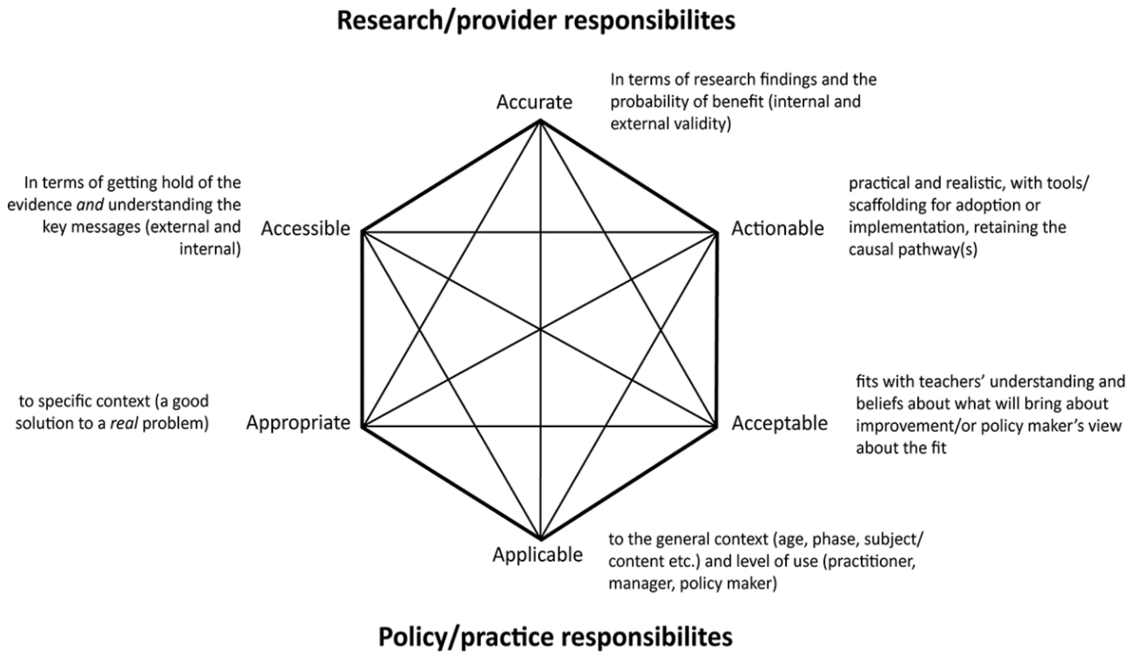

Figure 3.4 A model of research and practice responsibilities in research adoption and application
Source: (Higgins, 2020, p.2)

Most of the suggestions presented so far focus on the form of presentation of research evidence to improve its use. Another suggestion is to involve conduit or intermediaries to promote the use of research evidence in practice (see Dixon et al., 2020; Haines et al., 2004; Ogunleye, 2014). The conduit or intermediaries may summarise research evidence and disseminate it to users effectively (Gorard, 2020). Alternatively, a direct connection might be established between researchers and users. Campbell and Levin (2012) emphasise that, unless there are specific initiatives and efforts to improve connections between researchers and schools, even the best evidence will not work effectively in practice. According to Haines et al. (2004), therefore, better collaboration between research providers and users might help facilitate the use of research evidence in practice. As mentioned before, another suggestion from the literature review is that high-quality research evidence should be disseminated to users in an effective way (see See et al., 2016). How this is to be done remains to be addressed.

CHAPTER 4

How to best disseminate research evidence to teachers

This chapter discusses how to best disseminate research evidence to teachers and explains why it matters to improve the use of research evidence in practice. It then addresses efforts to disseminate research evidence to users, and suggestions on how to best do it.

4.1 What does dissemination mean in this study?

There has recently been a surge of interest in transferring research evidence to users in a number of fields. A range of terms have been proposed to describe the process of evidence transfer (Mady, 2013) among them dissemination, transfer and mobilisation. Since there is lack of consensus about the meaning of these terms and their scope, writers use their own phrases such as "get evidence into use" (see Gorard et al., 2020a), "dissemination" (see Lord et al., 2017a) and "knowledge mobilisation" (see Nelson & O'Beirne; 2014; Segedin, 2017), sometimes giving them different interpretations according to the context of their study. There is some confusion in the literature about whether the term being used refers to the action of communicating research evidence to make it more (allegedly) usable and accessible in one-way communication, or whether refers to users' engagement in research evidence in a collaborative manner. In order to avoid such confusion, it is important to explain what the term dissemination refers to in this study.

First, there needs to be some clarification about the types of evidence transfer and how evidence can be used in practice. Two main distinctions need to be made with regard to research use in practice. First, it is important to specify whether the aim is to transfer a specific piece of research evidence to users or to increase users' general willingness to use research evidence (Gorard et al., 2020a). Second, it is required to specify whether the research use will be instrumental or conceptual. According to Langer et al. (2016), whereas instrumental research use highlights the 'concrete application of research' and uses research evidence directly, conceptual research use refers to its 'enlightenment function', focusing on the users' understanding of research evidence (p.7).

Evidence can be transferred in a variety of ways. Gorard et al. (2020a, p.578) identify three types of evidence, plain, modified or engineered, and list three different types of evidence transfer - passive, engagement or (inter) active transfer (see Figure 4.1).

	Passive transfer	Engagement in transfer	(inter)Active transfer
Plain evidence	e.g. open access to journals	e.g. journal clubs	e.g. practitioner inquiry
Modified evidence	e.g. EEF Toolkit for practitioners	e.g. Think tanks	e.g. internships, research schools
Engineered evidence	e.g. lesson plans	e.g. hotlines, helpdesks	e.g. legislation for population measures

Figure 4.1 Two dimensions of evidence-into-use
Source: (Gorard et al., 2020a, p.578)

In summary, there are various types of research transfers and uses to be considered. This study prefers to use the term dissemination which refers to the transfer of research not only with one-way communication, but also with different interactions or collaborations. In addition, for the purposes of this study, the term dissemination does not impose any limitations on the aforementioned types of evidence transfer. There is one exception about the source of evidence that should be explained at this point. Although teachers may also provide research evidence through their own research in practice (see Leuverink & Aarts, 2021; See et al., 2016), the investigation in this study focuses on how to get external research evidence into use. Therefore, the systematic review employed in this study, which is explained later, is limited to the transfer of research evidence provided by researchers.

4.2 Why does the dissemination approach matter?

Why the dissemination approach matters in EBP can be explained by referring to the current situation and issues in EBP. According to Gorard et al. (2020a), increased focus on experimental design and more secure data archiving and use have contributed to improvement in the provision of robust and varied research evidence, which has led to more promising interventions to be used in practice. The authors suggest that more research evidence-based strategies and approaches are probably being used in schools than in the past. As aforementioned, however, despite these attempts and notable achievements in recent years, educators do not often use research evidence in their practice.

As mentioned above, there are various issues and barriers to consider in EBP, including teachers' attitudes, skills and knowledge, and the accessibility of research evidence. These issues may be caused by the way the research evidence was disseminated. In other words, the method of dissemination of evidence to users may be the major issue triggering most of the other issues in EBP. If this is the case, the focus can be on how to best disseminate research evidence to teachers in order to overcome most of the aforementioned issues and get evidence into use. We may consider two scenarios here to comprehend how the dissemination issue can be connected with other problems.

If providers simply disseminate research evidence through journal papers and expect teachers to access such papers, interpret findings and benefit from evidence for their work, issues such as the quality of research evidence and teachers' attitudes and lack of skills may remain serious barriers to be overcome. A study by Morris et al. (2020) found that school leaders found it difficult to understand and interpret research evidence. Therefore, Speight et al. (2016) argue that, even if teachers have a positive attitude to the use of research evidence to improve their teaching, they may face difficulties applying specific or general evidence-based approaches such as metacognition and effective feedback. Also, Goldacre (2013) claims that teachers do not often read single studies in academic journals that are technical and too complicated for users to understand. Overall, these studies show that teachers may encounter difficulties caused by the method of dissemination.

On the other hand, if teachers were asked to use a curriculum in which robust research evidence has already been embedded, they may not face the same problems. If providers were to put high-quality evidence in the curriculum, then teachers would not need to find evidence to implement themselves or judge the quality of such evidence. Moreover, the teachers' attitudes, skills and knowledge may not be crucial factors as in the first scenario. It is important to note here that this comparison is not being made to claim that this type of evidence transfer is superior. These examples are provided to illustrate how some barriers to getting evidence into use may arise because of the dissemination routes used, although there may be dissemination approaches that are more effective than others. This is why the dissemination issue has received considerable attention in the literature, particularly by those who want to facilitate the use of research evidence in practice.

Goldacre (2013) notes that, although there have been some valuable research findings from randomised trials in the UK, they have largely failed to inform practice as they were often poorly disseminated. Moreover, it is suggested that, even the best evidence summarised by systematic reviews may not inform or change practice without further communication of research evidence and efforts (see Green et al., 2016; Haines et al., 2004). Therefore, many writers suggest that research evidence should be explained clearly and communicated effectively to enable teachers to use evidence-based approaches and strategies in the classroom (see Campbell & Levin, 2012; Cooper et al., 2009; Langer et al., 2016; Lord et al., 2017a; Mahoney, 2013; Segedin, 2017; White, 2020).

4.3 How best to disseminate research evidence to teachers

Generating robust evidence alone has a limited impact on practice (Campbell & Levin, 2012; Green et al., 2016). Effort needs to be made to get evidence into use. In recent years there has been a growing interest in getting evidence into use rather than only generating robust evidence. White (2019, p.2) illustrates the four waves of the evidence revolution in the figure below.

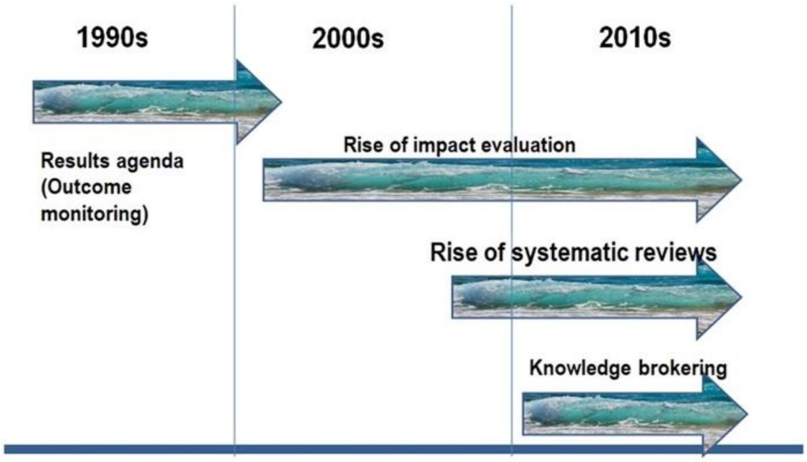

Figure 4.2 Four waves of the evidence revolution
Source: (White, 2019, p.2)

A more advanced version of the evidence revolution encompasses the translation of evidence. In a more recent work, White (2020, p.21) illustrated this translation process with an evidence architecture (shown in Figure 4.3). The architecture is based on the knowledge translation pyramid that indicates the stages of how plain evidence can be translated into more (allegedly) usable and accessible formats, a one-way dissemination format that does not encompass collaborative or interactive approaches. In the first few stages, evidence is produced and shared with primary or single studies. Existing evidence is then synthesised through systematic reviews, which is probably one of the most important stages in the process as it is assumed that such reviews are more likely to provide more robust research evidence than single studies. The databases, evidence maps and platforms provide access to research papers and allow users to find evidence on some specific areas. According to White, the translation of research evidence into more usable formats often happens at the top three levels of the pyramid, namely: “portals (more about ‘what works’), guidelines (more about ‘how to do it’), and checklists (more about ‘just do this’)” (p.22). White points out that at these top levels users may use research evidence for their work without reading research papers.

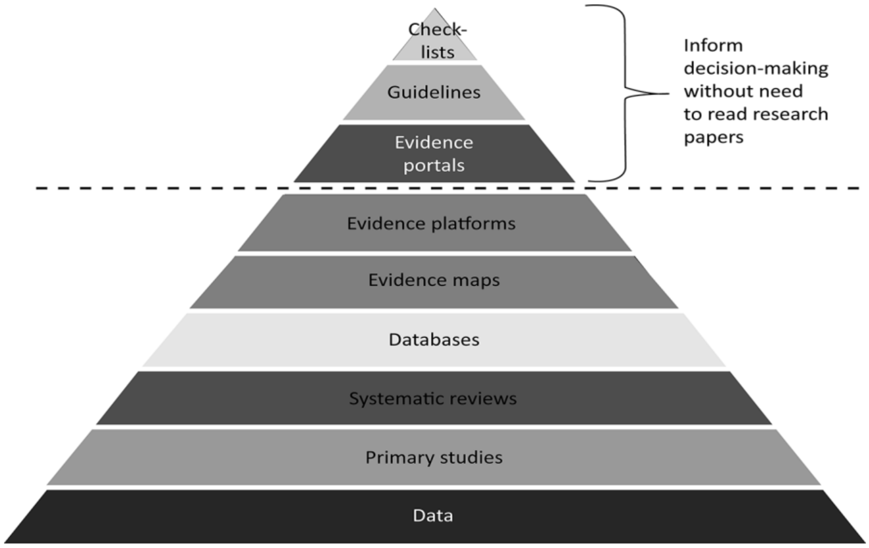

Figure 4.3 The evidence architecture (knowledge translation pyramid)
Source: (White, 2020, p.21 based on White, 2019)

Evidence dissemination may involve further active components such as workshop training or coaching. However, even if the translation of research evidence to allegedly more usable and readable formats, such as evidence portals, may be considered a passive dissemination approach, it may support other dissemination strategies due to the fact that any other dissemination approach can benefit from such forms of evidence. For example, if providers want to disseminate research evidence through workshop training, they may easily use evidence from evidence portals and share the available evidence-based resources with teachers. Therefore, it could be argued that, regardless of how to best disseminate research evidence, translating research evidence to a format that users or researchers can easily read and understand may be an important facilitator. In the last few years, considerable effort has been made to translate evidence from the first stages of the pyramid to the middle or top stages. Governments have supported and encouraged third party organisations to produce, summarise and disseminate research evidence to users (Cooper et al., 2009). Conduits have emerged to facilitate collaboration between researchers and users (Gorard et al., 2020a) and knowledge brokers or intermediators have made an effort to promote use of research evidence (Shields & Evans, 2012; Tseng, 2012). Some of the efforts and initiatives that aimed to facilitate the use of research evidence by users are presented here.

Most efforts and initiatives have focused on providing high-quality research evidence and summarising such evidence through systematic reviews. The UK has been one of the pioneer countries in evidence mobilisation and dissemination. Three research centres were established in the beginning of 2000s: the EPPI Centre, Centre for the Wider Benefits of Learning, and Centre for the Economics of Education (Cooper et al., 2009). According to Cooper et al., the ESRC Teaching and Learning Research Programme also encouraged considerable work on how educators use research in their practice. Another improvement was the establishment of the EEF in 2010, supported by the government particularly to improve the achievements of disadvantaged students (See, 2020). With the growing interest, new research centres emerged, a current example of these being the Durham University Evidence Centre for Education (DECE) that has the aim of promoting and evaluating the impact of robust education research. Another policy initiative, as mentioned before, is Welsh Government's National Strategy for Educational Research and Enquiry (NSERE) which aims to inform educational policy and practice in Wales with the best existing research evidence and educational professionals' enquiry.

International examples of such initiatives include the Campbell Collaboration and the American Institutes for Research (AIR). The most notable initiatives in this field, however, are the UK's Education Endowment Foundation (EEF) and the US Institute of Educational Sciences What Works Clearing House (WWC) websites that makes available high-quality research evidence to both users and researchers in education (See, 2020).

All of the initiatives listed above have played an important role in the generation and summarising of research evidence, but some have also included the last stages of evidence translation involving portals/toolkits, guidelines and checklists to make research evidence more (allegedly) user-friendly (White, 2020). Systematic reviews are often reported in complex technical language. In portals, the portal manager translates or communicates research evidence (See, 2020) on some specific evidence-based interventions, providing extra details such as the cost, impact and evidence strength of any intervention (White, 2020). According to White, these portals/toolkits focus on what works and most have been developed by What Works Centres in the UK and USA.

The Teaching and Learning Toolkit website supported by the EEF presents an overview of evidence on various approaches so that practitioners in education can make more evidence-informed decisions to improve students' achievements in schools (Higgins, 2020). Higgins notes that the Toolkit is being widely used in England with approximately 65% of headteachers reporting they have benefited from it, or at least consulted it. Figure 4.4 shows part of the EEF pupil premium toolkit which is an example of passive evidence transfer giving the impact, cost and evidence strength of each type of intervention (EEF, 2022, p.1).

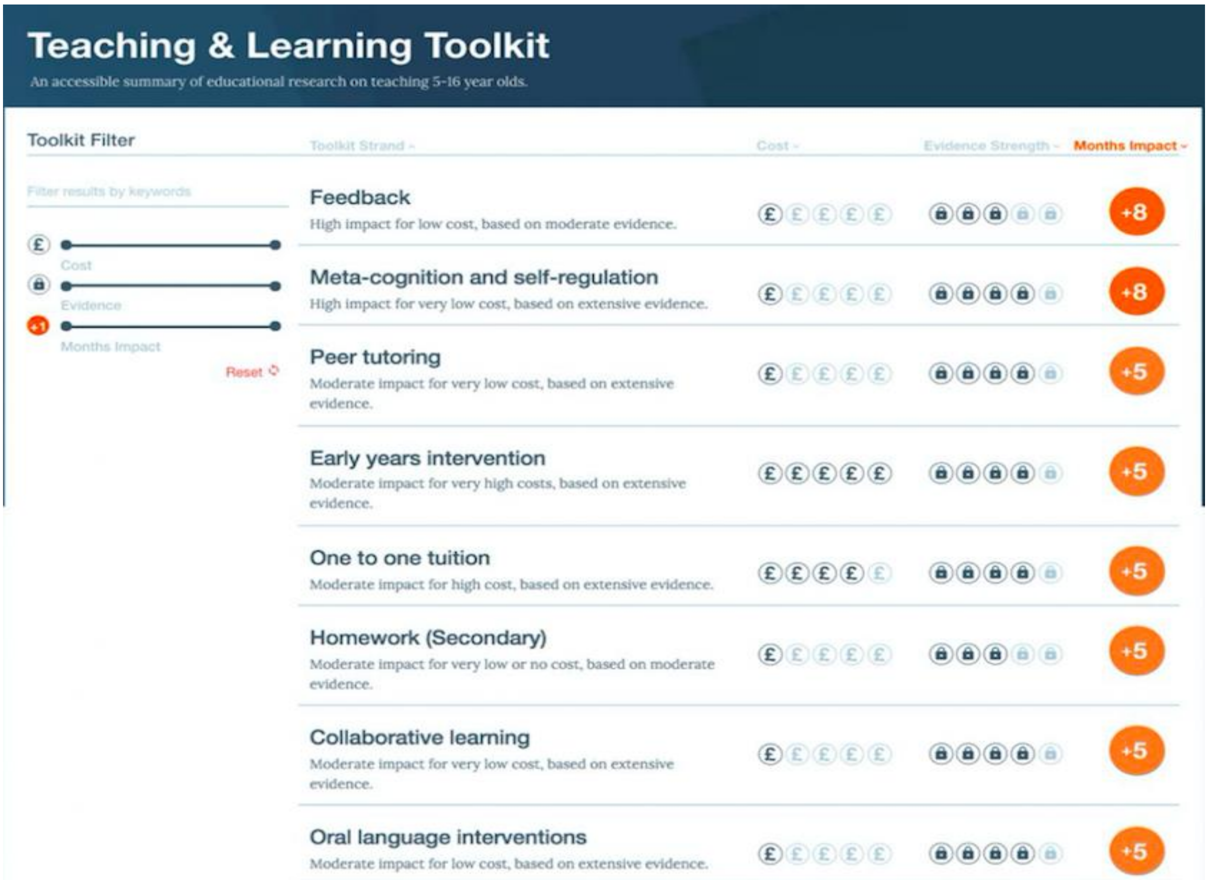

Figure 4.4 Teaching and learning Toolkit by the EEF
Source: (EEF, 2022, p.1)

Guidelines (more about 'how to do it') were created to help users primarily in the health sector (White, 2020, p.22). An example of such a guidebook in the education field may be the one developed by the Early Intervention Foundation (EIF), a charity founded in 2013 to promote the use of effective interventions to support young people and children at risk of having poor outcomes. With the guidebook, the Foundation aims to promote and translate research evidence into useful guidance, ultimately into practice and policy (See, 2020). Checklists ("more about just do this"), like guidelines, are rare in education as a way of evidence dissemination (White, 2020). White also summarises the developments in evidence architecture in education and health and presents a comparative scoreboard (see Figure 4.5) to show how evidence translation is established in health and education (p.30). According to this scoreboard, although there have been notable improvements in the promotion and translation of research evidence in education, the sector still lags behind the health sector in all aspects except the evidence portals.

	Health	*Education*
Data	WHO list of outcomes and interventions. Initiatives supporting common outcomes and internationally comparable data.	No comparable initiatives, though good EMIS in many countries.
Studies	A very large number of studies support accumulating bodies of evidence.	Far fewer studies without the culture of accumulating evidence.
Reviews	Systematic reviews are widely accepted and the norm.	Traditional literature reviews prevail. Far fewer systematic reviews.
Databases	Large databases devoted to effectiveness studies.	No databases devoted solely to effectiveness.
Evidence maps	Not widely adopted in health	Starting to be adopted on a small scale.
Evidence portals	Common.	Reasonably common.
Evidence platforms	Not common but being developed.	Pioneered by WWC in US and later EEF in UK.
Guidelines	Evidence-based guidelines common at international and national level.	Not common.
Checklists	Evidence-based checklists used at international and national level.	Not common.

Figure 4.5 The evidence architecture in health and education: a comparative scorecard
Source: (White, 2020, p.30)

The literature suggests that teachers do not often read original studies in academic journals (Cooper et al., 2009; Goldacre, 2013) and, thus, many studies highlight the need to provide more usable and accessible research evidence (see Higgins, 2020; Nelson & O'Beirne, 2014; See, 2020). However, as shown in the figure above, evidence translation in the education sector remains poorly established (Cooper et al., 2009; White, 2020).

In the literature, some authors/reports suggest different models for effective knowledge mobilisation or disseminating evidence. For example, the UK government's What Works Network suggests a model explaining how What Works Centres work (see Figure 4.6). These centres mainly focus on "generating evidence, translating that evidence into relevant and actionable guidance, and helping decision-makers act on that guidance" (Cabinet Office, 2018, p. 5). This model can be an example of linear models for research use, involving simple one way connections (Maxwell et al., 2022). Perhaps evidence-based models might be more likely to adopt such models compared to models based on 'evidence-informed' or 'quality use of evidence'.

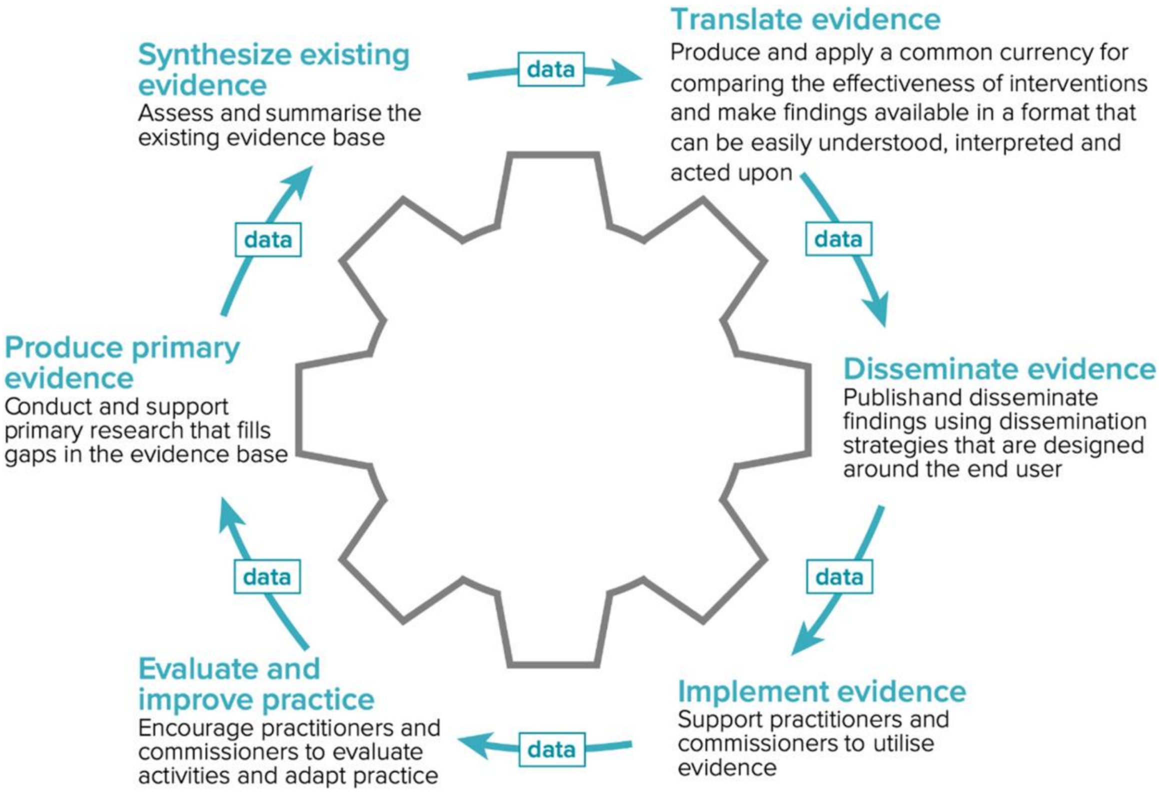

Figure 4.6 What Works Centres' areas of activity
Source: (Cabinet Office, 2018, p.6), adapted from the MAGIC Digital and Trustworthy Evidence Ecosystem (MAGIC, 2016)

The dissemination of research evidence does not include only passive dissemination approaches, but also involves a wide range of active routes that, for example, allow teachers to engage in research evidence in workshop training and then design their own practices. Moreover, there are more complicated models involving the use of systems approaches rather than adopting simple linear models. Maxwell et al. (2022) explain 'systems approaches' as "a set of related theoretical and methodological positions" (p.4).

Campbell and Levin (2012, p.6) suggest a model that would help promote knowledge mobilisation in England (see Figure 4.7).

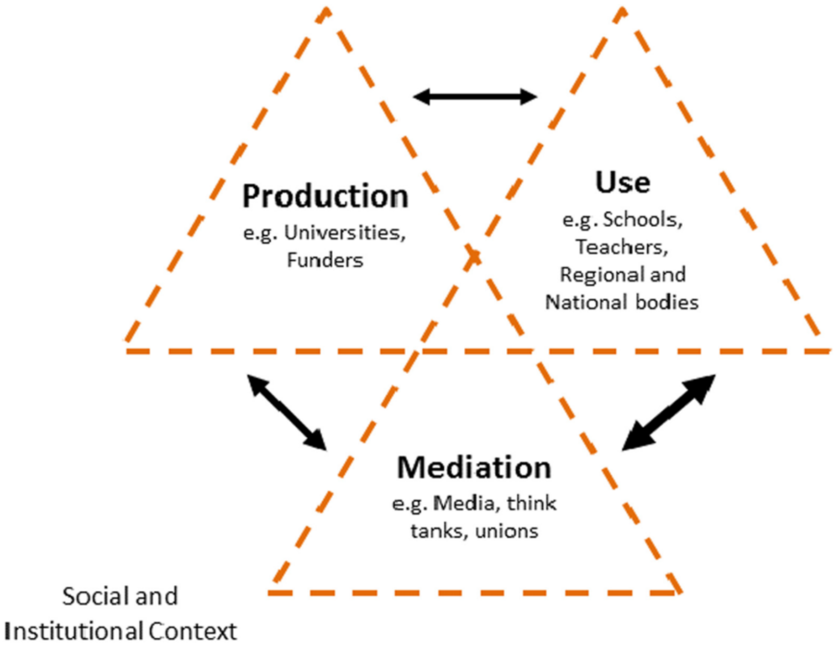

Figure 4.7 A simple model for knowledge mobilisation
Source: (Campbell & Levin, 2012, p.4)

The model highlights the need to involve more collaborative and multi-dimensional knowledge mobilisation rather than only push-based dissemination. Figure 4.8 shows the detailed version of the model, including its dimensions.

The model developed by Campbell and Levin (2012) suggests that there are two main areas to be addressed in England: strengthening networks among researchers, users and intermediaries (the three main players in effective knowledge mobilisation) and improving users' capacity in schools to find, understand and apply research evidence. Maxwell et al. (2022), explain 'research intermediaries' as "third party brokers that bridge between the creation of research knowledge and its use" (p.13). Although the model suggested by Campbell and Levin (2012) involves mediators/intermediaries, practitioners should have some necessary skills to be able to find and interpret relevant research evidence. Users also need time and resources to look at research evidence even if there is a staff member (e.g., knowledge lead) to help them.

	Researchers	Mediators	Practitioners
Find	Research is made publicly available and not confined to peer-reviewed journals. Attention is paid to how results will be made accessible at all stages of the research process.	Research synthesised and summarised in one place and made freely available. Research findings are included in professional resources and materials.	Teachers and school leaders have the skills to identify research needs and find relevant research resources. Teachers and school leaders have the time and resources to look at research, perhaps with a member of staff designated the 'knowledge lead'.
Understand	Research written in an accessible form without jargon. The implications of research for practice are clearly outlined.	Implications of research for practice are clearly explained to teachers, parents, governors and the media. Findings are synthesised and inconsistencies are explained. Training and support for leaders using research is provided.	Initial teacher education and professional development equips teachers and leaders with the skills to be able to assess and interpret research. Time is allocated to discussing applications of research in all staff meetings.
Share	Researchers share their findings widely, including at conferences, training events, online and social media. Practitioners can influence research agendas and approaches.	Local and national organisations, including charities, unions, the media, academy chains and local authorities share evidence. Mediators ensure that lessons from research travel between schools and across the education system.	Experiences with research can be shared between and within schools (e.g. between departments). Staff have time to attend external events and have time to share and embed knowledge on return.
Act	Research makes explicit its implications for practice, what the pitfalls may be, and which elements should (and should not) be adapted.	Benefits of using research evidence are clearly explained to different teachers, parents, governors. Schools are supported when embedding research. Examples of school and classroom approaches to acting on research are identified and shared.	Schools develop a culture and practices that value, demand and act on research in their work. Schools have the freedom to make research-based decisions. Staff have time and resources necessary to embed research and evaluate impact in their own context

Figure 4.8 A model for effective knowledge mobilisation
Source: (Campbell & Levin, 2012, p.6)

According to Maxwell et al. (2022), another complicated model involving dynamic and two-way relationships can be the model developed by the EPPI Centre (see Figure 4.9), which “aims to capture the main domains of evidence use and the two-way interactive relationship between the use of research and research production” (p.12). But, as Maxwell et al. (2022) point out, causal pathways were not clearly explained in the model.

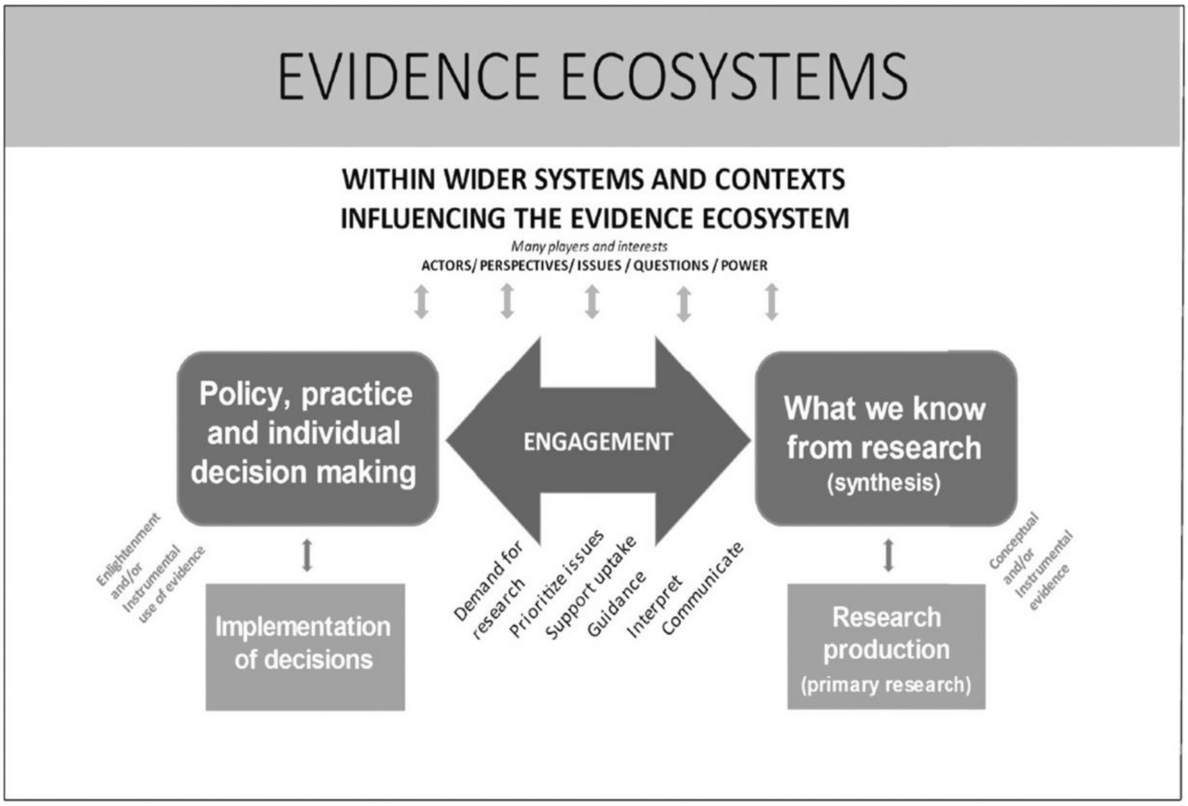

Figure 4.9 EPPI Centre's Research-use Ecosystem (developed from Gough et al, 2011)
Source: (Gough et al., 2021, p.748)

There have been other suggestions by users and researchers on how to disseminate research evidence – perhaps too many suggestions, and certainly not enough robust testing of them. A study by Mahoney (2013) suggested that research translation involving useful classroom and instructional practices for users is more promising. Sparks (2018) proposes providing teachers with more podcasts to listen to, webinars and similar conversations about research instead of merely giving access to research papers. In a study carried out in the USA involving school and district leaders, Penuel et al. (2017) found that instrumental research use was more common than other types of research use. In their study, users reported that they more often use research evidence accessed through professional conferences and associations than research evidence provided by U.S. Department of Education resources such as the WWC.

Cooper et al. (2009) suggest that users often use research evidence through mediating events such as professional development training programmes. Perhaps more radically, Segedin (2017) argues that there is a need for transition from common or traditional dissemination approaches, such as workshops, to more creative ones such as theatre. Segedin explored educators' attitudes to theatre as a method of dissemination of research evidence. The study suggests that theatre is a promising approach to improving educators' research use in practice. However, it must be noted that these studies were based on users' reported suggestions rather than causal research evidence based on high-quality evaluations that tested one or more dissemination approaches robustly.

In conclusion, there have been numerous suggestions on how to best disseminate research evidence to users, specifically, teachers. How effective each of the suggestions remains unclear as far too little attention has been paid to causal evidence on how to best disseminate research evidence to teachers. Therefore, this new study attempts to contribute to the literature by investigating how to best disseminate research evidence to teachers. The study first presents existing research evidence on the most effective ways to disseminate research evidence to teachers through a systematic review so that a promising approach, based on the review findings, could then be evaluated through an RCT in practice. Considering both the systematic review findings and other factors, such as time and budget, workshop training with supporting evidence-based resources was choosen as an intervention in the evaluation. The literature review indicated that there are three main outcome measures to consider: educators' attitudes to research evidence, their use of research evidence in practice, and student attainment. This study also considers attitudes and research use as outcome measures. In accordance with the purpose of the study, the review and subsequent evaluation questions addressed in the study are:

- What is the existing evidence on the most effective ways of disseminating research evidence to teachers?
- What is the impact of disseminating research evidence through workshop training with supporting evidence-based resources on teachers' attitudes towards the use of research evidence?
- What is the impact of disseminating research evidence through workshop training with supporting evidence-based resources on teachers' use of research evidence in schools?
- Does the impact of disseminating research evidence through workshop training with supporting evidence-based resources on teachers' attitudes towards the use of research evidence differ according to their demographic characteristics (gender, age, job, experience and degree)?

- Does the impact of disseminating research evidence through workshop training with supporting evidence-based resources on teachers' use of research evidence differ according to their demographic characteristics (gender, age, job, experience and degree)?

The study also attempted to examine teachers' attitudes to research evidence and their use of research evidence in practice before the intervention. The questions addressed for this purpose are:

- What are teachers' attitudes towards the use of research evidence in schools?
- To what extent do teachers use research evidence in practice?
- Do teachers' attitudes towards the use of research evidence differ according to their demographic characteristics (gender, age, job, experience and degree)?
- Does teachers' use of research evidence differ according to their demographic characteristics (gender, age, job, experience and degree)?

A large-scale systematic review on how to best get evidence into use was published by Gorard et al. (2020a) when this study was in progress. The study involved education, health sciences and other fields, covering both policy and practice. The review found only a few high-quality studies. The systematic review indicated that giving access to plain or partially simplified research evidence was ineffective in terms of getting research evidence into use. The results were still poor when knowledge-brokers presented such evidence to users using short courses. The review indicated that a possible effective way might be to present engineering evidence to users actively or iteratively through a trusted conduit.

SECTION 2
RESEARCH DESIGN AND METHODS

This section consists of two chapters. Chapter 5 explains the methods and procedures employed in the systematic review. Chapter 6 presents the methods and approach used for the impact evaluation, including the pre-survey analysis.

CHAPTER 5

Systematic review- research design and methods

This chapter presents the methods and procedures employed in the systematic review, specifically, the design of the review, the search strategies, the study selection and screening, the data extraction, the quality appraisal and the data analysis procedure.

5.1 Design

The overall objective of the review was to identify existing evidence on the most effective ways to disseminate research evidence to teachers so that a promising approach can be determined based on the review findings to be evaluated in the second phase of the study. The research question for the review is as follows:

> What is the existing evidence on the most effective ways of disseminating research evidence to teachers?

A systematic review was adopted to address the research question above. A systematic review applies explicit methods to identify existing evidence regarding a specific topic, which makes it more rigorous than the traditional review (Torgerson, 2003). According to Wozney (2009), systematic reviews tend to:

a) be driven by well-focused and feasible questions
b) employ explicit procedures or review protocols and methods for evaluating source material
c) provide transparent descriptions of methods used so that at least in theory another researcher could reproduce the study and arrive at the same conclusions
d) operate as efficient information management tools by providing a way of reducing the volume of information on a topic; and
e) are concerned with having practical value to the research community and other stakeholders (p.43-44)

The methods and procedures employed in this review, including the search strategies and screening, were based on the methods described in a mix of sources rather than just one source, which allowed the review to be tailored to the needs of this study. The main methods and procedures drawn upon were the ones proposed by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (PRISMA, n.d.), Gough et al. (2017) and

Torgerson (2003). To assess the trustworthiness of a research finding, the procedures used by Gorard et al. (2017) were adopted. Lastly, some researchers and librarians were consulted for their assistance. The methods and procedures used are presented below.

5.2 The search strategies

The review identifies possible ways to disseminate research evidence to teachers rather than a specific route. Prior to the review, it was envisaged that a small-scale systematic review would find only a few studies for each route. This is mainly because the standard literature review suggested that there is lack of robust evaluations on how to disseminate research evidence to users, and also because the review only focuses on people related to teaching process in schools, such as teachers and headteachers. Therefore, this study set out to find as many studies as possible that address different dissemination strategies. Thus, a large-scale systematic review was adopted with a broad search strategy for electronic databases and search engines.

The search consisted of a primary and complementary search. In the primary search, studies were identified through 10 electronic databases and Google Scholar. The electronic databases searched were: Applied Social Sciences Index and Abstracts (ASSIA), Australian Education Index (AEI), British Education Index (BEI), Educational Resources Information Center (ERIC), International Bibliography of the Social Sciences (IBSS), ProQuest Dissertations & Theses Global, PsychINFO, Scopus, Social Science Citation Index (SSCI) and Social Services Abstracts (SSA).

An advanced search function using search strings was used with electronic databases. Initial search strings were created and then improved upon according to the review question. First, the relevant literature was simply reviewed, taking into account the review question to identify the first keywords and understand how to use them to create the initial search strings. The initial search strings were then tested, modified and refined for each electronic database. During this process, new keywords and synonyms were explored and tested to see if they had an impact on the search results. In addition, librarians and researchers within the field were consulted to improve the search strings. Lastly, in order to find out whether the search strings worked in practice, they were used to find known studies. This process required adding new keywords and using the 'Near' operator to broaden the search. The review question required the use of common words that almost all studies include in their title or abstract, such as "evidence", "research", "knowledge" and "use". Not surprisingly, even though the advanced search strings were created with search formulas by using Boolean Operators (And, Or, Not), the number of hits for each database was usually high due to the broad search strategy and the aforementioned common keywords.

Table 5.1 presents the search strings created for each electronic database. Most of the search strings consist of four main components (lines for advanced search) that are separated with "**AND"** and "**NOT".** Since the advanced search function adds brackets between the lines, which can be seen in the search history (see Appendix A), the table below shows no additional brackets between the lines for most of the databases. Additional search limits were applied for some of the search strings depending on the characteristics of the databases. Since Google Scholar did not allow the use of advanced search strings created for the electronic databases, shorter and simpler versions of the search strings were developed, thereby necessitating many separate searches (see Appendix A for the search history by electronic database (including detailed search strings) and search strings for Google Scholar).

Table 5.1 Search strings developed for the electronic databases

Databases	Search String
ASSIA Applied Social Sciences Index and Abstracts (ASSIA) (ProQuest)	(("Research knowledge" OR evidence) N/2 (use OR used OR using OR utilis* OR utiliz* OR uptak* OR transf* OR translat* OR modif* OR engag* OR summar* OR access* OR disseminat* OR mobilis* OR mobiliz* OR implement* OR present* OR bring* OR push* OR shar*)) OR (research N/1 (use OR used OR using OR utilis* OR utiliz* OR transf* OR translat* OR disseminat*)) OR ("evidence into practice" OR "research into practice") **AND** facilitat* OR improv* OR promot* OR increas* OR develop* OR support* OR effective* OR better OR best OR strateg* OR pathway* OR intervention **AND** education OR school* OR college* OR classroom* OR teach* OR learn* OR educator* OR student* OR children OR pupil* OR achiev* OR attainment OR exam* OR attendance **NOT** health* OR dent* OR medic* OR nurses OR nursing OR clinic*
Australian Education Index (AEI) (ProQuest)	(("Research knowledge" OR evidence) N/2 (use OR used OR using OR utilis* OR utiliz* OR uptak* OR transf* OR translat* OR modif* OR engag* OR summar* OR access* OR disseminat* OR mobilis* OR mobiliz* OR implement* OR present* OR bring* OR push* OR shar*)) OR (research N/1 (use OR used OR using OR

	utilis* OR utiliz* OR transf* OR translat* OR disseminat*)) OR (“evidence into practice” OR “research into practice”) **AND** facilitat* OR improv* OR promot* OR increas* OR develop* OR support* OR effective* OR better OR best OR strateg* OR pathway* OR intervention **AND** education OR school* OR college* OR classroom* OR teach* OR learn* OR educator* OR student* OR children OR pupil* OR achiev* OR attainment OR exam* OR attendance **NOT** health* OR dent* OR medic* OR nurses OR nursing OR clinic*
Educational Resources Information Center (ERIC) (ProQuest)	((“Research knowledge” OR evidence) N/2 (use OR used OR using OR utilis* OR utiliz* OR uptak* OR transf* OR translat* OR modif* OR engag* OR summar* OR access* OR disseminat* OR mobilis* OR mobiliz* OR implement* OR present* OR bring* OR push* OR shar*)) OR (research N/1 (use OR used OR using OR utilis* OR utiliz* OR transf* OR translat* OR disseminat*)) OR (“evidence into practice” OR “research into practice”) **AND** facilitat* OR improv* OR promot* OR increas* OR develop* OR support* OR effective* OR better OR best OR strateg* OR pathway* OR intervention **AND** education OR school* OR college* OR classroom* OR teach* OR learn* OR educator* OR student* OR children OR pupil* OR achiev* OR attainment OR exam* OR attendance **NOT** health* OR dent* OR medic* OR nurses OR nursing OR clinic*
International Bibliography of the Social Sciences (IBSS) (ProQuest)	((“Research knowledge” OR evidence) N/2 (use OR used OR using OR utilis* OR utiliz* OR uptak* OR transf* OR translat* OR modif* OR engag* OR summar* OR access* OR disseminat* OR mobilis* OR mobiliz* OR implement* OR present* OR bring* OR push* OR shar*)) OR (research N/1 (use OR used OR using OR utilis* OR utiliz* OR transf* OR translat* OR disseminat*)) OR (“evidence into practice” OR “research into practice”) **AND** facilitat* OR improv* OR promot* OR increas* OR develop* OR support* OR effective* OR better OR best OR strateg* OR pathway* OR intervention **AND**

	education OR school* OR college* OR classroom* OR teach* OR learn* OR educator* OR student* OR children OR pupil* OR achiev* OR attainment OR exam* OR attendance **NOT** health* OR dent* OR medic* OR nurses OR nursing OR clinic*
ProQuest Dissertations and Theses Global	((“Research knowledge” OR evidence) N/2 (use OR used OR using OR utilis* OR utiliz* OR uptak* OR transf* OR translat* OR modif* OR engag* OR summar* OR access* OR disseminat* OR mobilis* OR mobiliz* OR implement* OR present* OR bring* OR push* OR shar*)) OR (research N/1 (use OR used OR using OR utilis* OR utiliz* OR transf* OR translat* OR disseminat*)) OR (“evidence into practice” OR “research into practice”) **AND** facilitat* OR improv* OR promot* OR increas* OR develop* OR support* OR effective* OR better OR best OR strateg* OR pathway* OR intervention **AND** education OR school* OR college* OR classroom* OR teach* OR learn* OR educator* OR student* OR children OR pupil* OR achiev* OR attainment OR exam* OR attendance **NOT** health* OR dent* OR medic* OR nurses OR nursing OR clinic*
Social Services Abstracts (SSA) (ProQuest)	((“Research knowledge” OR evidence) N/2 (use OR used OR using OR utilis* OR utiliz* OR uptak* OR transf* OR translat* OR modif* OR engag* OR summar* OR access* OR disseminat* OR mobilis* OR mobiliz* OR implement* OR present* OR bring* OR push* OR shar*)) OR (research N/1 (use OR used OR using OR utilis* OR utiliz* OR transf* OR translat* OR disseminat*)) OR (“evidence into practice” OR “research into practice”) **AND** facilitat* OR improv* OR promot* OR increas* OR develop* OR support* OR effective* OR better OR best OR strateg* OR pathway* OR intervention **AND** education OR school* OR college* OR classroom* OR teach* OR learn* OR educator* OR student* OR children OR pupil* OR achiev* OR attainment OR exam* OR attendance **NOT** health* OR dent* OR medic* OR nurses OR nursing OR clinic*
British	((“Research knowledge” OR evidence) N2 (use OR used OR using OR utilis* OR

Education Index (BEI) (Ebscohost)	utiliz* OR uptak* OR transf* OR translat* OR modif* OR engag* OR summar* OR access* OR disseminat* OR mobilis* OR mobiliz* OR implement* OR present* OR bring* OR push* OR shar*)) OR (research N/1 (use OR used OR using OR utilis* OR utiliz* OR transf* OR translat* OR disseminat*)) OR ("evidence into practice" OR "research into practice") **AND** facilitat* OR improv* OR promot* OR increas* OR develop* OR support* OR effective* OR better OR best OR strateg* OR pathway* OR intervention **AND** education OR school* OR college* OR classroom* OR teach* OR learn* OR educator* OR student* OR children OR pupil* OR achiev* OR attainment OR exam* OR attendance **NOT** health* OR dent* OR medic* OR nurses OR nursing OR clinic*
PsychINFO (Ebscohost)	(("Research knowledge" OR evidence) N2 (use OR used OR using OR utilis* OR utiliz* OR uptak* OR transf* OR translat* OR modif* OR engag* OR summar* OR access* OR disseminat* OR mobilis* OR mobiliz* OR implement* OR present* OR bring* OR push* OR shar*)) OR (research N/1 (use OR used OR using OR utilis* OR utiliz* OR transf* OR translat* OR disseminat*)) OR ("evidence into practice" OR "research into practice") **AND** facilitat* OR improv* OR promot* OR increas* OR develop* OR support* OR effective* OR better OR best OR strateg* OR pathway* OR intervention **AND** education OR school* OR college* OR classroom* OR teach* OR learn* OR educator* OR student* OR children OR pupil* OR achiev* OR attainment OR exam* OR attendance **NOT** health* OR dent* OR medic* OR nurses OR nursing OR clinic*
Scopus	TITLE-ABS((education OR school* OR college* OR classroom* OR teach* OR learn* OR educator* OR student* OR children OR pupil* OR achiev* OR attainment OR exam* OR attendance) AND ((("research knowledge" OR evidence) W/2 (use OR used OR using OR utilis* OR utiliz* OR uptak* OR transf* OR translat* OR modif* OR engag* OR summar* OR access* OR disseminat* OR mobilis* OR mobiliz* OR present* OR bring* OR push* OR shar*)) OR (research W/1 (use OR used OR using OR utilis* OR utiliz* OR transf* OR translat* OR

	disseminat*)) OR ("evidence into practice" OR "research into practice")) AND (facilitat* OR improv* OR promot* OR increas* OR develop* OR support* OR effective* OR better OR best OR strateg* OR pathway* OR intervention) AND NOT (health* OR dent* OR medic* OR nurses OR nursing OR clinic*))
Web of Science	TS=(education OR school* OR college* OR classroom* OR teach* OR learn* OR educator* OR student* OR children OR pupil* OR achiev* OR attainment OR exam* OR attendance) AND TS=(facilitat* OR improv* OR promot* OR increas* OR develop* OR support* OR effective* OR better OR best OR strateg* OR pathway* OR intervention) NOT TS=(health* OR dent* OR medic* OR nurses OR nursing OR clinic*) **Combine AND** TS=("research knowledge" NEAR/2 use or "research knowledge" NEAR/2 used or "research knowledge" NEAR/2 using or "research knowledge" NEAR/2 utilis* or "research knowledge" NEAR/2 utiliz* or "research knowledge" NEAR/2 uptak* or "research knowledge" NEAR/2 transf* or "research knowledge" NEAR/2 translat* or "research knowledge" NEAR/2 modif* or "research knowledge" NEAR/2 engag* or "research knowledge" NEAR/2 summar* or "research knowledge" NEAR/2 access* or "research knowledge" NEAR/2 disseminat* or "research knowledge" NEAR/2 mobiliz* or "research knowledge" NEAR/2 mobilis* or "research knowledge" NEAR/2 present* or "research knowledge" NEAR/2 bring* or "research knowledge" NEAR/2 push* or "research knowledge" NEAR/2 shar*) OR TS=(evidence NEAR/2 use or evidence NEAR/2 used or evidence NEAR/2 using or evidence NEAR/2 utilis* or evidence NEAR/2 utiliz* or evidence NEAR/2 uptak* or evidence NEAR/2 transf* or evidence NEAR/2 translat* or evidence NEAR/2 modif* or evidence NEAR/2 engag* or evidence NEAR/2 summar* or evidence NEAR/2 access* or evidence NEAR/2 disseminat* or evidence NEAR/2 mobilis* or evidence NEAR/2 mobiliz* or evidence NEAR/2 present* or evidence NEAR/2 bring* or evidence NEAR/2 push*or evidence NEAR/2 shar*) OR TS=(research NEAR/1 use or research NEAR/1 used or research NEAR/1 using or research NEAR/1 utiliz* or research NEAR/1 utilis* or research NEAR/1 transf* or research NEAR/1 translat* research NEAR/1 disseminat*) OR TS=("evidence into practice" OR "research into practice")

The search limits applied were as follows:

- No restrictions on the location of the study
- Studies available in English

- Studies published after 1999
- No restriction on the type of document
- Studies in education. No health sciences or other fields.

The primary search began in February 2019 and ended in May 2019. However, further studies were followed through search alerts. In addition to the primary search, a complementary search was also employed to identify both published and unpublished records that included citation tracking, searching websites, communicating with researchers and experts within the field via email, and including records already found from previous studies in the field. In the end, a total of 68,817 records were identified through the primary and complementary searches, including the search alerts. The results of the search are presented in more detail in the results section.

5.3 The selection criteria and screening

Following the search and identification of relevant studies, all the records from the electronic databases were exported to the Mendeley Reference Manager (Mendeley) to identify duplicate records. The Mendeley found 14,677 duplicate records. It is known that such applications may delete records in error and, in a large-scale review involving a high number of records, the possibility of this happening is quite high. In order to identify possible missing records, the references of all studies were exported into Microsoft Word both before and after exporting them into Mendeley, thereby creating two reference lists. These lists were then compared and 531 studies were found to have been removed as duplicate records which should not have been. These studies were then re-included before the screening process. The number of records for the screening was 54,671, including studies found via other searches such as the complementary search. A detailed table showing the results of the search and a flow diagram displaying the number of records in the selection and screening process are presented in the results section (Chapter 7).

The selection and screening involved two main stages following the removal of the duplicate records. In the first step (screening), the titles and abstracts were screened to see if the studies complied with the selection criteria. Following the screening, a full-text review was employed to identify the studies to be included on the basis of their eligibility. Both inclusion and exclusion criteria were used to screen and identify studies for inclusion. Table 5.2 below shows the inclusion criteria.

Table 5.2 Inclusion criteria

Category	Inclusion criteria
Scope	• The study must attempt to disseminate "research evidence" (research, research knowledge etc.) to teachers. • Fidelity studies will be included if their purpose is to get research evidence into use and test one or more interventions to disseminate research evidence. • Studies related to teaching (core curriculum) in the education field will be included. • Studies aiming at disseminating certain research evidence or improving use of evidence in general will be included. • Studies involving the following outcome measures will be included: - Attitudes/awareness and knowledge (or similar) - Teachers' use of research evidence (research, research knowledge etc.) - End-user/student outcomes (e.g., attainment)
Population and Setting	• There are no restrictions on the age groups taught in school. Teachers can be from the following educational stages: - Early Childhood Education - Primary Education - Secondary Education • Studies that recruited participants involving teaching process such as pre-service teachers or headteachers will be included.
Methodology	• Only empirical studies evaluating one or more interventions will be included in this systematic review. • Studies using secondary data to examine the impact of one or more interventions on participants will be included. For example, a study will be included if it obtains its data from the national pupil database to examine the impact of an intervention on student attainment. • Non-empirical studies such as reviews will not be included. If a review has single studies that meet the inclusion criteria, each of those studies will be included as a single study.

	• Intervention studies whose design or method is randomised controlled trial, quasi-experimental, regression discontinuity, or any evaluation studies involving cross-sectional or pre-post comparisons to test one or more interventions will be included.
Location, Language and Time Frame	• No restrictions on the location of the study • Studies available in English • Studies published after 1999

Studies that do not meet the inclusion criteria were excluded. The following exclusion criteria were also used to exclude studies. Studies were excluded if they were:

- Not related to education
- Not related to teaching (core curriculum)
- Studies related to psychology or students with behavioural disorders
- Not focused on teachers or other participants related to the teaching process
- Not about the evaluation of dissemination approaches to teachers
- Not primary research (non-empirical studies) such as reviews
- Not intervention studies
- Based on information not derived from research
- Not based on external research evidence
- Studies that do not provide sufficient information or details to be assessed in terms of eligibility
- Not available in English
- Studies published before 2000

Many authors suggest that there has been lack of causal evidence on various dissemination routes. However, the traditional review shows that recent years have seen interest in how to effectively disseminate research evidence to teachers. Therefore, the current study used an exclusion criterion and search studies published after 1999, which still enabled to reveal evidence for a long time period.

When humans are involved in a research study, subjectivity becomes a problem. However, a systematic review requires completing the procedures as objectively as possible. In order to minimise bias, a pilot screening was performed with a second researcher acting as an independent reviewer before the first screening. The details of the systematic review and the selection criteria were explained to the second reviewer, a PhD student within the field of education. Based on an expert opinion, 2,750 records (slightly more than 5%) were randomly selected for the pilot screening. Two reviewers then screened the titles and abstracts respectively. Inter-rater reliability computed for Cohen's kappa was 0.91, indicating a "very strong" agreement between the two reviewers (McHugh, 2012).

Following the pilot screening, all records were screened with their titles and abstracts. Most of the records were excluded as they were irrelevant (mostly health studies). The screening identified 308 records, for full-text review, of which 24 of which met the inclusion criteria.

5.4 Data extraction and quality appraisal

A data extraction form (see Appendix B) was used to assess the quality of research evidence generated by the studies that were included (n=24) and to analyse the data. The data extraction involved some important information and details such as study design, sample, missing data, intervention and the results of the studies. During the data extraction and quality appraisal process, it became evident that some researchers classified their outcome measures differently from others. For example, Rose et al. (2017) investigated the impact of an intervention on pupils' reading outcomes and teachers' use of research evidence. Although the data collection instrument was described as a "research use survey", it also provided research evidence on attitudes. To maintain consistency when summarising research evidence to allow comparison of studies on the basis of their outcome measures, such outcome measures were classified into two categories: attitudes (including awareness and knowledge) and use of research evidence (behaviours and practice).

Studies with more than one outcome measure are often assessed as a whole and rated once in terms of the quality of evidence it provides. In the process of this review, however, it was realised that the quality of evidence of different outcome measures in the same study varied. This occurred especially when a study provided evidence on both student attainment and teachers' attitudes or behaviours. Whereas student attainment mostly involved a large-scale sample with a low drop-out rate, evidence on teacher outcomes was mostly based on a small-scale survey with a high-dropout rate. Therefore, for the purposes of this study, the different outcomes of the same study were assessed separately, so some studies with differing outcome measures in terms of quality were rated more than once. Studies whose outcome measures were rated the same were addressed as one study and rated only once. However, it should be noted that the expectation was that the two outcomes (student and teacher outcomes) would be rated differently given that their population and / or data collection instrument were usually different.

Gorard et al. (2017) note that assessing the trustworthiness of evaluation findings is difficult, but that it is an important process as it explains how secure the research evidence is. This study benefited from a ‘sieve’ approach that was developed by Gorard et al. (see Table 5.3) to assess the quality of research evidence provided by the studies included in the review (p.37).

The current study used the ‘sieve’ approach for several reasons. Firstly, this approach has been found useful by some other studies and used widely in the literature (see Aslantas, 2021; El-Soufi, 2019; Gorard et al., 2020a). The approach does not describe a specific design for all research questions or use statistical limits for sample or missing cases, which gives some flexibility to reviewers considering the nature of educational research. Also, as mentioned before, Gorard et al. (2020a) conducted a similar review on how to best get evidence into use and adopted the same ‘sieve’ approach. In this respect, using the same ‘sieve’ approach might be considered useful for those who want to take account of the findings of both the reviews as they kept to a similar procedure to judge the quality of evidence. Given all of these, the current study found the ‘sieve’ approach developed by Gorard et al. (2017) appropriate and useful to judge the quality of the studies included in the review.

As shown in Table 5.3 below, the quality of evidence is assessed according to 5 characteristics, namely: design, scale, dropout/missing data, data quality and other threats. These characteristics are rated on a scale ranging from 0🔒 (low-quality) to 4🔒 (high-quality). When using this approach, the criteria need to be applied from left to right. The score should go down if the study does not meet the criteria presented in that row. This should happen repeatedly until the study meets or exceeds the criteria in the given row. It is important to note that the rating process should be repeated for every column without moving up. Briefly, if a study has a weak design and is rated as 1🔒 for its design, having a large-number of cases cannot increase the rating score and make it 2🔒.

Table 5.3 A 'sieve' to assist in the estimation of trustworthiness of descriptive work

Design	Scale	Dropout	Data quality	Other threats	Rating
Strong design for research question (RQ)	Large number of cases (per comparison group)	Minimal attrition, no evidence of impact on findings	Standardised, pre-specified, independent	No evidence of diffusion, demand or other threat	4🔒
Good design for RQ	Medium number of cases (per comparison group)	Some attrition (or initial imbalance)	pre-specified, not standardised or not independent	Little evidence of diffusion, demand or other threat	3🔒
Weak design for RQ	Small number of cases (per comparison group)	Moderate attrition (or initial imbalance)	Not pre-specified but valid in context	Evidence of diffusion demand or other threat	2🔒
Very weak design for RQ	Very small number of cases (per comparison group)	High attrition (or initial imbalance)	Issues of validity or appropriateness	Strong indication of diffusion, or other threat	1🔒
No consideration of design	A trivial scale of study, or unclear	Attrition huge or not reported	Poor reliability, too many outcomes, weak measures	No consideration of threats to validity	0🔒

Source: (Gorard et al., 2017, p.37)

The first criterion is research design. This criterion allows the reviewer to consider the research question and judge the design of the study on its own merit instead of accepting a certain design as ideal for all research questions posed in the studies. This study aimed to identify the most promising approaches to get research evidence into use so that one of these could be tested through an RCT. Given that the standard literature review suggested that there is lack of robust evaluations on how to disseminate research evidence, only a few robust evaluations were expected to be revealed by the systemic review. This expectation was also supported by the findings of a recent review published by Gorard et al. (2020a) involving studies in education, health and other fields. Therefore, this review was not limited to RCTs or quasi experimental designs, but also included pre-post evaluations without comparison group. Such studies were considered to be weak in terms of design and most were rated 1🔒 as they are generally based on small-scale samples, but they increased the number of studies providing evidence for each route.

This allowed the reviewer to determine a promising dissemination approach taking account of both robust and weak evidence due to the fact that when robust evidence on certain approaches indicate negative impact, the reviewer may consider other weak studies indicating positive impact to choose an approach to be tested. In other words, if there is sufficiently robust evidence to judge an approach as being ineffective, the approach can be discarded and does not need to be evaluated. Other approaches considered to be promising according to evidence may be subject to testing even if the quality of evidence is moderate. As Gorard et al. (2020a) state, research evidence may also show what does not work, which helps researchers avoid using ineffective approaches. This approach could help save time and money.

The second and third criteria are scale and missing data. No statistical limits are used in this approach to provide flexibility to users when judging sample size and missing data. In this review, studies on student attainment generally involve a large sample size with a low dropout rate as the data is usually obtained from national pupil databases. On the other hand, the data relating to teachers are generally based on pre-post surveys, which often means a small sample size with a high dropout level. Consequently, this approach considers such limitations and factors in light of the outcome measures of the studies.

Data quality refers to the type of data used in the study. According to Gorard et al. (2017), data based on real life measurements, such as the length of an object, lead to better results than data based on, for example, a survey about motivation. They note that: “In social science it is best to assume that all measurements are inexact. For any dataset there will be errors in the measurement” (p.43). Therefore, this study assumes that all measurements are inexact considering the outcome measures of the studies included in the review. However, some are stronger than others – for example, attainment scores are generally better measured than attitudes scores.

The fifth criterion considers other issues such as a conflict of interest (CoI) that can affect the quality of research evidence. For example, according to Gorard et al. (2017), an evaluation conducted for a private company with a vested interest in the study may be more likely to provide misleading results.

Some of the studies were rated together with a research professor prior to the data appraisal to check the level of overall agreement. A total of 24 studies were then rated by the author, using the sieve approach described above.

5.5 Data analysis

Following the data extraction and appraisal, the studies included in the review were analysed. The analysis consisted of descriptive and narrative analyses. The descriptive analysis addressed the results of the search, screening and the main characteristics of the studies (e.g. design and intervention) including quality appraisal. The results are presented with tables and a flow-diagram.

The dissemination approaches used by the studies included in the review were classified into six categories according to their distinguishing characteristics: passive with or without active (light) support, active single-component, active multi-component, collaborative, technology supported, and evidence embedded in curriculum. This classification helped to map all studies and, more importantly, allowed a comparison among the six dissemination approaches to determine the most promising approaches.

In the narrative analysis, the results for each of the six dissemination approaches are summarised by their impact and quality of evidence. In addition, relevant information regarding the studies, such as their purpose, intervention and outcomes, are narratively summarised. In order to determine whether or not an approach is promising, both the quantity of studies and their quality of evidence (rating scores ranging from 0🔒 to 4🔒) were considered. The studies providing high-quality evidence (high rating score) were given superiority over those generating weak evidence (low rating score). Approaches showing the most positive studies based on higher quality evidence were considered more promising than other approaches. In other words, some approaches may have more promising studies than others, but they may not be seen promising if all the studies provide weak evidence. Approaches with high quality evidence indicating negative impact were considered to be strategies to be excluded for the evaluation in this study.

The systematic review identified only 24 studies with a variety of methods of dissemination. Even when the dissemination approaches were classified into broader categories, there were only a few studies in each category. Moreover, some of the key details of these studies, such as their outcome measures, quality of evidence and data analysis differed, which prevented a precise comparison of these details. Some of the studies did not clearly report key details such as attrition rate. Given these issues and the purpose of this study, a meta-analysis was not performed as it would have been misleading.

CHAPTER 6

The impact evaluation – research design and methods

This chapter presents the methods and procedure used for the impact evaluation. Teachers' attitudes to research evidence and their (self-reported) use of research evidence were addressed through the pre-survey results of the impact evaluation, and description of this is included in this chapter.

6.1 Research questions

This chapter involves both primary and secondary research questions.

6.1.1 Primary research questions

The primary objective of this study was to evaluate a promising approach to the dissemination of research evidence to teachers. A workshop training based on the review findings with supporting evidence-based resources was used as an intervention to disseminate research evidence to teachers. The following research questions were set to meet the primary objective:

- What is the impact of disseminating research evidence through workshop training with supporting evidence-based resources on teachers' attitudes towards the use of research evidence?
- What is the impact of disseminating research evidence through workshop training with supporting evidence-based resources on teachers' use of research evidence in schools?
- Does the impact of disseminating research evidence through workshop training with supporting evidence-based resources on teachers' attitudes towards the use of research evidence differ according to their demographic characteristics (gender, age, job, experience and degree)?
- Does the impact of disseminating research evidence through workshop training with supporting evidence-based resources on teachers' use of research evidence differ according to their demographic characteristics (gender, age, job, experience and degree)?

6.1.2 Secondary research questions

In addition to the impact evaluation, this study aimed to examine teachers' attitudes to research evidence and their use of research evidence, using the pre-survey results of the evaluation. The secondary research questions set in the study are:

- What are teachers' attitudes towards the use of research evidence in schools?
- To what extent do teachers use research evidence in practice?
- Do teachers' attitudes towards the use of research evidence differ according to their demographic characteristics (gender, age, job, experience and degree)?
- Does teachers' use of research evidence differ according to their demographic characteristics (gender, age, job, experience and degree)?

6.2 Design and rationale

According to Gorard (2013), RCTs and other experiments have superiority for "causal, comparative *and* time-dependent claims" compared to other designs (p.17). The author is of the view that RCTs are even better than quasi-experiments as they require a random allocation of cases to comparator groups. Moreover, Torgerson (2003) notes: "The most robust method of assessing whether something is effective or not is the randomised controlled trial (RCT)." (p.19). Given these suggestions, the primary research questions (impact evaluation) were addressed through an RCT. Both intervention and outcome measures were determined taking account of the review findings and other factors such as budget and time. The author intended to conduct an efficacy trial through an RCT. "A RCT is a planned experiment using a scientific procedure that is designed to compare two or more forms of treatment or behaviour" (Bentham, 2015, p. 117). According to Bentham, the randomisation process ensures that differences due to external influences do not occur between groups, and this helps the researcher to obtain an unbiased estimate of the effect of the treatment.

The secondary research questions were addressed with a survey design. The data was obtained from the pre-survey of the evaluation to reflect the situation prior to the intervention.

6.3 Sample and randomisation

The participants' recruitment in the evaluation involved two stages - school and participant level recruitment. The schools were recruited on a voluntary basis. The author participated in a series of events held by the DECE and the ESRC Festival of Social Science in Durham in order to recruit schools. Some headteachers/school leaders in the events were given information about the evaluation with an invitation letter and a consent form (see Appendix C). The author asked headteachers/school leaders to share the letter and consent form with other schools in the region (North East England) via email, if possible. Therefore, the exact number of headteachers/school leaders who received the email with an invitation letter and a consent form is unknown. 23 headteachers/school leaders (for 24 schools) were interested in the evaluation at the start, some of which signed the consent form to take part in the evaluation. The evaluation eventually involved nine primary schools in England, most of which were in North East England. For these nine schools, eight headteachers/school leaders were recruited after they gave their consent to participate. One of the headteachers who took part in the study was representing two schools.

All necessary communications with teachers for the participant recruitment and the evaluation procedures were made through their leaders who agreed to participate in the study. Since one of the headteachers took part in the study for two schools, these two schools were treated as one in the randomisation process given the possibility of knowledge sharing between the schools or participants. This means that this study involved eight headteachers/school leaders representing nine primary schools. The teachers, headteachers or other participants related to the teaching process in the school, who were recruited as individual participants on a voluntary basis were recruited through the nine headteachers/school leaders. They were also given an information sheet (see Appendix D) about the evaluation, with a consent form. The study collected its data through a pre-post survey, which is explained in detail in the following pages. The teachers' consent was also sought in the survey before they completed it. In the end, a total of 46 teachers / headteachers took part in the evaluation, excluding other staff, pupils or parents.

The randomisation was conducted at school level by a research professor within the field of education. Nine primary schools were randomly allocated to the treatment (n=4) or control group (n=5). Following the randomisation, teachers who participated in the evaluation from the treatment (n=25) and control group (n=21) were asked to complete a pre-survey asking questions about their attitudes to and use of research evidence. Table 6.1 presents the number of participants by groups and schools.

Table 6.1 The number of participants for the pre-survey and post-survey

	Schools	Teachers pre-survey	Teachers post-survey
Treatment group	4	25	12
Control group	5	21	13
Total	9	46	25

As shown in Table 6.1 above, a total of 46 teachers completed the pre-survey, 25 of whom also completed the post-survey. While the pre-survey analysis involved a total of 46 teachers, the sample for the impact evaluation was 25. This level of attrition was largely due to Covid lockdown.

6.4 Intervention

The studies that were assessed as providing high-quality evidence in the systematic review used passive approaches (e.g., simply sharing research summaries with teachers) to disseminate research evidence. These studies indicated that such passive dissemination does not work in practice. Although the studies that proposed other approaches did not yield evidence that was as robust as the studies that used the passive approach, the review identified three approaches that appeared to be more promising than others, namely active multi-component, technology supported and embedding evidence in curriculum. These approaches were not supported by high-quality evidence, but there were at least no studies that yielded high-quality evidence showing a negative impact.

A workshop training with supporting evidence-based resources, which is classified as “active multi-component approaches” in the review, was adopted as an intervention. The workshop training approach was identified as a suitable intervention method within the time and budget restrictions of the study, based on the findings of the review.

For the intervention, participants were invited to a two-hour workshop that had the aim of helping teachers to understand research evidence. The workshop was held by a research professor within the field of education at Durham University in February 2020. The training was recorded and involved participants on a voluntary basis. Attendance was very sparse. The video recording only involved the trainer without showing any of the participants (see Figure 6.1).

The recorded workshop was shared with the treatment teachers through the headteachers / school leaders at the beginning of March 2020. This enabled all treatment teachers to take part in the workshop, and served as a refresher for the participants. Although the duration of the intervention was planned to span 4 months, in reality it spanned over 6 months as teachers were given extra time to complete the post-survey due to disruption caused by the Covid-19 pandemic and the summer holidays. The impact of the Covid-19 pandemic on the evaluation and missing cases is explained in the following pages and in the results section (Chapter 9). Once the post-survey data was obtained following the intervention period, the same workshop training and evidence-based resources were shared with the control teachers electronically, in a waiting list design.

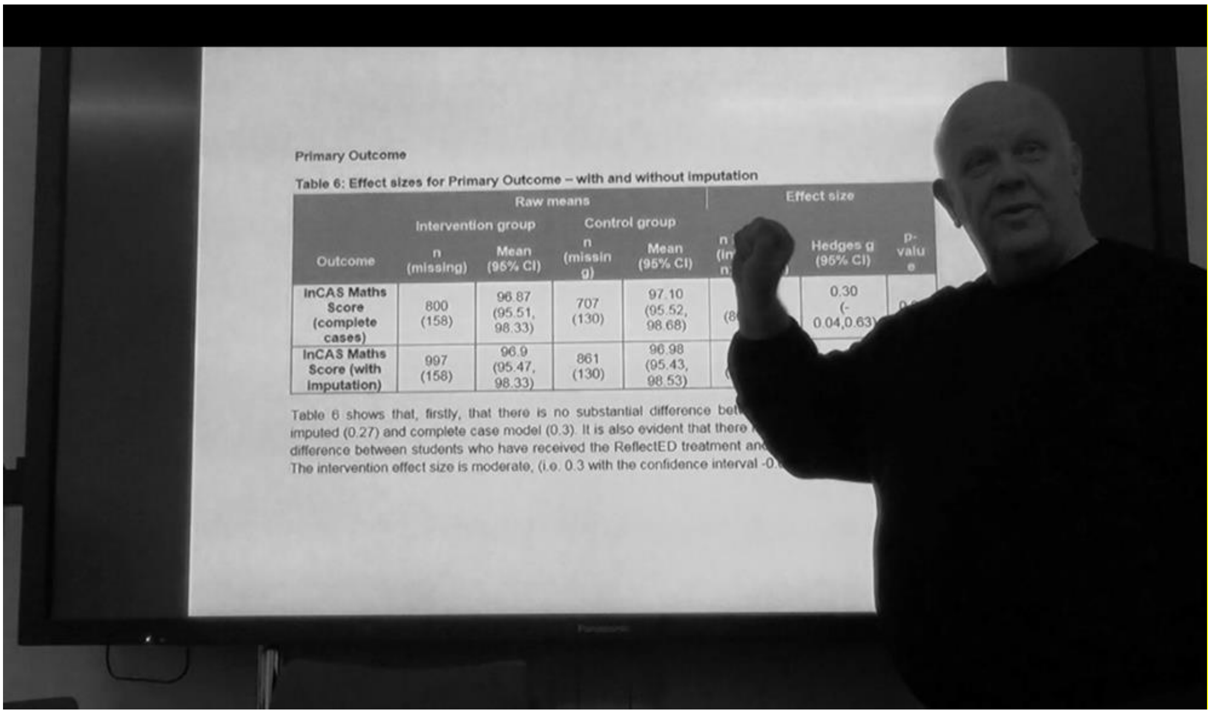

Figure 6.1 Workshop on helping teachers to understand research evidence

The workshop was designed to help teachers understand research evidence better rather than simply presenting existing evidence on the most effective evidence-based approaches to be used by teachers in schools. Specifically, it attempted to help teachers reflect more critically on the research findings or summarised research evidence, assess the trustworthiness of the research evidence, and benefit from existing evidence on the most effective approaches to use.

The treatment teachers were also given extra supporting evidence-based resources, such as an evidence kit identifying promising approaches to improve literacy in primary schools in the forms of handouts. These resources were also supplied electronically via email to all treatment participants. In addition, teachers were offered desk-based support (via email) if they needed it. Table 6.2 shows the components of the intervention, including a more detailed description of the training.

Table 6.2 Description of the intervention

Intervention	Workshop training with supporting evidence-based resources
Components of the intervention	• Workshop training • Supporting evidence-based resources and educational materials • Desk-based support (via email)
Description of the workshop	
Location	Durham University, Durham.
Place	A large conference room at School of Education
Duration	Two hours
Trainer	A research professor at Durham University
Type of the training	An interactive workshop training
Date and time	26.02.2020 17:00-19:00
Expenses and participants' rights	• Free participation on a voluntary basis • Free parking on site • Refund for travel expenses • Free buffet with refreshments plus tea/coffee from the outset
Educational materials and evidence-based resources	The following resources were shared with the teachers: • The slides used in the workshop • The Evidence Kit: identifying potential approaches to improving literacy in primary schools • A list of potential approaches: A template showing potential approaches to be ranked after considering the evidence kit

	• ReflectED Metacognition: A summary of an efficacy trial carried out by ReflectED • Effective classroom instructions for primary literacy? A critical review of the causal evidence: A single study review of literacy approaches in primary school (see Gorard, 2020) • Key concepts for thinking critically about educational claims https://thatsaclaim.org/educational/
Content of the training	
Themes	Content of the training and rationale behind the materials/evidence-based resources
Introduction	In the introduction part, the trainer gave background information about the use of evidence in education and explained the content of the training. Teachers were given information about a range of ways which practitioners could engage with evidence. These ways include: • Using research evidence as it is forced by law • Making informed decisions considering research evidence on a specific intervention or approach • Increasing knowledge and understanding on research evidence in a general way Participants were informed that the workshop training would focus on the third one. The intervention aimed to help teachers understand research evidence better and improve their use of research evidence in a general way.
Quality of evidence	In this part, the trainer addressed the quality of evidence, which is considered one of the key issues in the EBP/EIP. The trainer did emphasise the importance of assessing and judging the trustworthiness of research evidence. The trainer mainly addressed the following issues or questions: • How to judge the quality of research evidence

	• Whether researchers or users should unquestioningly trust research evidence • Whether researchers or users should rely on a particular paradigm, method, author, organisation or institution to trust evidence • Why do we need to investigate the "impact" without relying only on what users' or other relevant actors' report about a certain approach/intervention or strategy? • Real life examples showing that evidence of approaches that might not actually be trustworthy
Form of evidence and its comprehensibility	Reading a full evaluation report might be difficult for practitioners or even for researchers. There is an assumption that users may understand better research summaries compared to a full evaluation report. Teachers were given a research summary (ReflectED Metacognition: A summary of an efficacy trial carried out by ReflectED) and shown some tables presenting research evidence and abstracts from various reports in the slide. These resources were given or shown in order to ask various questions to allow a discussion, some of which were as follows: • What do you understand from these reports/tables/abstracts? • How can you interpret research evidence from these reports/tables/abstracts? • How can you get research evidence from these reports/tables/abstracts into use?
Identifying the promising approaches	The Teaching and Learning Toolkit developed by the EEF was introduced. The Toolkit simply shows research evidence on various approaches, including the strength of evidence and the cost of using it. The trainer intended to help teachers understand how they can benefit from such toolkits and get evidence into their practice.

	Teachers were also given an evidence kit to help them understand how to identify promising approaches to improving literacy in primary schools. The evidence kit explains how to identify the promising approaches considering the impact and cost of any intervention, and the strength of evidence. The kit also includes a list of potentially promising approaches for improving literacy in primary schools. Teachers were then given a template showing potential approaches to be ranked after considering the evidence kit. The trainer and teachers discussed how they ranked the approaches considering the evidence kit. The trainer also addressed various issues or questions about identifying promising approaches from the single study reviews, some of which are below: • How can you identify the promising approaches considering the quantity and quality of single studies on a certain approach? • How might weak studies showing positive impact be misleading while identifying the promising approaches? • What can or should users do if high-quality evidence shows negative impact for a certain approach? In order to address these issues or questions, teachers were given a single study review (see Gorard, 2020) and shown additional tables summarising single studies of different reviews on various approaches/interventions. Lastly, the trainer mentioned key concepts for critically about educational claims (https://thatsaclaim.org/educational/). This aimed to help teachers interpret better research findings/evidence or claims in education.

In sum, the intervention aimed to help teachers understand research evidence through workshop training with supporting evidence-based resources, involving some evidence-based approaches. The intention of the intervention was to disseminate research evidence to teachers in a general way rather than to encourage the teachers to use specific research evidence. Table 6.3 shows a simple logic model for the intervention.

Table 6.3 Helping teachers to understand (and use) research evidence (logic model)

Situation/need	Resources	Activities	Outcomes	
			Short term outcomes	Long term outcomes
Despite the importance of using evidence in schools, teachers' use of research evidence is still limited in practice. It is now widely accepted that research evidence needs to be disseminated to teachers effectively to facilitate utilisation of research evidence. However, little attention has been directed towards causal evidence on how to best disseminate research evidence to teachers. There is a need to evaluate one or more promising approaches to get evidence into use.	-Educational materials -Evidence-based resources -Time -Money (expenses for workshop training) -Trainer -Facilities	-Recruiting schools and participants -Workshop training for participants -Sharing educational materials and evidence-based resources with participants -Desk-based support (via email) Participants -Teachers -Headteachers	Teachers have more positive attitudes towards research evidence. Teachers are more likely to use research evidence in practice.	Teachers are able to use research evidence in their practice, thereby improving student outcomes (e.g., student attainment).

Assumptions	External Factors
-School leaders and teachers will be interested in the evaluation -Teachers/headteacters will attend the workshop training -There will be sufficient time to make changes in teachers' attitudes and behaviours	-Political environment -Availability of teachers/headteachers -Teachers'/ headteachers' workload -Willingness of teachers/headteachers to participate in the workshop and embrace new ideas

6.5 Outcome measures and data collection

The evaluation in this study involved two outcome measures: teachers' attitudes to research evidence and their use of research evidence in schools. The data collection instrument involved questions regarding 'use of research evidence', without assessing 'accurate use of research evidence' or 'quality use of research evidence'. The data was obtained through an online survey developed for this study (see Appendix E). The survey was created and distributed on Bristol Online Surveys via Durham University both before and after the intervention (pre-post survey). The pre-survey was completed by all the teachers taking part in the study (n=46) in February, 2020. As mentioned before, since the teachers needed extra time to complete the survey due to the Covid-19 pandemic and the summer holidays, the time for submitting the post-survey was extended by two months to September, 2020. The survey comprised questions about the teachers' attitudes to research evidence (15 questions) and their use of research evidence (18 questions). Some additional questions about the participants' demographic characteristics were asked to describe the population and answer the research questions addressing the impact of the intervention by subgroups (e.g. male and female teachers).

With respect to the teachers' attitudes, this study modified and used "The Evidence-Based Practice Attitude Scale (EBPAS)" by Aarons (2004). The scale was developed and used to examine mental health provider attitudes toward adoption of evidence-based practices in the USA. It was adopted in this study for several reasons, the foremost of which was that no questionnaire was identified that was widely used by researchers in the education field and the scale developed by Aarons had been used in the field of education by other researchers (see Collins, 2017; Monahan et al., 2014). Health and education have similar principles, as mentioned in the standard literature review, and it was deemed that this study would benefit from the use of the EBPAS to examine teachers' attitudes to research evidence. For the purposes of this study the scale was modified to take into account some country (England and USA) and specific field (health and education) differences. The draft version of the modified scale was shared with a research professor for his comments. This study used the final version of the modified scale (see Appendix E for the initial and modified versions of the scale).

Aarons (2004) identified the following four dimensions of attitudes using a scale comprising 15 questions: (1) intuitive "*Appeal* of EBP, (2) likelihood of adopting EBP given *Requirements* to do so, (3) *Openness* to new practices, and (4) perceived *Divergence* of usual practice with research-based/academically developed interventions" (p.1). In order to see how items worked together and decide components in the modified scale for this study, this study involved a Pearson correlation matrix and then varimax rotation via factor analysis, using the data from the pre-survey (see Appendix F). Although the analysis indicated six components, some of the items also worked under different components. The results of the analysis were shared with a research professor within the field of education with some comments made by the author of this study. It was agreed that the analysis of this study did not provide convincing evidence to classify items into either the six components or one underlying component. Therefore, the data was analysed item by item against all the questions in the attitude scale. However, the attitude scale was divided into two tables considering the varimax rotation via factor analysis and a research professor's views. The first eight questions concerned teachers' general attitudes to research evidence and the rest concerned the influences that might affect teachers' use of a new intervention.

Table 6.4 lists the questions regarding teachers' general attitudes to research evidence. Participants were asked to indicate the extent to which they agree with each item using the following scale: 0= Not at all; 1 = To a slight extent; 2 = To a moderate extent; 3 = To a great extent; 4 = To a very great extent. Of the eight questions related to the general attitudes, four were negative items (coloured). These items were only reversed for the Pearson correlation matrix and varimax rotation via factor analysis. In order to demonstrate the actual questions as they appeared to the teachers and their actual responses, neither the questions nor the teachers' responses have been changed or reversed in the presentation of the findings. The method used to analyse and interpret the data pertaining to all the questions is explained below.

Table 6.4 Teachers' attitudes to research evidence

Item	0	1	2	3	4
Research-based interventions/methods are not useful in practice	O	O	O	O	O
Experience is more important than using manualised interventions/methods	O	O	O	O	O
I am willing to use new and different types of interventions/methods developed by researchers	O	O	O	O	O
I like to use new types of interventions/methods to help my students	O	O	O	O	O
I am willing to try new types of interventions/methods even if I have to follow a teaching/training manual	O	O	O	O	O
I know better than academic researchers how to care for my students	O	O	O	O	O
I would not use manualised interventions/methods	O	O	O	O	O
I would try a new intervention/method even if it were very different from what I am used to doing	O	O	O	O	O

Note:0= Not at all; 1 = To a slight extent; 2 = To a moderate extent; 3 = To a great extent; 4 = To a very great extent.

Table 6.5 below lists the questions concerning the influences that might affect teachers' adoption of a new intervention (seven items). In this study, the teachers' adoption of a new intervention based on evidence (first item) is considered preferable. In the remaining six circumstances, the teachers' adoption of a new intervention might still work in practice, but may represent unwarranted use. Meanwhile, if teachers adopt a new intervention based on evidence compared to the other circumstances in the table below, this represents a positive attitude towards the research evidence in this study.

Table 6.5 Teachers' attitudes to research evidence

If you received training in an intervention that was new to you, how likely would you be to adopt it if:	0	1	2	3	4
Evidence said it worked?	O	O	O	O	O
It was intuitively appealing?	O	O	O	O	O
It "made sense" to you?	O	O	O	O	O
It was required by your school (headteacher, principal etc.)?	O	O	O	O	O
It was required by law?	O	O	O	O	O

It was being used by colleagues who were happy with it?	O	O	O	O	O
You felt you had enough training to use it correctly?	O	O	O	O	O

Note:0= Not at all; 1 = To a slight extent; 2 = To a moderate extent; 3 = To a great extent; 4 = To a very great extent.

With respect to the teachers' use of research evidence in schools, this study adopted a modified version of the Teachers' Utilisation of Research Findings Questionnaire developed and used by Ogunleye (2014), who had used the questionnaire to investigate the impact of an intervention on teachers' use of research evidence in Oyo State, Nigeria. The initial questionnaire (20 items) was modified to fit the purpose of this study and the context in England. As with the attitude scale, the modified survey was improved following feedback by a research professor. The final modified questionnaire (18 items) was used for this study (see Appendix E for the initial and modified versions of the questionnaire).

The initial version of the questionnaire used by Ogunleye (2014) did not involve multiple components/factors. As in the attitude scale, this study involved a Pearson correlation matrix and then varimax rotation via factor analysis, based on data from the pre-survey to establish how the items worked together in the modified questionnaire. In contrast to the attitude scale, there were higher correlations between items. The analysis indicated two components. However, some of the items worked under both components (see Appendix F). As in the attitude scale, there was agreement between the author of this study and a research professor in the education field that the analysis did not provide convincing evidence to classify the items into either two components or one underlying component. Therefore, all the questions about the teachers' use of research evidence were analysed item by item. Table 6.6 lists all the questions (18 items) about the teachers' use of research evidence. Unlike the attitude scale, there were no negative items in terms of use of research evidence. Therefore, a higher agreement for these questions by teachers was considered preferable in this study.

Table 6.6 Teachers' (self-reported) use of research evidence

Item	0	1	2	3	4
Level of agreement with "I utilise information from research":					
to get acquainted with effective teaching strategies	O	O	O	O	O
to help in improving my learners' progress	O	O	O	O	O
for innovations in school curricula	O	O	O	O	O

on how to improve my learners' interest in schooling	O	O	O	O	O
to source better evaluation techniques for day-to-day activities	O	O	O	O	O
in order to prepare my lessons well	O	O	O	O	O
to help me in effective delivery of instruction	O	O	O	O	O
for effective use of instructional materials	O	O	O	O	O
to become knowledgeable on recent theories of child development	O	O	O	O	O
for theories behind various new teaching strategies	O	O	O	O	O
to improve my content knowledge of school subjects	O	O	O	O	O
for the acquisition of more pedagogical knowledge	O	O	O	O	O
for more effective classroom management techniques	O	O	O	O	O
for skills at motivating and reinforcing my learners in learning	O	O	O	O	O
to acquire knowledge and skills in using modern questioning techniques in class	O	O	O	O	O
for further verification of research findings	O	O	O	O	O
to increase the level of classroom interaction i.e. teacher-student, student-student and student-material interactions	O	O	O	O	O
to assist me in planning and carrying out research involving my learners	O	O	O	O	O

Note:0= Not at all; 1 = To a slight extent; 2 = To a moderate extent; 3 = To a great extent; 4 = To a very great extent.

The study also intended to obtain additional data through interviews with some of the teachers / school leaders from both the treatment and control schools. It was thought that such interviews could help us improving our understanding on ‘how’ dissemination approaches work or can work in practice from teachers’ perspective considering that both ‘does it work’ and ‘how does it work’ are important questions to be addressed. It was also thought that this study could also benefit from such interview data to better understand and interpret the results of systematic review and impact evaluation. However, due to disruption caused by the Covid-19 pandemic the interviews were not held. The results of the survey were supported by reference to the comments of some of the participants who took part in the workshop. These participants were asked for their consent to be quoted.

Since this study did not attempt to disseminate a piece of specific research evidence and expect teachers to use it accurately in practice, the fidelity was not measured.

6.6 Data analysis

Prior to the evaluation of the impact, this study addressed the secondary research questions examining teachers' attitudes to research evidence and their use of research evidence before the intervention (Chapter 8). The participants' demographic characteristics (gender, age, job, experience and degree) are presented first for the pre-survey completed by all participants (n=46). The results of the pre-survey for all the participants were presented in the form of tables involving mean scores (average agreement scores) and standard deviation (SD), and interpreted narratively with reference to the tables. The mean scores were then compared by participants' demographic characteristics to determine whether the participants' attitudes to research evidence and their use of research evidence differed by subgroups.

The results of the impact evaluation appear in Chapter 9. The descriptive results of the evaluation were first addressed. These results included the achieved sample and missing cases with their demographic characteristics, and missing data and sensitivity analyses. The missing data and sensitivity analyses are briefly explained below, but the results of the missing data and sensitivity analyses are presented before the results of the impact evaluation in Chapter 9.

To assess the impact, the study presented the gain score for each item based on the changes between the pre- and the post-survey mean scores. The difference in the changes between the treatment and control groups was also shown as an effect size, dividing the gain score by their overall standard deviation. According to Coe (2002) "effect size is simply a way of quantifying the size of the difference between two groups" (p.1), and this is "just the standardised mean difference between the two groups" and is calculated as follows (p.2):

$$\text{Effect size} = \frac{\text{(Mean of treatment group)} - \text{(Mean of control group)}}{\text{Overall Standard deviation (SD)}}$$

In this study, the difference in mean (average agreement score) from pre- to post survey was shown as a gain for each group (treatment and control). The effect size was then calculated by dividing the difference in gain by their overall standard deviation (SD) as follows:

$$\text{Effect size} = \frac{\text{(Gain of treatment group)} - \text{(Gain of control group)}}{\text{Overall Standard deviation (SD)}}$$

The effect size calculated in this study is based on the treatment group, which means that, if the effect size is positive, this shows a positive impact for the treatment group except for the four negative items. As mentioned before, out of the eight questions about the participants' general attitudes to research evidence, four (coloured in the tables) were negative in terms of general attitudes. Since the actual questions and responses are presented without reversing in the tables, the negative items should be interpreted as negative for attitudes. For example, the following item is negative in terms of general attitudes: research-based interventions/methods are not useful in practice. For this and other negative items, the bigger mean represents more negative attitudes and the smaller mean represents more positive attitudes. Similarly, a positive effect size for this item does not mean that there is a beneficial impact on the treatment group from the intervention but means that the treatment teachers made bigger gains for this negative item in terms of their attitude to research evidence.

The results of the evaluation are first presented by groups (treatment and control). Some of the participants' views are also presented briefly. The results of the impact evaluation (demographic characteristics) are then summarised for each subgroup respectively. Similarly, the subgroup analyses indicate the changes from pre-survey to post-survey with mean scores and gain based on the difference in means and "effect" size, dividing the difference in gain by their overall standard deviation (SD). The effect size is based on the treatment group. All scores and effect sizes are shown for each subgroup to enable a comparison by subgroups.

More detailed examples and explanation are given in the presentation of the results of the first tables to help readers interpret the findings.

6.6 Missing data and the impact of the Covid-19 pandemic on the evaluation

All the participants were asked to complete the pre- and post-survey with a pseudonym so that it could be established that a participant had completed both the pre- and post-survey to enable a comparison for the evaluation without revealing the participants' names. This was also important to identify missing cases and calculate the achieved sample and the participants' demographic characteristics.

Although the Covid-19 pandemic emerged at the end of 2019 and did not considerably affect the pre-survey and intervention, the situation got worse during the evaluation, which caused some restrictions in the UK. The intervention did not involve any parents, pupils or any other staff apart from teachers or school leaders / headteachers. Also, the intervention did not require an application of a specific piece of research evidence by teachers in schools. Therefore, the implementation of the intervention remained feasible. However, the restrictions relating to the pandemic had escalated by the time that the teachers were asked to complete the post-survey in middle of 2020. Given these restrictions and its effect on work and daily life, participants were given extra time to complete the post-survey. After approximately seven months, the online post-survey was closed. Although extra time had been given, the evaluation experienced a considerable dropout rate in the post-survey.

The flowchart in Figure 6.2 illustrates the dropout rate and achieved sample at participant level. The participant level dropouts for the treatment group, control group and overall (combining both groups) were 52%, 38% and 46 %, respectively. The number of participants who completed both pre- and post-survey (achieved sample) for the evaluation was 25.

“Any dropout from the study is serious after the cases have been allocated to comparison groups, because there is no reason to believe that the dropout will be either random or balanced” (Gorard et al., 2017, p.41). Therefore, missing data and sensitivity analyses were employed to understand how the missing data might affect the results of the impact evaluation.

First, the participants’ demographic characteristics by missing data and achieved sample were presented to establish whether the dropout was meaningful in terms of subgroups. Also, Gorard et al. (2017) suggests a test to address the missing cases with “The number of counterfactual cases that would be needed to disturb the finding (NNTD)” (p.45), which is a very stringent test. They note that the NNTD would simply be “the absolute value of the ‘effect’ size multiplied by the number of cases in the smaller group in the comparison” and “the number needed to disturb is the number of counterfactual cases needed to change the effect” (p.45). According to this analysis, if the NNTD is larger, it will take more missing (or counterfactual cases) to reverse the effect. In this respect, NNTD was calculated to test whether or not the missing cases would reverse the effect. The missing data and sensitivity analyses showed that there was a possibility that missing cases could reverse the effect.

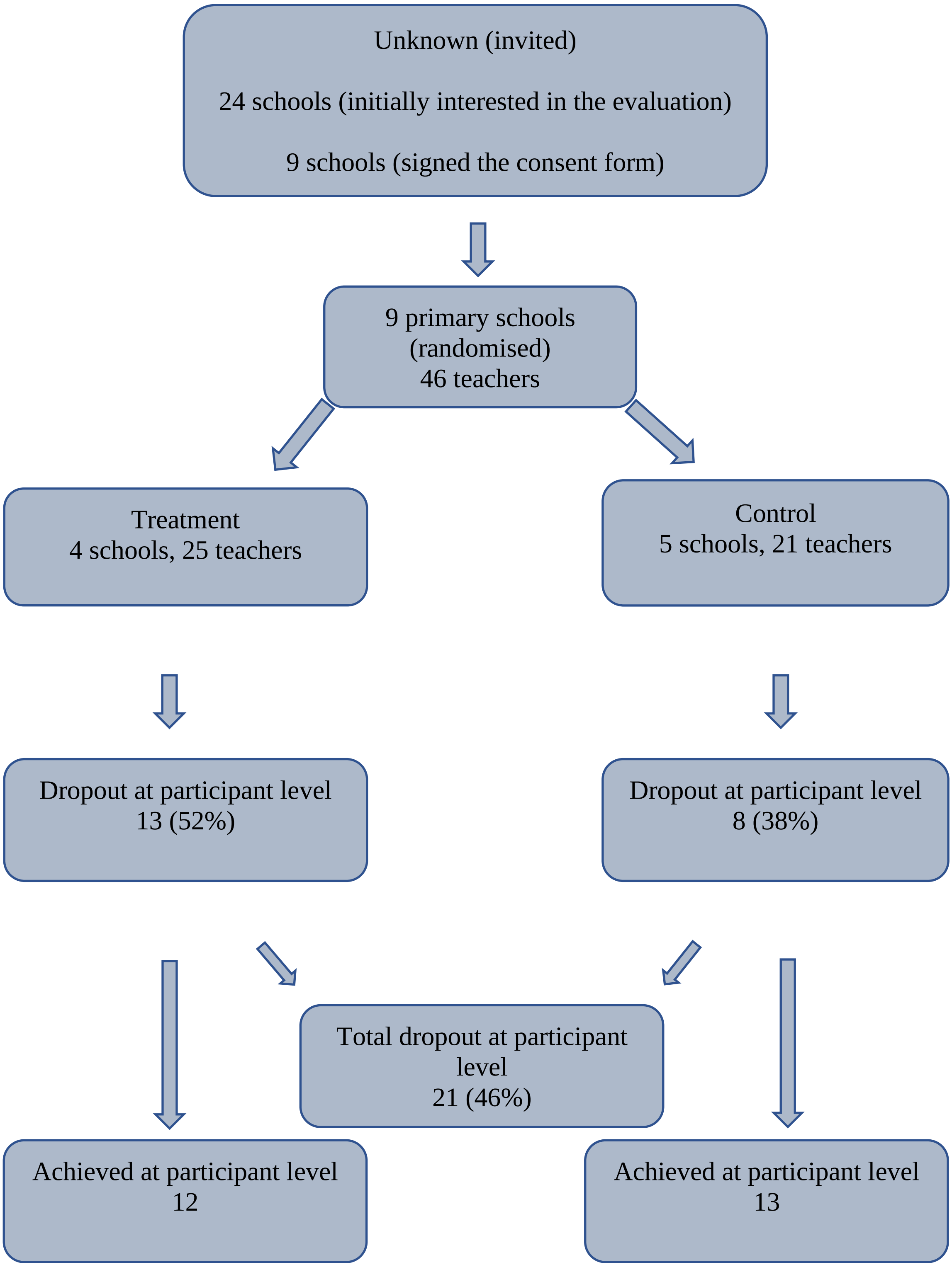

Figure 6.2 Flowchart showing the dropout rate and achieved sample

Lastly, participants who completed the post-survey may have had significantly different pre-survey mean scores compared with those who completed the post-survey, which would bias the findings. Therefore, the mean scores of the pre-survey were compared for participants who did not complete the post survey (missing data) and those who completed the post-survey. Further details and comprehensive analyses of missing data, including the NNTD scores, are addressed in the presentation of the results of the impact evaluation (Chapter 9).

6.7 Ethics and the conflict of interest (CoI)

This project received ethical approval from the School of Education Ethics Committee at Durham University (see Appendix G).

In the evaluation, schools and teachers were recruited on a voluntary basis. Headteachers/school leaders were contacted and given an information sheet regarding the evaluation and a consent form for participation (see Appendix C). The schools (n=9) whose headteachers/school leaders signed and returned the agreement form were recruited. As mentioned before, since one of the headteachers was representing two primary schools, these schools were treated as one school as there was the possibility that some information or resources would be shared between these schools even if they were allocated to different groups (treatment or control).

Following the recruitment of all the schools, teachers or other participants related to the teaching process in the school were given an information sheet that included a consent form to participate in the project through the headteachers /school leaders (see Appendix D). The participants' consent was also obtained prior to their completion of the survey. A total of 46 teachers took part in the study on a voluntary basis using a pseudonym which them to participate anonymously. No other staff, pupils or parents took part in the evaluation.

Gorard et al. (2017) note that the issue of conflict of interest (CoI), which is a considerable threat to any study, should be considered while addressing the trustworthiness of a study. According to the authors, this has traditionally referred to a situation where stakeholders "stand to gain financially" from the findings of the study (p.43). They have also given some examples and scenarios related to CoIs. For example, this concern may arise when a study on the hazards of tobacco is funded by companies within the tobacco sector. Another scenario might be that researchers may avoid testing their own or other well-known claims in the literature using sufficiently robust evaluations. Some studies include "a declaration of conflicting interest" in their report (see Doabler et al., 2014). This study here declares no potential conflict of interest (Col) connected with the research project.

SECTION 3
RESULTS

This section consists of three chapters. Chapters 7, 8 and 9 present the results of the systematic review, the pre-survey and the impact evaluation respectively.

The initial findings of the systematic review have been published as a conference paper (Erkan, 2021), and an overall impact evaluation appeared in Erkan (2022). This thesis presents the final and most comprehensive analysis of the systematic review and impact evaluation.

CHAPTER 7
Results of the systematic review

This chapter presents the results of the systematic review through descriptive and narrative analyses. The descriptive analysis addresses the results from the search, screening and quality appraisal. The studies included in the review are then presented indicating their chief characteristics, such as design, intervention and outcome measures. They are also summarised into various tables to make the results easier for readers to interpret. In the narrative analysis, dissemination routes are classified into six groups according to their distinguishing characteristics. This method of analysis was found to be useful to compare various dissemination approaches and determine the most promising ones.

7.1 Descriptive Analysis

7.1.1 The results of search and selection

The review first identified a total of 66,571 records from the primary search (electronic databases and Google Scholar). Table 7.1 presents the studies found in each of the electronic databases and Google Scholar. 1,237 records were identified through the complementary search. Additional 1,009 studies obtained from the same electronic databases (via search alerts) when the complementary search was in progress were then included in the screening. The result was that a total of 68,817 records were reviewed. (see Appendix A for the additional details).

Table 7.1 The number of records found in each database

Databases / Search Engine	Number of studies
Applied Social Sciences Index and Abstracts – ASSIA	2,262
Australian Education Index – AEI	1,717
British Education Index – BEI	457
Educational Resources Information Center – ERIC	9,477
International Bibliography of the Social Sciences – IBSS	5,607
PsychINFO	6,717
Scopus	13,388
ProQuest dissertations and theses global	15,087
Social Services Abstracts – SSA	1,090

Social Science Citation Index – SSCI	7,820
Google Scholar	2,949
Total	66,571

The screening was performed according to pre-determined selection criteria. Figure 7.1 is a flow diagram depicting the number of studies included and excluded during the selection process.

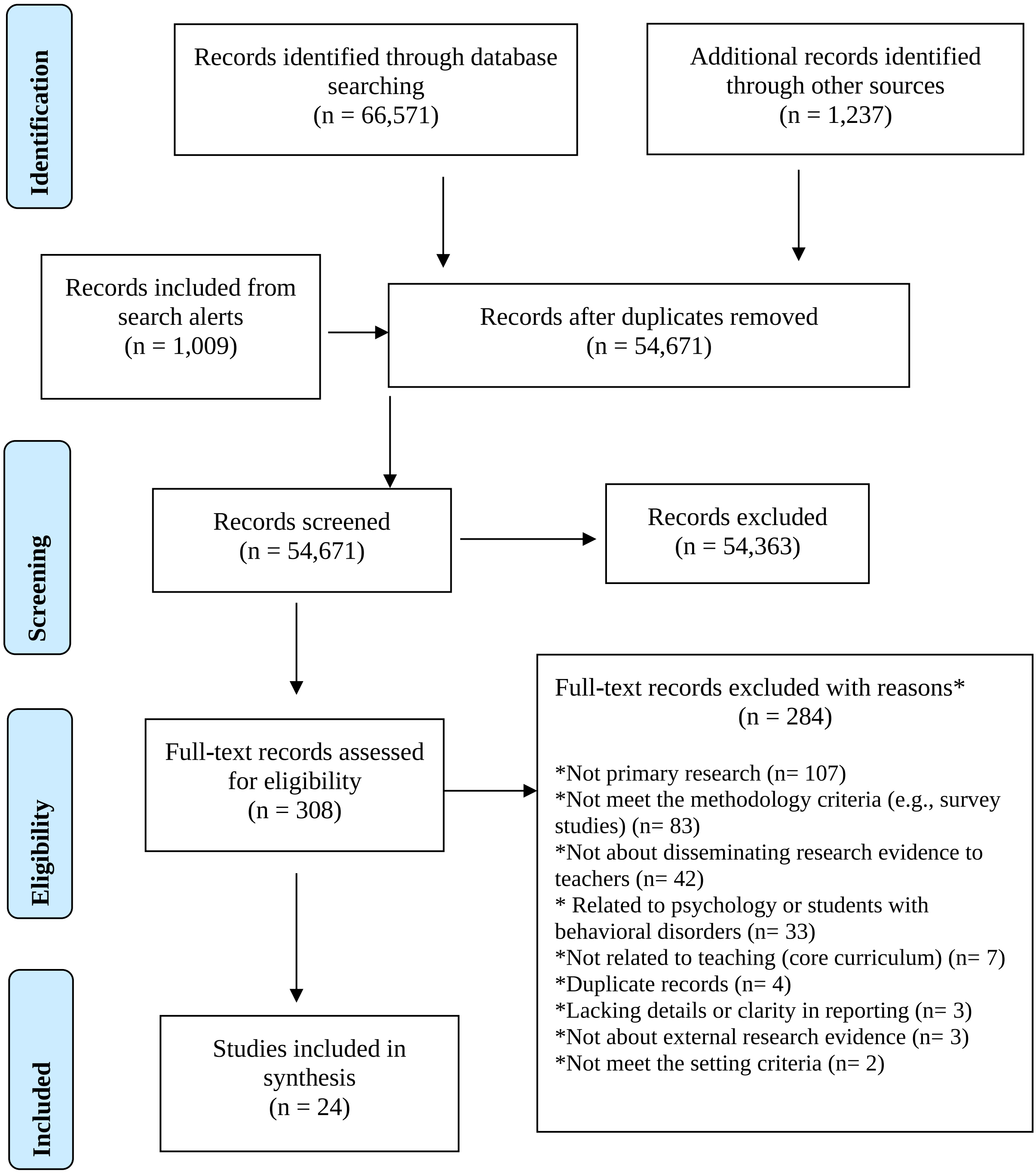

Figure 7.1 PRISMA flow diagram
Source: (based on Moher et al., 2009).

308 studies were identified after the first screening phase (title and abstract) was completed. After full-text readings, 24 studies were found to meet the inclusion criteria and so included in the analysis.

7.1.2 Quality appraisal and summarising results

All the included studies (n=24) were rated using the 'sieve' approach (ranging from 0🔒 to 4🔒), as developed by Gorard et al. (2017). The studies were classified applying three main outcomes measures - attitudes (including awareness and knowledge), the use of research evidence (behaviour), and end-user outcomes (student attainment). Two studies (**Lord et al., 2017b; Rose et al., 2017**) were rated twice because their outcome measures differed considerably in terms of the quality of the evidence.

The current study classified dissemination approaches into six categories depending on the review findings rather than adopting a predetermined classification due to several reasons. Firstly, there is diverse opinion and a lack of consensus in the literature on the types of dissemination approaches. Another reason was that this study attempted to reveal evidence on various dissemination approaches, and it was thought that using a predetermined classification could ignore the possibility that there could be unique or innovative approaches (e.g., technology supported routes) neglected in previous classifications. Lastly, it was realised that some studies included in the review used interventions involving a combination of various dissemination approaches, and some increased the intensity of training in the intervention, which required to consider multi-component approaches while classifying the dissemination approaches.

When classifying the dissemination approaches, distinctions between the interventions were not entirely clear, as some shared similar components to disseminate research evidence. The majority of approaches involved some form of "training", but this was mostly neither specific nor the primary focus of the interventions. For example, a study may attempt to embed research evidence into a trial curriculum, and teachers may then be trained about the curriculum. In this case, training is more centred on the curriculum, and the "training" process itself is not then a distinguishing feature of the intervention. Therefore, the current study focused on the distinguishing characteristics of the interventions when classifying them into groups. Consequently, dissemination approaches were classified into six categories. Table 7.2 illustrates the six main categories/approaches with some examples for each.

Studies in the first category involved passive dissemination approaches with or without active (light) support. For example, teachers were given evidence-based resources (e.g., research summaries, toolkits). Some trials in this category used active light components (supporting components) after the passive dissemination approaches such as inviting teachers to one CPD session to introduce evidence-based resources, which was not the main dissemination approach. In the second category (active single-component), studies used one active dissemination approach such as workshop and coaching. The third category was classified as active multi-component approaches as studies in this category combined more than one active dissemination approach (e.g., workshop training and coaching) or involved follow up support (e.g., consultant support) after the main active dissemination approach. In the fourth category, teachers were allowed to actively engage in or with research evidence to benefit from it. For example, teachers were expected to engage with research evidence and develop their action plans or materials to be used in schools. Therefore, dissemination routes in this category were classified as collaborative approaches. A few studies benefited from technology to use, relatively, more innovative and unique dissemination approaches such as using virtual mixed-reality. Therefore, a separate category (technology supported) was used for these studies. In the last category, studies also differed from the previous studies in the review as they attempted to get evidence into use through a special curriculum in which evidence embedded.

Table 7.2 The categories of dissemination routes

Categories/approaches	Examples or clarification of the intervention
Passive with or without active (light) support (research summaries)	*Only passive approaches (e.g., simply disseminating evidence-based resources or research summaries to teachers) *Passive approach (main approach) plus active light support (e.g., inviting teachers to a training after a passive approach)
Active single-component	*Only one active intervention such as coaching, mentoring and training
Active multi-component	*Combining more than one active approach (e.g., workshop plus coaching) *Combining two or more approaches if the main approach

	is active. For example, one active main approach (e.g., workshop or coaching) plus passive dissemination (e.g., research-based materials)
Collaborative	*Allowing users to engage in or with research evidence (e.g., engaging in research evidence and developing action plans or evidence-based materials)
Technology supported	*Using forums, apps, video-recorders etc. (e.g., creating a virtual mixed-reality)
Evidence embedded in curriculum plus training	e.g., a special curriculum in which the evidence is embedded

Table 7.3 summarises the included studies (n=24). What is most evident from the table below is that the majority of the studies were rated 1🔒 or 2🔒. Only four studies were rated higher than 2🔒 (**Lord et al., 2017a; Lord et al., 2017b; Rose et al., 2017; Wiggins et al., 2019**). Overall, this clearly indicates the lack of high-quality evidence across the wide variety of dissemination routes found in the systematic review. Upon evaluating the table below, it is apparent that most of the studies were weak in terms of their design and sampling methods. There were also only a few RCTs with relatively large-scale samples. Given the importance of the research design and the sample when determining the trustworthiness of research findings, low rating scores are not surprising. Another interesting finding reported was that all studies rated higher than 2🔒 (**Lord et al., 2017a; Lord et al., 2017b; Wiggins et al., 2019; Rose et al., 2017**) were funded by the EEF, with or without other foundations. A possible explanation for this may be that issues related to capacity such as lack of human resources. That is, time and budget considerations could have prevented most of the evaluations undertaken by researchers working in universities from conducting a large-scale RCT. Another important finding is that the majority of the studies, particularly the more robust ones, have been published in recent years. More detailed mapping of the studies and how the quality assessment was made according using the ‘sieve’ approach are presented in the data extraction and quality assessment tables (see Appendix H).

Table 7.3 Summary of all the included studies

Study	Design	Sample	Approach	Outcomes	Quality
Lord et al. (2017a)	RCT	466,799 pupils from 12,500 schools (four	Research summaries	-End-user	4🔒

		trial arms and one control group arm)			
Lord et al. (2017b)	RCT	32,613 pupils and 2,041 teachers from 823 schools; 60 were allocated to each of the nine intervention arms and 283 to the control group	Research summaries	-Attitudes -Behaviour -End-user	Attitudes and behaviour 2 🔒 End-user 4 🔒
Wiggins et al. (2019)	RCT	40 schools (20 treatment and 20 control) Cohort A pupils= 7,468, Cohort B pupils= 7,633	Active multi-component	-End-user	3 🔒
Rose et al. (2017)	RCT	119 schools (60 treatment, 59 control) 5462 pupils and 1709 teachers	Active single component	-Attitudes -Behaviour -End-user	Attitudes and behaviour 2 🔒 End-user 3 🔒
See et al. (2016)	Quasi-experiment	9 treatment schools were compared with five local, 49 other state-funded and all state-funded primary schools in England	Collaborative	-End-user	2 🔒
Purper (2015)	RCT	96 teachers (48 treatment, 48 control)	Active single component	-Attitudes -Behaviour	2 🔒
Nelson-Walker et al. (2013)	RCT	16 schools, 42 teachers (23 treatment, 19 control)	Active multi-component	-Behaviour	2 🔒

Ely et al. (2014)	Experiment	49 participants: CAP plus video (24) and reading (25)	Technology	-Behaviour	2🔒
Ely et al. (2018)	Experiment	22 participants	Technology	-Attitudes	2🔒
Clarke et al. (2011)	RCT	64 classrooms with more than 1,300 students	Embedded	-End-user	2🔒
Doabler et al. (2014)	RCT	129 classrooms (68 intervention and 61 control), 130 teachers	Embedded	-Behaviour	2🔒
Griggs et al. (2016)	One group pretest-posttest	Five schools (106 teachers for the analysis)	Active multi-component	-Attitudes -Behaviour	1🔒
Speight et al. 2016	One group pretest-posttest	10 schools (124 teachers)	Active multi-component	-Attitudes -Behaviour	1🔒
Kretlow et al. (2012)	Multiple baseline	One school (three teachers)	Active multi-component	-Behaviour	1🔒
Sawyer (2015)	Multiple baseline	Four teachers	Collaborative	-Behaviour	1🔒
Ogunleye (2014)	One-group pretest - posttest	60 teachers	Collaborative	-Attitudes -Behaviour	1 🔒
Vaughn (2004)	Pre-post evaluation	2 schools, 12 teachers (six mentors, six participants)	Active single component	-Behaviour	1🔒
Briand-Lamarche et al. (2016)	Multiple case study	7 schools, 24 participants	Research summaries	-Attitudes -Behaviour	1🔒
Mady (2013)	Pre-post evaluation	38 teachers (pre-survey), 21 (post survey),18 (both)	Technology	-Attitudes	1🔒

Abbott et al. (2002)	Pre-post evaluation	Kindergarten intervention :6 pupils First-grade intervention: 11 pupils Expanded first-grade intervention:12 pupils	Collaborative	-End-user	1🔒
Maheady et al. (2004)	Pre-post evaluation	10 teachers, 207 students	Active multi-component	-Behaviour -End-user	1🔒
Learmond (2017)	Action research	12 teachers and two instructional coaches	Active single component	-Behaviour	1🔒
Schnorr (2013)	Multiple baseline	9 teachers	Active multi-component	-Behaviour	1🔒
Kutash et al. (2009)	Pre-post	15 teachers, 87 students	Collaborative	-Behaviour -End-user	1🔒

7.1.3 The results by outcome measures

The impact of the studies as determined by outcome measures (attitudes, research use and student outcomes) is presented respectively.

Nine studies attempted interventions to improve teachers' attitudes towards using research evidence. Table 7.4 lists these studies alongside their ratings scores and impact. It reveals that all studies on teachers' attitudes towards research evidence provided relatively weak evidence, with none rated higher than 2🔒. A further finding of interest is that most indicated a positive impact on attitudes. Simpler comparisons in studies with descriptive findings are also shown with additional tables in the following pages in order to display the overall picture and facilitate comparisons by outcome measures.

Table 7.4 Summary of all studies by attitudes

Study	Quality	Approach	Impact
Ely et al. (2018)	2🔒	Technology	Positive
Lord et al. (2017b)	2🔒	Research summaries	Null/negative
Purper (2015)	2🔒	Active single-component	Positive
Rose et al. (2017)	2🔒	Active single-component	Unclear/mixed

Griggs et al. (2016)	1🔒	Active multi-component	Null/negative
Briand-Lamarche et al. (2016)	1🔒	Research summaries	Positive
Mady (2013)	1🔒	Technology	Positive
Ogunleye (2014)	1🔒	Collaborative	Positive
Speight et al. (2016)	1🔒	Active multi-component	Positive

17 studies intended to promote teachers' use of research evidence. Table 7.5 presents these studies with their ratings scores and impact. The descriptive results for research use are similar to those for attitudes. All the studies on research use were relatively weak with regard to the provision of robust evidence. There were no rating scores higher than 2🔒. The results were mixed but largely positive.

Table 7.5 Summary of all studies by research use

Study	Quality	Approach	Impact
Doabler et al. (2014)	2🔒	Embedded	Positive
Ely et al. (2014)	2🔒	Technology	Positive
Lord et al. (2017b)	2🔒	Research summaries	Null/negative
Purper (2015)	2🔒	Active single component	Null/negative
Rose et al. (2017)	2🔒	Active single component	Positive
Nelson-Walker et al. (2013)	2🔒	Active multi-component	Positive
Griggs et al. (2016)	1🔒	Active multi-component	Null/negative
Kretlow et al. (2012)	1🔒	Active multi-component	Positive
Kutash et al. (2009)	1🔒	Collaborative	Unclear/mixed
Briand-Lamarche et al. (2016)	1🔒	Research summaries	Unclear/mixed
Learmond (2017)	1🔒	Active single component	Positive
Maheady et al. (2004)	1🔒	Active multi-component	Positive
Ogunleye (2014)	1🔒	Collaborative	Positive
Sawyer (2015)	1🔒	Collaborative	Positive

Schnorr (2013)	1🔒	Active multi-component	Positive
Speight et al. (2016)	1🔒	Active multi-component	Unclear/mixed
Vaughn (2004)	1🔒	Active single component	Positive

Nine studies aimed to improve student outcomes. Table 7.6 shows these studies with their rating scores and impact. Compared to attitudes and research use outcomes, the studies on student outcomes provided higher-quality evidence. Two of these nine studies were rated 4🔒, which was the highest rating score when applying the 'sieve' approach. However, unlike previous studies on attitudes and research use, most of these nine studies had a null/negative impact on student outcomes. Only three studies were found to have a positive impact, but they were weaker than those with a negative impact. This is common finding in reviews – stronger studies tend to have smaller "effect"sizes.

Table 7.6 Summary of all studies by student outcomes

Study	Quality	Approach	Impact
Lord et al. (2017a)	4🔒	Research summaries	Null/negative
Lord et al. (2017b)	4🔒	Research summaries	Null/negative
Rose et al. (2017)	3🔒	Active single component	Null/negative
Wiggins et al. (2019)	3🔒	Active multi-component	Unclear/mixed
Clarke et al. (2011)	2🔒	Embedded	Positive
See et al. (2016)	2🔒	Collaborative	Null/negative
Abbott et al. (2002)	1🔒	Collaborative	Positive
Kutash et al. (2009)	1🔒	Collaborative	Unclear/mixed
Maheady et al. (2004)	1🔒	Active multi-component	Positive

To illustrate the overall picture and integrates further results, the results were summarised with numbers. Table 7.7 compares the outcome measures by rating scores. The table indicates that, whereas all studies on attitudes and research use were rated 1🔒 or 2🔒, four out of nine studies on student outcomes were rated as 3🔒 or 4🔒. Low ratings for attitudes and research use could be explained with these studies' sample size, missing data and data quality, due to the fact that the majority addressed attitudes and research use with a questionnaire involving a small sample size and high dropouts. In contrast, some studies involving student outcomes used student attainment data obtained from national pupil databases, allowing researchers to work on a larger sample size with minimum dropouts.

Table 7.7 The number of studies for each outcome measure by rating scores

Rating	Attitudes	Research use	Student outcomes
4🔒	-	-	2
3🔒	-	-	2
2🔒	4	6	2
1🔒	5	11	3
Total	9	17	9

Table 7.8 compares the outcome measures by impact. When consulting the table, it is apparent that studies on attitudes and research use were more likely to have a positive impact than those on student outcomes. There could be three possible explanations for this. First, improving student outcomes might be considered more challenging than changing teachers' attitudes and use of research. Secondly, high-rated studies may tend to investigate more passive approaches (perhaps less effective) to disseminate research evidence, which may then generate a null/negative impact. This explanation is supported by the results from the systematic review on interventions, which is presented when comparing dissemination approaches. Lastly, this may relate to the quality of the evidence provided for each outcome measure. As mentioned previously, studies on attitudes and research use generated evidence that was judged less secure, and such studies may have been further affected by bias or other factors, which could have led to more positive results even if the actual impact was negative.

Table 7.8 The number of studies for each outcome measure by impact

Impact	Attitudes	Research use	Student outcomes
Positive	6	11	3
Unclear/mixed	1	3	2
Null/negative	2	3	4
Total	9	17	9

In order to better show whether the impact differs significantly by rating scores, Table 7.9 presented all studies' impact on three outcome measures according to their rating scores. As apparent from the table, weak evaluations were more likely than robust studies to report a positive impact considering that there was no positive study rated higher than 2🔒.

Table 7.9 The number of studies for each rating score by impact

Rating	Positive	Unclear/mixed	Null/negative
4🔒	-	-	2
3🔒	-	1	1
2🔒	7	1	4
1🔒	13	4	2
Total	20	6	9

7.2 The results by interventions: Narrative analysis

All the included studies are summarised via a narrative analysis applying six dissemination categories: Passive with or without active (light) support, active single-component, active multi-component, collaborative, technology-supported, embedding evidence in the curriculum. Whether the dissemination approach is promising is explained by reaching a simple conclusion at the end of each dissemination category. However, which intervention is most promising is determined by comparing the six dissemination routes after a narrative analysis of all studies according to their interventions.

7.2.1 Passive dissemination approaches with or without active support (three studies)

Three studies involved passive dissemination with or without active support, involving simply sharing research summaries with teachers. Table 7.10 presents a summary of the studies in this category. One study by **Lord et al. (2017b)** is presented twice in the table as it was rated twice regarding the different outcome measures.

Compared with the other approaches, the most secure evidence presented in the review related to this approach (passive dissemination with or without active support). Two large-scale RCTs with a 4🔒 rating score, as funded by EEF (**Lord et al., 2017a; Lord et al., 2017b**), generated robust evidence with regard to student outcomes. **Lord et al. (2017b)** also provided less secure evidence concerning attitudes and research use, with a rating of 2🔒.

Table 7.10 A summary of studies involving passive dissemination with or without active support

Studies	Rating	Attitudes	Research use	Student outcomes
Lord et al. (2017a)	4🔒			Null/negative
Lord et al. (2017b)	4🔒			Null/negative
Lord et al. (2017b)	2🔒	Null/negative	Null/negative	
Briand-Lamarche et al. (2016)	1🔒	Positive	Unclear/mixed	

A large-scale randomised effectiveness trial, with a 4🔒 rating score, by **Lord et al. (2017a),** examined the impact of disseminating evidence-based materials and research summaries to teachers on pupils' Key Stage 2 English scores in England. The study included a total of 12,500 primary schools, randomly assigned to five groups of 2,500 (four treatment groups and one control group), covering 466,779 pupils. The study used pupil administrative data from the National Pupil Database (NPD), resulting in a small number of missing cases. While data missing at the school level was in the region of 1%, it was roughly 6% at the pupil level. Each treatment group involved a variety of passive dissemination approaches, such as: research summaries, evidence-based booklets, or a subscription to a website designed around evidence-based strategies and techniques, and offering visual guides for users. The study also conducted a subgroup analysis examining the impact of the interventions on pupils who had received free school meals (everFSM6). The results indicated that none of the interventions involving passive dissemination approaches improved pupils' Key Stage 2 English scores relative to the control pupils. The study also reported similar results among those pupils who had received free-school meals.

A similar large-scale RCT employed by **Lord et al. (2017b**), rated 4🔒 for student attainment, and 2🔒 for teacher outcomes, involved 823 primary schools (60 randomly assigned to each of the nine treatment groups and 283 to the control), covering 32,613 pupils and 2,041 teachers in England. Unlike the previous evaluation, the study adopted both passive (four trial arms) and active (five trial arms) dissemination approaches aimed at improving Key Stage 2 English scores and teachers' use of research evidence. All nine trial arms involved passive approaches, simply disseminating evidence as in the previous evaluation, five also included active dissemination support, such as inviting participants to one twilight Continuing Professional Development (CPD) session. Although some of the trials utilised active approaches, this took the form of follow up support after passive dissemination. Moreover, the active approaches used in the study were not considered dominant, when compared with other studies that heavily focused on active approaches. Given these and the other four passive trial arms, this study was assigned to the passive category. With respect to data collection, while student attainment was examined by reviewing administrative data from NPD, data on teachers' use of research evidence was obtained from a survey that also offered evidence of teachers' attitudes towards research evidence. Similar to the previous evaluation, while school level missing data was around 1%, pupil level missing data was approximately 6%. However, the attrition rate reported for schools in the teachers' use survey was around 44%, representing considerable drop-out. Therefore, teacher outcomes were rated 2🔒, as they differed considerably from the outcome measure for student attainment in terms of quality of evidence. The study indicated that the intervention did not improve the Key Stage 2 English scores. Additionally, neither teachers' use of research evidence nor their attitudes changed significantly.

The study by **Briand-Lamarche et al. (2016)**, which was rated 1🔒, investigated the impact of "the Competency Model for Knowledge Translation to Support Educational Achievement among Quebec Youth (RAC)" on teachers' attitudes towards research evidence and their use of it (p.168). In total, 24 participants working in seven schools in Canada participated in the study. The intervention was based on various components, some of which were: the model itself with target competencies and the materials needed, delivering training to participants about the model and discussing how to improve use of research evidence-based interventions in educational contexts. The study employed tracking sheets and three series of interviews. Reportedly the intervention generated positive attitudes among teachers with regard to use of evidence. However, there was no convincing evidence that the intervention improved teachers' use of research evidence in practice.

Taken together, two of the three studies **(Lord et al., 2017a; Lord et al., 2017b)** provided high-quality evidence about passive dissemination approaches with or without active support, demonstrating that simply disseminating research evidence to teachers is insufficient to effect change. The teacher outcomes (two studies) were less reliable than the student outcomes. As mentioned in the quality appraisal, the current study was unable to realistically apply strict criteria for sampling and identifying missing data for teacher outcomes. Overall, the evidence on teachers' outcomes in this category should not be underestimated, considering the lack of high-quality evidence on teacher outcomes in the review.

7.2.2 Active single-component dissemination approaches (four studies)

Four studies involved an active single-component dissemination approach, such as coaching, to disseminate research evidence to teachers. Table 7.11 summarises these studies. A study by **Rose et al. (2017)** was rated twice by its outcome measures.

Table 7.11 A summary of studies involving active single-component dissemination

Studies	Rating	Attitudes	Research use	Student outcomes
Rose et al. (2017)	3🔒			Null/negative
Rose et al. (2017)	2🔒	Unclear/mixed	Positive	
Purper (2015)	2🔒	Positive	Null/negative	
Vaughn (2004)	1🔒		Positive	
Learmond (2017)	1🔒		Positive	

Overall, the studies in this category provided less rigorous evidence than those evaluating passive dissemination approaches, but were relatively more secure than most of the other studies presented in the review. An RCT by **Rose et al. (2017)**, funded by the EEF, generated higher quality evidence on student attainment with a 3🔒 rating score. **Rose et al. (2017)** and **Purper (2015)**, both rated 2🔒, provided less secure evidence regarding teacher outcomes than student attainment in this category, but their findings relating teacher outcomes were more reliable than those of **Vaughn (2004)** and **Learmond (2015)**, which were both rated 1🔒.

Rose et al. (2017), rated 3🔒 for student attainment and 2🔒 for teacher outcomes, employed an RCT recruiting 5,462 pupils and 1,709 teachers from 119 schools (treatment 60, control 59) in England. The intervention involved Research Learning Communities (RLC), and aimed to improve the attitudes and use of research evidence in practice to promote teaching quality, and ultimately student attainment scores. Specifically, the intervention involved four RLC workshops held by researchers, and two Evidence Champion teachers from each school selected to participate in these workshops, alongside some of their peers from other schools. All the evidence champions were asked to develop, implement and evaluate strategies that considered their learning in the workshops, and also to assist their colleagues to improve their attitudes, understanding, and use of research evidence. The study obtained data through the NPD and a survey, and reported approximately 9% pupil level attrition. The evaluation demonstrated that the intervention improved teachers' use of research evidence, and generated some positive changes in attitudes. However, there was no evidence that the intervention improved pupils' Key Stage 2 reading outcomes.

Another RCT conducted by **Purper (2015)**, and rated 2🔒, involved 96 early childhood teachers, randomly assigned to treatment (48) or control (48) groups in the USA. The study examined the impact of an intervention on early childhood teachers' use of Websites created to disseminate research evidence-based practices with training materials. In the intervention, the teachers were given professional development (PD) training and information regarding five websites disseminating research evidence. The data obtained via the three surveys comprised teachers' self-reported use of research evidence-based practices. The study did not report its "attrition rate" clearly, but it was determined minimal (less than %10) by the author of the current study. Although the participants reported more positive attitudes towards the use of research evidence, there was no evidence that the intervention made a difference in teachers' use of Websites.

On the other hand, two studies provided weak evidence in this category. For example, a study by **Learmond (2015**), rated 1🔒, involved 12 teachers, and evaluated an intervention based on an instructional coaching model focusing on research evidence-based instructional strategies. The intervention sought to improve teachers' use of these research-based strategies in practice. Observations, interviews and a post-intervention checklist were performed to obtain data regarding the teachers' use of research evidence. The results indicated that the intervention improved teachers' use of research evidence-based strategies in practice. The other study, rated 1🔒, was conducted by **Vaughn (2004)**. The study involved 12 teachers and investigated the impact of mentoring on teachers' use of research evidence-based reading strategies. Of the 12 teachers, six were given training on one of two evidence-based practices: partner reading and collaborative strategic reading. The teachers were then asked to mentor and assist the other teachers to implement these same evidence-based practices. The data collection consisted of pre-post interviews, observations involving implementation checklists, and teachers' implementation logs. The intervention had a positive impact on teachers' use of research evidence-based strategies.

When examined together, the results in this category were mixed. The most secure evidence in this category had a negative impact. Weak studies tended to deliver more positive results. Overall, the studies in this category provided no convincing evidence that active single-component routes work effectively to disseminate research evidence to teachers.

7.2.3 Active multi-component dissemination approaches (seven studies)

In this category, interventions mostly involved workshop training with follow-up support such as consultant support and sharing extra evidence-based materials with users. Seven studies used active-multi component dissemination approaches to disseminate research evidence to teachers. Table 7.12 summarises the studies in this category.

Table 7.12 A summary of studies involving active multi-component dissemination

Studies	Rating	Attitudes	Research use	Student outcomes
Wiggins et al. (2019)	3🔒			Unclear/mixed
Nelson-Walker et al. (2013)	2🔒		Positive	
Kretlow et al. (2012)	1🔒		Positive	
Griggs et al. (2016)	1🔒	Null/negative	Null/negative	
Speight et al. (2016)	1🔒	Positive	Unclear/mixed	
Schnorr (2013)	1🔒		Positive	
Maheady et al. (2004)	1🔒		Positive	Positive

This category includes more studies than those in any other category in the review, but offered less secure evidence than the first category: passive dissemination approaches. There were just two studies rated higher than 1🔒: **Wiggins et al. (2019)** rated 3🔒, and **Nelson-Walker et al. (2013)** rated 2🔒.

An EFF funded study by **Wiggins et al. (2019)**, rated 3🔒**,** conducted an RCT involving 40 secondary schools, randomly allocated to a treatment (20) or a control (20) group, in England. The study recruited 7,468 pupils from Cohort A and 7,633 pupils from Cohort B. The study investigated the impact of an evidence informed school improvement model on pupils' mathematics and English attainment scores. A senior teacher from each school was appointed as the Research Lead and given the responsibility to improve and support the use of research evidence in schools. These research leads were then supported with a series of training and follow-up support, including via CPD sessions, follow-up meetings and evidence-based resources. In addition to the Research Leads, headteachers and subject leads in mathematics and English were supported during the workshops. The Research Leads were then supported to implement an evidence-informed school improvement model. The reported attrition rates for cohorts and subjects ranged from 9% to 13%. After the intervention, there was only a small improvement in the mathematics and English scores when comparing the treatment group and the control pupils.

Another RCT by **Nelson-Walker et al. (2013)**, rated 2🔒, involved 16 schools and 42 teachers (treatment 23, control 19). The study implemented a multi-tiered reading intervention to improve the quality and intensity of explicit literacy instruction, presenting the results for the first stage. Both the treatment and control group teachers were responsible for providing reading instruction to first grade pupils (n= 883), but the treatment teachers were trained and supported with PD and follow-up coaching for improving explicit literacy instruction application. Two schools (treatment one, control one) left the evaluation, with a reported attrition rate of 11%. The data obtained when observing the teachers' behaviours indicated that the intervention improved teachers' instructional behaviours.

Griggs et al. (2016), rated 1🔒, employed a one group pretest-posttest design in five schools (four secondary and one primary) in England. The study involved 190 teachers at baseline and 106 at the post-survey stage, representing an attrition rate of over 40%. A research champion from each participating school was recruited to deliver a programme consisting of various components, some of which were: a collection of research symposia for participants, 'audits' of schools' needs and interests, twilight forums regarding research and development. The intervention attempted to improve teachers' attitudes towards the value of research evidence, and their use of research evidence in practice. However, neither their attitudes nor their use of research evidence changed significantly after the intervention.

Another one-group pretest-posttest design, carried out by **Speight et al. (2016)** and rated 1🔒, used an intervention based on CPD training with direct consultant support relating to some research evidence-based strategies, such as metacognition and self-regulated learning. The study aimed to improve teachers' attitudes towards research evidence and their use of research evidence in practice. The study involved 169 teachers at baseline and 124 at the post-survey stage, which led to an attrition rate of approximately 27%. The results indicated that the intervention did not promote teachers' use of research evidence in practice, but did generate some positive changes in attitudes.

Kretlow et al. (2012), with a 1🔒 rating score, employed a multiple-baseline-across-teachers design involving three teachers from the USA. The study first evaluated only PD/in-service, and then PD/in-service plus follow up support with coaching. The intervention intended to improve teachers' accurate delivery of evidence-based practices during mathematics instruction, and was evaluated through observations of the group instructional units applied. The study found that even the first stage of the intervention (PD/in-service) enabled teachers to implement evidence-based strategies accurately. After the second stage (PD plus coaching), the teachers implemented these strategies more effectively.

Schnorr (2013), with a 1🔒 rating score, adopted multiple baselines across the participants' designs, recruiting nine teachers in the USA. The study employed a multilevel intervention based on a three hour workshop, and coaching, designed as follow up support for teachers who did meet the necessary criteria to establish teachers' accurate delivery of research evidence-based practices related to reading. The study improved teachers' accurate use of research evidence-based strategies in practice.

Maheady et al. (2004), with a 1🔒 rating score, involved 10 pre-service teachers with cooperating educators, and 207 students in the USA. The participants were given training and supported with a workshop (plus in class assistance) including a research evidence-based program. Whereas the teachers' use of research evidence were assessed by checking their accurate use of evidence-based practices, pre and post-tests were administered to students to examine their academic progress. After the intervention, teachers were able to use the evidence-based program accurately, and students made progress in their test results.

In conclusion, the most secure evidence provided by **Wiggins et al. (2019)** identified some small improvements in student outcomes, however the extent of the impact was inconclusive. Almost all the other studies in this category demonstrated a positive impact, but they were all weak in providing robust evidence. Overall, however, the results recorded for this category were more promising than those achieved via the previous dissemination approaches (passive or active single-component).

7.2.4 Collaborative dissemination approaches (five studies)

In this approach, teachers were mostly expected to engage with research evidence to develop their own plans or strategies for use in schools. Table 7.13 shows five studies in this category.

Table 7.13 A summary of studies involving collaborative dissemination

Studies	Rating	Attitudes	Research use	Student outcomes
See et al. (2016)	2🔒			Null/negative
Sawyer (2015)	1🔒		Positive	
Ogunleye (2014)	1🔒	Positive	Positive	
Kutash et al. (2009)	1🔒		Unclear/mixed	Unclear/mixed
Abbott et al. (2002)	1🔒			Positive

This category produced less rigorous evidence than most of the other categories. Of the five studies of this type, four were rated 1🔒.

A quasi-experimental study by **See et al. (2016),** rated 2🔒, involved nine treatment schools in England. The study shared a research article related to enhanced feedback with teachers, and supported them with a series of training events so they could develop three action cycles. The study attempted to improve students' level of attainment. Nine treatment schools were compared with five local comparison schools, and all state-funded primary schools in England. There was no evidence that treatment pupils made more positive progress in their academic attainment when compared to those in the comparison schools.

A study by **Sawyer (2015)**, rated 1🔒, employed a multiple baseline design with all participants involving four teachers. The intervention involved a coaching stage first. The teachers were then supported and helped to develop their own self-designed treatments based on evidence, to then introduce them into their practice. The intention was to improve teachers' accurate use of research evidence-strategies in practice. By the end of the intervention, the teachers had successfully implemented evidence-based self-designed plans in practice.

Ogunleye (2014), with a 1🔒 rating score, used an intervention based on a collaborative programme consisting of micro-teaching, focus groups and seminars allowing the sharing of knowledge and ideas. The researcher conducted one-group pre-test and post-test design and recruited 60 teachers (pre-primary 30, primary 30) in Nigeria. A positive impact on teachers' attitudes towards research evidence and their self-reported use of evidence in practice was found.

Abbott et al. (2002), with a rating score of 1🔒, carried out a pre-post evaluation, involving differing numbers of pupils over a three year period, starting from their kindergarten level (kindergarten 6, first-grade 11 and expanded first-grade 12). Teachers were allowed to participate in the intervention process actively, and developed useful resources and materials for themselves based on research evidence regarding phonemic awareness. They were also given training and follow up support during the intervention process. The intention was to improve teachers' use of research evidence in practice, and pupil's literacy skills. Since the study did not provide sufficient details regarding the teachers' outcome measures, only the results of student attainment were presented here. The study found the intervention improved pupils' student attainment.

A similar intervention was adopted by **Kutash et al. (2009)**, with a 1🔒 rating. It involved carrying out a pre-post-test design involving 15 teachers and 87 students. In the project phase (see Duchnowski et al., 2006), the teachers were allowed to engage with research evidence to develop evidence-based manuals. These materials were then used in this study to transfer evidence into use to improve students' attainment in reading and mathematics. Teachers were given training and supported by an instructional consultant during the intervention. There were some positive results in the teachers' implementation of evidence-based approaches and students' reading scores, but the intervention did not improve maths scores.

In conclusion, **See et al. (2016)**, rated 2🔒, found no evidence of a beneficial impact. Only some of the studies with weak evidence, reported a positive impact. Hence, we may conclude that there was no convincing evidence suggesting a collaborative approach is effective at transferring research evidence into use to improve student attainment.

7.2.5 Technology supported dissemination approaches (three studies)

Innovative approaches involving the use of technology were presented in this category. Table 7.14 displays three studies of this nature.

Table 7.14 A summary of studies involving technology supported dissemination

Studies	Rating	Attitudes	Research use	Student outcomes

Ely et al. (2014)	2🔒		Positive	
Ely et al. (2018)	2🔒	Positive		
Mady (2013)	1🔒	Positive		

Ely et al. (2014), rated 2🔒, carried out an experimental study to examine the impact of a multi-media-based intervention on teachers' use of evidence-based practices in the USA. The study recruited 49 pre-service teachers, randomly allocated to one of two intervention groups: a modelling video and Content Acquisition Podcast (CAP) (n=24), and reading (n=25). The multimedia approach applied was based on video with advanced podcasting regarding research evidence-based vocabulary practices. The study found that CAP plus video made greater improvements in teachers' use of evidence-based practices compared to simply reading.

In a more recent study, **Ely et al. (2018)**, rated 2🔒, used an experimental two-group design in the USA, involving 22 pre-service teachers, randomly allocated to "teach in a simulation or observe peers teach in a simulation" (p.71). The study involved a classroom simulation developed via a virtual mixed-reality application. The intention was to increase preservice teachers' knowledge of a specific programme named Collaborative Strategic Reading (CSR) in which evidence-based strategies are embedded. The study found that pre-service teachers improved their knowledge about use of evidence-based strategies.

Mady (2013), with a 1🔒 rating score, carried out a pre-post evaluation and focused on teachers' conceptual use of research. The study recruited 38 teachers at baseline, but only 18 completed both the pre and post-survey. In the intervention phase, the participants were given six journal articles with supporting guides. They were then invited to a discussion in an online forum, allowing communication with researchers. The study found that teachers improved their knowledge after the intervention.

Taken together, although there were only three studies in this category, all of which were rated 1🔒or 2🔒, they all reported a beneficial impact. Therefore, technology supported dissemination may be considered one of the most promising approaches evaluated when compared to the other approaches discussed thus far.

7.2.6 ***Evidence embedded in curriculum plus training dissemination (two studies)***

This category includes approaches where evidence is embedded in a context such as curriculum. Table 7.16 shows the two studies considered in this category.

Table 7.15 A summary of studies embedding evidence in curriculum.

Studies	Rating	Attitudes	Research use	Student outcomes
Clarke et al. (2011)	2🔒			Positive
Doabler et al. (2014)	2🔒		Positive	

Clarke et al. (2011), rated 2🔒, carried out a randomised block design, and evaluated a 120-lesson comprehensive kindergarten curriculum, the Early Learning in Mathematics (ELM) curriculum, in which research evidence-based strategies are embedded. The study initially involved 64 classrooms, covering more than 1,300 students. In total, 64 classrooms were randomly allocated to the treatment (the ELM) or to the control (standard conditions) group. There were various conditions determining attrition rate, and it differed between conditions. However, overall attrition was around 10%. The curriculum was developed to meet the learning needs of students at-risk, including all students in general education. There was evidence that students at risk made considerable progress in mathematics when compared with those in the control group, thereby effectively bridging the achievement gap between students.

Doabler et al. (2014), rated **2🔒**, employed another evaluation, involving a total of 129 classrooms (treatment 68, control 61) covering 130 teachers. The intention of this study was to examine the impact of the intervention (the Early Learning in Mathematics (ELM) curriculum) on teachers' use of explicit mathematics instruction, which was then assessed through a total of 379 observations. The teachers from the treatment group exhibited better use of evidence-based practices than those from the control group.

Overall, these two studies provided some evidence that embedding research evidence in a curriculum may be effective as a means to disseminate research evidence to teachers. However, considering the limited number of studies and their ratings scores, this category requires further study; most notably more robust evaluations with a larger sample size need to be carried out to deliver a clearer conclusion.

7.3 Conclusion

In this chapter, all the studies were summarised in detail under each of the six dissemination approaches, and their rating scores and outcome measures noted. This classification and analysis process was carried out to identify the most promising approach/es comparatively. Unsurprisingly, there were only a few studies identified for each dissemination approach. In addition, the majority did not provide high-quality evidence. However, the review provided important findings as a basis to determine which approaches were the more promising to evaluate in practice.

The clearest finding from the systematic review was that simply disseminating research evidence passively (e.g., sharing research summaries with teachers) was not an effective way to get research evidence into use and ultimately improve student attainment. Also, the evidence was deemed more rigorous for this approach than for others. Therefore, we may wish to avoid using this approach with further evaluations or to disseminate research evidence to teachers. Although the review indicated some positive results in relation to collaborative approaches, all the studies in this category except for one were rated 1🔒 in terms of high-quality evidence. Only **See at al. (2016)** yielded relatively more secure evidence, rated as 2🔒, and they reported a negative/null impact in their study. All the studies involving technology supported routes and embedding evidence in curriculum suggested a positive impact. However, the number of studies in these categories were limited. In addition, none of them were rated higher than 2🔒.

A further point is that most studies in the review involved active multi-component approaches (e.g. workshop plus consultant support). Most of these studies reported positive impact, but there was no high-quality evidence indicating that this approach works in practice. In conclusion, the review indicated that technology supported routes, embedding evidence in the curriculum and active-multi component approaches may be considered more promising relative to the other options. Certainly, there was no secure evidence indicating that they did not work in practice. In this respect, the current study adopted an intervention involving workshop training with supporting evidence-based resources, which was classified under an active multi-component approach. This intervention was also chosen considering that the current study was a doctoral research study subject to time and budgetary constraints.

CHAPTER 8

Results of the pre-survey

This chapter presents the results of the pre-survey to address the secondary research questions regarding teachers' attitudes towards research evidence, and their (self-reported) use of research evidence in practice.

8.1 Teachers' attitudes towards research evidence and their (self-reported) use of research evidence in practice

The following research questions are addressed here to examine teachers' attitudes towards research evidence, and their (self-reported) use of research evidence in practice:

- What are teachers' attitudes towards the use of research evidence in schools?
- To what extent do teachers use research evidence in practice?
- Do teachers' attitudes towards the use of research evidence differ according to their demographic characteristics (gender, age, job, experience and degree)?
- Does teachers' use of research evidence differ according to their demographic characteristics (gender, age, job, experience and degree)?

A total of 46 teachers from nine primary schools in England participated in the RCT and completed the pre-survey examining teachers' attitudes towards research and their use of research evidence. Table 8.1 below displays the demographic distribution of those participants who completed the pre-survey (n=46).

As shown in Table 8.1, the female participants (78.3%) outnumbered male participants (21.7%). This difference may be related to the overall distribution of teachers by gender in primary schools in England. Another possible explanation could be that female teachers may have been more interested in the study as recruitment in the evaluation was voluntary. Aside from cases with missing data (n=1), all the participants were classified into two groups by age: younger (aged 18 to 35 years) and older teachers (aged 36 years and over). The distribution was balanced by age. While 46% of the participants were aged 18 to 35 years, and 52% were aged 36 years or over. The majority of the participants were classroom teachers (61%), with the remainder being headteachers/principals (37%) and other (2%). The distribution was relatively balanced by experience, less experienced teachers (41%) and experienced teachers (54%), although there were cases with missing data. With respect to degree, while participants with a Bachelor's degree accounted for 74%, those with a Master's degree or equivalent represented only 17 % of all participants. None of the participants had a "Doctorate or equivalent' degree. Considering the distribution by degree, it can be said that most of the participants had not completed any further academic degree after their Bachelor's degree.

Table 8.1 The demographic distribution of participants

Demographic characteristics		Frequency	Percent
Gender	Female	36	78.3
	Male	10	21.7
Age (years)	18-35 (younger)	21	45.7
	> 35 (older)	24	52.2
	Missing	1	2.2
Job	Classroom teacher	28	60.9
	Headteacher/principal etc.	17	37.0
	Other	1	2.2
Experience (years)	Less experienced (0-10)	19	41.3
	Experienced (10+)	25	54.3
	Missing	2	4.3
Degree	Master's degree or equivalent	8	17.4
	Bachelor's degree or equivalent	34	73.9
	Other	1	2.2
	Missing	3	6.5

Since there was no response for "Doctorate or equivalent" degree, this was removed from the tables. This means that "other" (n=1) does not include "Doctorate or equivalent" degree in the table above. Also, those who did not prefer to mention their demographic characteristic (missing) are not included in the table when summarising the results by the subgroups. Perhaps the results by gender and degree should be interpreted with caution considering that the distribution of participants was not balanced in this regard.

The results of the pre-survey regarding teachers' attitudes towards research evidence and their (self-reported) use of research evidence in practice are presented first. The results by subgroups are then addressed. Readers should interpret the pre-survey results with caution, particularly in relation to the subgroups, considering the small sample size.

8.1.1 What are teachers' attitudes towards the use of research evidence in schools?

All participants were asked eight questions relating to their general attitudes towards use of research evidence in schools, and a further seven questions related to influences that may affect their adoption of a new intervention. Table 8.2 shows the results for all teachers' (n=46) general attitudes towards research evidence.

Viewing Table 8.2 from an overall perspective, we can assert that teachers' general attitudes towards the use of research evidence were positive. While the four negative items (coloured) in terms of attitudes provided lower mean scores ranging from 0.70 to 1.91, the other responses yielded bigger mean scores ranging from 2.70 to 3.17. In other words, agreement by teachers was lower than moderate for negative items in terms of attitude, but higher for the remaining questions. Teachers were less likely to say that they would not use manualised interventions/methods, or that research-based interventions are not useful in practice with a mean score of 0.70 and 1.52 respectively, meaning that they might use manualised interventions and find the use of research evidence beneficial in practice. In addition, they were willing to use any novel intervention with mean scores ranging from 2.70 to 3.17. In particular, they were more willing to use a new intervention developed by researchers (compared to in other circumstances) with the highest mean of 3.17. Additionally, they were less likely to report that they feel they know better than academic researchers how best to care for their students, with a lower mean score of 1.52.

On the other hand, the teachers reported that experience is more important than using manualised interventions/methods with a mean score of 1.91, which was a greater mean score than that for the other negative items. The level of agreement for this item can therefore be considered moderate. However, the teachers were more likely to report positive attitudes towards questions related to researchers, and research-based interventions. In this respect, we can deduce that although teachers took account of practical experience, they reported placing a higher value on interventions developed by researchers, and other research-based practices.

Table 8.2 Teachers' attitudes towards the use of research evidence

Item	Mean	SD
Research-based interventions/methods are not useful in practice	1.52	1.22

Experience is more important than using manualised interventions/methods	1.91	0.86
I am willing to use new and different types of interventions/methods developed by researchers	3.17	0.64
I like to use new types of interventions/methods to help my students	3.07	0.68
I am willing to try new types of interventions/methods even if I have to follow a teaching/training manual	2.70	0.84
I know better than academic researchers how to care for my students	1.52	1.09
I would not use manualised interventions/methods	0.70	0.78
I would try a new intervention/method even if it were very different from what I am used to doing	2.93	0.71

Table 8.3 illustrates the findings for the remaining seven questions regarding influences that may affect participants' use of a new intervention. From the table below we can see that if teachers received training in an intervention that was new to them, they were quite likely to use it in almost all given circumstances, with mean scores ranging from 2.84 to 3.48. Compared to other circumstances, teachers were less likely to use a new intervention if it was intuitively appealing, or being used by colleagues who were happy with it, or one based on evidence, with mean scores of 2.84, 2.93 and 3.02 respectively. This might be of interest, considering that the literature review and some of the previous studies suggested teachers may tend to consult their colleagues when they need or want to adopt an intervention in their practice. As can be seen from the table below, teachers were less likely to report that they would adopt a new intervention being used by colleagues (2.93), compared to almost all the other circumstances.

On the other hand, teachers were more likely to use a new intervention, if it was required by law; this option receiving the highest mean score of 3.48. This is perhaps not striking considering the power of law or national decisions on public sector employees. Teachers were also quite likely to use a new intervention if they felt they had had sufficient training to use it correctly, with the second highest mean score of 3.33. This is perhaps an important finding, indicating that teachers might not adopt a new intervention if they perceive they lack sufficient training or the general skills to use it. In summary, these results indicate that although teachers were willing to use a new intervention based on evidence (3.02), they were more likely to do so in some other circumstances, which might lead to use of a programme being unwarranted.

Table 8.3 Teachers' attitudes towards the use of research evidence

Item If you received training in an intervention that was new to you, how likely would you be to adopt it if:	Mean	SD
Evidence said it worked?	3.02	0.75
It was intuitively appealing?	2.84	0.87
It "made sense" to you?	3.04	0.87
It was required by your school (headteacher, principal etc.)?	3.17	0.71
It was required by law?	3.48	0.62
It was being used by colleagues who were happy with it?	2.93	0.71
You felt you had enough training to use it correctly?	3.33	0.63

8.1.2 To what extent do teachers use research evidence in practice?

All the participants were asked 18 questions regarding their (self-reported) use of research evidence in practice. Table 8.4 displays the results for all teachers (n=46).

From an overall perspective, we can see that teachers' (self-reported) use of research evidence in schools was more than moderate, with mean scores ranging from 2.07 to 2.93. We might state that teachers' (self-reported) use of research evidence in practice was limited. None of the mean scores in the table below were rated higher than 3.00. These results might be more interesting compared with those of teachers' general attitudes towards the use of research evidence. Overall, the mean scores were inclined to be lower for teachers' (self-reported) use of research evidence relative to their attitudes. Consequently, it could be argued that while teachers' general attitudes towards research evidence seemed positive, their (self-reported) use of research evidence was somewhat limited, particularly compared to their general attitudes.

Compared to other given circumstances, teachers were more likely to report using research evidence to improve their learners' progress and interest in schooling, with the greatest mean scores being 2.93 and 2.76 respectively. They were also less likely to use research evidence for the further verification of research findings, or to assist them in planning and carrying out research involving their learners, with the lowest mean scores of 2.07 and 2.20 respectively. Given these results, we may conclude that teachers were more interested in how best to improve their students' attainment, rather than in critiquing research evidence or making efforts to conduct their own practical research. Of course, being more critical with regard to research evidence, or making efforts to conduct their own research in practice may indirectly benefit their learners, but teachers may have become more interested in using research evidence directly to observe the impact on their learners.

Table 8.4 Teachers' (self-reported) use of research evidence

Item	Mean	SD
Level of agreement with "I utilize information from research":		
to get acquainted with effective teaching strategies	2.65	0.82
to help in improving my learners' progress	2.93	0.83
for innovations in school curricula	2.67	0.94
on how to improve my learners' interest in schooling	2.76	0.90
to source better evaluation techniques for day-to-day activities	2.50	0.98
in order to prepare my lessons well	2.59	0.96
to help me in effective delivery of instruction	2.59	0.88
for effective use of instructional materials	2.28	0.91
to become knowledgeable on recent theories of child development	2.39	1.14
for theories behind various new teaching strategies	2.61	1.08
to improve my content knowledge of school subjects	2.65	1.06
for the acquisition of more pedagogical knowledge	2.58	1.04
for more effective classroom management techniques	2.67	1.08
for skills at motivating and reinforcing my learners in learning	2.64	0.90
to acquire knowledge and skills in using modern questioning techniques in class	2.62	0.90
for further verification of research findings	2.07	1.18
to increase the level of classroom interaction i.e. teacher-student, student-student and student-material interactions	2.61	1.13
to assist me in planning and carrying out research involving my learners	2.20	1.17

8.1.3 Do teachers' attitudes towards the use of research evidence differ according to their demographic characteristics (gender, age, job, experience and degree)?

The results for teachers' attitudes towards use of research evidence by their demographic characteristics are presented below.

8.1.3.1 *Teachers' attitudes towards the use of research evidence by gender*

Table 8.5 and Table 8.6 demonstrate the results detailing the participating teachers' attitudes towards the use of research evidence by gender: female (n=36) and male (n=10). Although the distribution of teachers by gender was not balanced, the number of males can be considered sufficient for a comparison. However, the results would have been more reliable had the sample size been larger for males. Table 8.5 illustrates the results for teachers' general attitudes towards the use of research evidence by gender.

Overall, we can say that both female and male teachers' general attitudes towards the use of research evidence might be seen as positive, considering that while the mean scores for negative items ranged from 0.80 to 1.94 for females, and from 0.37 to 2.10 for males, those for the remaining questions ranged from 2.75 to 3.19 for females, and from 2.50 to 3.10 for males. This means both groups were less likely to agree with the negative statements, but more likely to agree regarding the remaining items.

When the two groups were contrasted, the findings were mixed. Both female and male teachers were almost equally willing to use new interventions developed by researchers (or indeed any new intervention) with mean scores of 3.19 and 3.10 respectively. However, males were much more likely than females to determine that research-based interventions/methods are not useful in practice, with mean scores of 2.10 and 1.36 respectively. Additionally, males are more likely to state that they know better than academic researchers how to care for their students, with mean scores of 1.80 and 1.44 respectively. However, they were less likely than female teachers to say that they would not use manualised interventions/methods with mean scores of 0.37 and 0.80 respectively. Overall, despite the differences in mean scores between the two groups being quite sizeable for some of the items, there was no convincing evidence that either one of these two groups were comparatively more likely to report positive and consistent attitudes towards research evidence.

Table 8.5 Teachers' attitudes towards the use of research evidence by gender

Item	Female		Male	
	Mean	SD	Mean	SD
Research-based interventions/methods are not useful in practice	1.36	1.22	2.10	1.10

Experience is more important than using manualised interventions/methods	1.94	0.75	1.80	1.23
I am willing to use new and different types of interventions/methods developed by researchers	3.19	0.62	3.10	0.74
I like to use new types of interventions/methods to help my students	3.06	0.67	3.10	0.74
I am willing to try new types of interventions/methods even if I have to follow a teaching/training manual	2.75	0.87	2.50	0.71
I know better than academic researchers how to care for my students	1.44	1.05	1.80	1.23
I would not use manualised interventions/methods	0.80	0.79	0.37	0.68
I would try a new intervention/method even if it were very different from what I am used to doing	2.94	0.75	2.90	0.57

Table 8.6 depicts a further seven questions regarding the influences that may affect teachers' use of a new intervention. Overall we can see that both female and male teachers were relatively likely to adopt an intervention in all given circumstances, with mean scores ranging from 2.86 to 3.53, and from 2.70 to 3.43 respectively.

Comparisons of the two groups indicate that female teachers were more likely than male teachers to adopt a new intervention in almost all circumstances (five out of seven). In most respects, the mean scores did not differ much between these two groups. Females were more likely than males to adopt an intervention if it was required by law, or based on evidence, or being used by colleagues who were happy with it, with a relatively greater difference in mean scores compared to in other circumstances. In summary, female teachers (3.06) were slightly more likely than male teachers (2.90) to use a new intervention if it was based on evidence, but they were also more likely to use it in most other respects, which may lead to unwarranted use of the programme.

Table 8.6 Teachers' attitudes towards the use of research evidence by gender

If you received training in an intervention that was new to you, how likely would you be to adopt it if:	Female		Male	
	Mean	SD	Mean	SD
Evidence said it worked?	3.06	0.63	2.90	1.10
It was intuitively appealing?	2.86	0.83	2.80	1.03

It "made sense" to you?	3.06	0.92	3.00	0.67
It was required by your school (headteacher, principal etc.)?	3.17	0.70	3.20	0.79
It was required by law?	3.53	0.61	3.30	0.67
It was being used by colleagues who were happy with it?	3.00	0.72	2.70	0.67
You felt you had enough training to use it correctly?	3.31	0.62	3.43	0.69

8.1.3.2 *Teachers' attitudes towards the use of research evidence by age*

Table 8.7 and Table 8.8 reveal the results for teachers' attitudes towards the use of research evidence by age (years): 18-35 (n=21) and > 35 (n=24). The distribution of teachers by age was relatively more balanced than for the other subgroups, and thus we may assume that the results presented here might be more secure when compared to those for the other groups.

Table 8.7 first shows the results for teachers' general attitudes towards the use of research evidence by age (n=45), except for missing cases (n=1). Viewed overall, we may suggest that both younger and older teachers reported positive attitudes towards the use of research evidence, given that the mean scores for negative items ranged from 0.57 to 1.90 for the younger group, and from 0.81 to 1.96 for the older group, those for the remaining questions ranged from 2.62 to 3.19, and from 2.71 to 3.13 respectively. This indicates a lower level of agreement with the negative statements, and greater agreement for positive statements.

When the two groups were compared with one another, despite the differences in mean scores being quite sizeable for some of the items, the overall findings were mixed. Younger teachers were more likely than older teachers to report research-based interventions or methods to be not useful in practice, with mean scores of 1.71 and 1.38 respectively. This difference in mean scores can be considered quite sizeable. However, this might be due to chance, bias or misreading of the first negative item, considering that the difference in mean scores for the remaining items were lower, and younger teachers were slightly more likely to report using new interventions in almost all cases. Considered together, there was no convincing evidence that any one of the two groups were more likely to report positive and consistent attitudes towards research evidence than each other.

Table 8.7 Teachers' attitudes towards the use of research evidence by age (years)

Item	18-35 (younger)	> 35 (older)

	Mean	SD	Mean	SD
Research-based interventions/methods are not useful in practice	1.71	1.27	1.38	1.21
Experience is more important than using manualised interventions/methods	1.90	0.94	1.96	0.81
I am willing to use new and different types of interventions/methods developed by researchers	3.19	0.60	3.13	0.68
I like to use new types of interventions/methods to help my students	3.14	0.73	2.96	0.62
I am willing to try new types of interventions/methods even if I have to follow a teaching/training manual	2.62	0.97	2.71	0.69
I know better than academic researchers how to care for my students	1.48	1.08	1.58	1.14
I would not use manualised interventions/methods	0.57	0.75	0.81	0.82
I would try a new intervention/method even if it were very different from what I am used to doing	2.95	0.67	2.88	0.74

Table 8.8 presents a further seven questions concerning the influences that may affect teachers' use of a new intervention. As can be seen the table below, both younger and older teachers were relatively likely to adopt a new intervention in almost all respects, as mean scores ranged from 2.62 to 3.43, and from 3.08 to 3.50 respectively.

What stands out from the table is that older teachers were more likely than younger teachers to adopt a new intervention in all instances. Indeed, the majority of the differences in mean scores for these two groups were quite sizeable. In particular, older teachers were more likely than younger teachers to adopt a new intervention if it was based on evidence (3.25 and 2.76), intuitively appealing (3.08 and 2.62), being used by their colleagues (3.13 and 2.71), or made sense to them (3.29 and 2.81). Consequently, older teachers were not only more likely than younger teachers to report adopting a new intervention based on evidence, but also more likely to use any new intervention in all the other circumstances, which may be problematic in practice.

Table 8.8 Teachers' attitudes towards the use of research evidence by age (years)

If you received training in an intervention that was new to	18-35	> 35

you, how likely would you be to adopt it if:	(younger)		(older)	
	Mean	SD	Mean	SD
Evidence said it worked?	2.76	0.89	3.25	0.53
It was intuitively appealing?	2.62	0.74	3.08	0.93
It “made sense” to you?	2.81	0.75	3.29	0.91
It was required by your school (headteacher, principal etc.)?	3.05	0.80	3.25	0.61
It was required by law?	3.43	0.68	3.50	0.59
It was being used by colleagues who were happy with it?	2.71	0.56	3.13	0.80
You felt you had enough training to use it correctly?	3.21	0.60	3.42	0.65

8.1.3.3 *Teachers' attitudes towards the use of research evidence by job*

Tables 8.9 and 8.10 show results by job: classroom teacher (n=28) and headteacher/principal (n=17). Since there was only one participant who responded ‘other’, this data was excluded from the tables below. Table 8.9 presents the findings of teachers’ general attitudes towards research evidence, relative to their jobs. As shown in the table below, both classroom teachers and headteachers/principals’ general attitudes towards the use of research evidence may be seen as positive considering that the mean scores for the negative items ranged from 0.71 to 1.86 for classroom teachers, and from 0.73 to 2.00 for headteachers/principals, and those for the remaining items ranged from 2.71 to 3.14, and from 2.59 to 3.18 respectively. This indicates that both groups were less likely to agree with negative statements, but more likely to agree with the remaining items.

A comparison of both groups from an overall perspective shows the mean scores did not differ significantly. Classroom teachers were more likely than headteachers/principals to hold the opinion that research-based interventions/methods are not useful in practice, with a relatively greater difference arising in mean scores for this group compared to the other items (1.64 and 1.41). Overall, there was no convincing evidence that either of the two groups were relatively more likely to report positive and consistent attitudes towards the use of research evidence.

Table 8.9 Teachers’ attitudes towards the use of research evidence by job

Item	Classroom teacher		Headteacher*	
	Mean	SD	Mean	SD

Research-based interventions/methods are not useful in practice	1.64	1.22	1.41	1.23
Experience is more important than using manualised interventions/methods	1.86	0.89	2.00	0.87
I am willing to use new and different types of interventions/methods developed by researchers	3.14	0.65	3.18	0.64
I like to use new types of interventions/methods to help my students	3.04	0.74	3.06	0.56
I am willing to try new types of interventions/methods even if I have to follow a teaching/training manual	2.71	0.71	2.59	1.00
I know better than academic researchers how to care for my students	1.50	1.11	1.59	1.12
I would not use manualised interventions/methods	0.71	0.81	0.73	0.75
I would try a new intervention/method even if it were very different from what I am used to doing	2.86	0.71	3.00	0.71

* Headteacher/principal, etc.

Table 8.10 presents the results for the further seven questions concerning influences that might affect teachers' adoption of a new intervention. Overall, it can be concluded that both classroom teachers and headteachers/principals were reasonably likely to adopt a new intervention in all the given circumstances, with mean scores ranging from 2.64 to 3.50, and from 2.88 to 3.47 respectively.

Headteachers/principals were more likely than classroom teachers to adopt a new intervention with the exception of two items. What is striking from the table is that headteachers/principals were more likely than classroom teachers to adopt a new intervention based on evidence, and the greatest difference in mean scores was achieved for this item (3.41 and 2.75). Moreover, compared to almost all other circumstances, whereas headteachers/principals were more likely to use a new intervention based on evidence, classroom teachers were less likely to use an intervention based on evidence. In summary, headteachers/principals reported placing a higher value on evidence when adopting a new intervention compared to classroom teachers, and also preferred this option to almost all other circumstances.

Table 8.10 Teachers' attitudes towards the use of research evidence by job

If you received training in an intervention that was new to you, how likely would you be to adopt it if:	Classroom teacher		Headteacher*	
	Mean	SD	Mean	SD
Evidence said it worked?	2.75	0.70	3.41	0.62
It was intuitively appealing?	2.64	0.83	3.11	0.86
It "made sense" to you?	2.89	0.83	3.24	0.90
It was required by your school (headteacher, principal etc.)?	3.14	0.71	3.18	0.73
It was required by law?	3.50	0.64	3.41	0.62
It was being used by colleagues who were happy with it?	2.93	0.60	2.88	0.86
You felt you had enough training to use it correctly?	3.23	0.69	3.47	0.51

* Headteacher/principal, etc.

8.1.3.4 *Teachers' attitudes towards the use of research evidence by experience*

Tables 8.11 and 8.12 show the results for teachers by experience (years): less experienced (0-10) and experienced (10+). The distribution was relatively balanced between the less experienced (n=19) and experienced teachers (n=25). Those who preferred not to mention their experience, missing (n=2), are not included in the tables. Table 8.11 displays the findings for teachers' general attitudes towards the use of research evidence by experience.

Overall, both less experienced and experienced teachers' general attitudes towards the use of research evidence might be seen as positive, considering that while the mean scores for the negative items ranged from 0.58 to 2.00 for less experienced teachers, and from 0.82 to 1.92 experienced teachers, those for the remaining questions ranged from 2.63 to 3.16, and from 2.68 to 3.16 respectively.

When the two groups were contrasted with one another, the results were mixed. The mean scores did not vary much aside from two questions. Less experienced teachers were more likely than experienced teachers to report that research-based interventions/methods were not useful in practice, with mean scores of 1.79 and 1.32 respectively, providing the greatest difference in mean score. On the other hand, experienced teachers were more likely than less experienced teachers to state that they would not use manualised interventions/methods, with mean scores of 0.82 and 0.58. Overall, there was no convincing evidence that one of these two groups were more likely to report positive and consistent attitudes towards research evidence than the other.

Table 8.11 Teachers' attitudes towards the use of research evidence by experience

Item	Less experienced		Experienced	
	Mean	SD	Mean	SD
Research-based interventions/methods are not useful in practice	1.79	1.23	1.32	1.25
Experience is more important than using manualised interventions/methods	2.00	1.00	1.92	0.76
I am willing to use new and different types of interventions/methods developed by researchers	3.16	0.69	3.16	0.62
I like to use new types of interventions/methods to help my students	3.11	0.81	3.00	0.58
I am willing to try new types of interventions/methods even if I have to follow a teaching/training manual	2.63	1.01	2.68	0.69
I know better than academic researchers how to care for my students	1.53	1.07	1.48	1.12
I would not use manualised interventions/methods	0.58	0.77	0.82	0.80
I would try a new intervention/method even if it were very different from what I am used to doing	2.95	0.71	2.88	0.73

Table 8.12 displays a further seven questions regarding the influences that might affect teachers' use of a new intervention. Overall, both less experienced and experienced teachers were somewhat likely to adopt a new intervention in almost all circumstances, with mean scores ranging from 2.68 to 3.47, and from 3.03 to 3.52 respectively.

What stands out from the table is that experienced teachers were more likely than less experienced teachers to adopt a new intervention in all cases. Experienced teachers were slightly more likely than less experienced teachers to use a new intervention based on evidence with mean scores of 3.12 and 3.00 respectively. However, the differences in mean scores were greater for the majority of the other circumstances. This means that experienced teachers seemed more receptive to new interventions in all respects, without placing a higher value on evidence compared to almost all other circumstances, which may lead to unwarranted acceptance of a novel programme.

The results by experience show some similarities to those for age. This is not surprising as we can assume that younger teachers tended to be less experienced, and older teachers are often more experienced. However, this assumption might not apply in all cases, as not all older teachers have more experience than younger teachers. For example, older teachers were much more likely than younger teachers to use a new intervention based on evidence (3.25 and 2.76), and yet the difference in mean scores for this same item was less sizeable by experience (3.12 and 3.00). Despite some similar findings, the results by experience and age led to different findings in some respects, which makes it reasonable to address both age and experience separately in the analysis.

On the other hand, despite the mixed results for less experienced and experienced teachers' general attitudes towards research evidence, the findings here show that experienced teachers were more likely than less experienced teachers to adopt a new intervention for all instances. This can be considered interesting, as there was no convincing evidence that experienced teachers were more willing than less experienced teachers to report using a new intervention in their general attitudes. However, when they were asked about influences that may affect their use of a new intervention, they were more likely to adopt it in all cases. Perhaps one explanation for this might be that experienced teachers would become more willing or find it easier to adopt an intervention after receiving training; especially considering the fact that they responded positively when asked "if you received training in an intervention that was new to you, how likely would you be to adopt it?". In other words, the effect of lack of training on teachers' adoption of a new intervention might vary relative to their experience. We may offer the same explanation for results by age considering the similarity of the findings obtained.

Table 8.12 Teachers' attitudes towards the use of research evidence by experience

If you received training in an intervention that was new to you, how likely would you be to adopt it if:	Less experienced		Experienced	
	Mean	SD	Mean	SD
Evidence said it worked?	3.00	0.67	3.12	0.73
It was intuitively appealing?	2.68	0.75	3.03	0.94

It “made sense” to you?	2.95	0.78	3.20	0.91
It was required by your school (headteacher, principal etc.)?	3.16	0.83	3.20	0.58
It was required by law?	3.47	0.70	3.52	0.51
It was being used by colleagues who were happy with it?	2.74	0.56	3.12	0.78
You felt you had enough training to use it correctly?	3.26	0.56	3.41	0.64

8.1.3.5 *Teachers' attitudes towards the use of research evidence by degree*

Tables 8.13 and 8.14 display the results for teachers with a Bachelor's degree or equivalent (n=34), and those with Master's degree or equivalent (n=8). The distribution was not balanced, and the number of participants with a Master's degree or equivalent was considered to be relatively small. Therefore, the results provided should be interpreted with caution. Table 8.13 presents the findings for teachers' general attitudes towards research evidence by degree.

These results were both mixed and interesting. Both teachers with a Bachelor's degree or equivalent, and those with a Master's degree or equivalent were reasonably likely to report that they are willing to try a new intervention, with mean scores ranging from 2.62 to 3.18, and from 2.88 to 3.25 respectively, especially when developed by researchers (3.18 and 3.25). What may be interesting about the data provided in the table is that teachers with a Master's degree or equivalent were much more likely than those with a Bachelor's degree or equivalent to report that research-based interventions/methods are not useful in practice, with mean scores of 2.63 and 1.32 respectively, or that experience is more important than using manualised interventions/methods, with mean scores of 2.38 and 1.79 respectively. This might be interesting considering that both groups were willing to use any new intervention. Even those teachers with a Master's degree or equivalent were more willing (3.25) than those with a Bachelor's degree or equivalent (3.18) to use a new intervention developed by researchers. Therefore, the first two items indicating negative attitudes for teachers with a Master's degree or equivalent might be explained by chance, considering that the Master's degree or equivalent group within the sample is small, and so might be more prone to be affected by chance and bias.

Some of teachers in this group may have failed to note that the first items were negative in terms of attitude when they began completing the survey. In particular, the first item was negative in terms of grammar, and thus some teachers in this group may have missed it.

However, readers should continue to bear in mind that both groups were asked the same questions. Overall, there was no convincing evidence from which to conclude that one of these two groups were more or less likely to report positive attitudes towards the use of research evidence.

Table 8.13 Teachers' attitudes towards the use of research evidence by degree

Item	Master's degree *		Bachelor's degree *	
	Mean	SD	Mean	SD
Research-based interventions/methods are not useful in practice	2.63	0.52	1.32	1.25
Experience is more important than using manualised interventions/methods	2.38	1.06	1.79	0.81
I am willing to use new and different types of interventions/methods developed by researchers	3.25	0.46	3.18	0.63
I like to use new types of interventions/methods to help my students	3.00	0.76	3.09	0.62
I am willing to try new types of interventions/methods even if I have to follow a teaching/training manual	2.88	0.64	2.62	0.85
I know better than academic researchers how to care for my students	1.63	1.06	1.44	1.11
I would not use manualised interventions/methods	0.88	0.83	0.69	0.80
I would try a new intervention/method even if it were very different from what I am used to doing	3.00	0.76	2.91	0.67

*or equivalent

The next section of the survey considered influences that might affect teachers' use of a new intervention (see Table 8.14). Overall, both teachers with a Bachelor's degree or equivalent and those with a Master's degree or equivalent were somewhat likely to adopt a new intervention, with mean scores ranging from 2.85 to 3.47, and from 2.75 to 3.63 respectively.

Teachers with a Master's degree or equivalent were more likely than those with a Bachelor's degree or equivalent to use a new intervention based on evidence, with mean scores of 3.13 and 2.97 respectively. Interestingly, however, teachers with a Master's degree or equivalent were more likely than those with Bachelor's degree or equivalent to report that research-based interventions/methods are not useful in practice, or that experience is more important than using manualised interventions/methods.

Overall, the differences in mean scores were not quite sizeable for the given circumstances. Consequently, a comparison of the two groups yielded no convincing evidence that teachers' adoption of a new intervention differed much by degree.

Table 8.14 Teachers' attitudes towards the use of research evidence by degree

If you received training in an intervention that was new to you, how likely would you be to adopt it if:	Master's degree*		Bachelor's degree *	
	Mean	SD	Mean	SD
Evidence said it worked?	3.13	0.83	2.97	0.76
It was intuitively appealing?	2.88	1.13	2.85	0.82
It "made sense" to you?	3.13	0.99	3.03	0.87
It was required by your school (headteacher, principal etc.)?	3.00	0.76	3.18	0.67
It was required by law?	3.63	0.52	3.47	0.61
It was being used by colleagues who were happy with it?	2.75	1.04	2.97	0.63
You felt you had enough training to use it correctly?	3.25	0.46	3.33	0.64

*or equivalent

8.1.4 Does teachers' use of research evidence differ according to their demographic characteristics (gender, age, job, experience and degree)?

Teachers' (self-reported) use of research evidence is addressed here in relation to their demographic characteristics.

8.1.4.1 *Teachers' (self-reported) use of research evidence by gender*

Table 8.15 illustrates the results of teachers' (self-reported) use of research evidence by gender: female (n=36) and male (n=10).

The mean scores for female and male teachers ranged from 1.97 to 3.00, and from 2.40 to 2.96 respectively. We can argue that although both female and male teachers' general attitudes towards the use of research evidence were positive, their (self-reported) use of evidence was limited.

Overall, the results were mixed when the two groups' general attitudes towards research evidence were contrasted. However, when they were asked about their use of research evidence, the mean scores differed more meaningfully. The male teachers were more likely than females to report using research evidence in most respects. The female teachers were more likely than males to report using evidence for four items. Greater difference in mean scores among these four items was observed when using research evidence to help improve learners' progress (3.00 for female and 2.70 for male). The female teachers were slightly more likely than the male teachers to use research evidence on how to improve their learners' interest in schooling (2.78 and 2.70), or to develop the theories behind various new teaching strategies (2.61 and 2.60), or acquire knowledge and skills using modern questioning techniques in class (2.63 and 2.60). However, in most respects (13 out of 18 items), male teachers were more likely than females to report using evidence in schools. In addition, differences in mean scores were relatively sizeable for most items. In conclusion, although teachers' general attitudes towards the research evidence did not vary much by gender, their (self-reported) use of research evidence in practice varied more in most respects.

Table 8.15 Teachers' (self-reported) use of research evidence by gender

Item	Female		Male	
Level of agreement with "I utilise information from research":	Mean	SD	Mean	SD
to get acquainted with effective teaching strategies	2.61	0.80	2.80	0.92
to help in improving my learners' progress	3.00	0.79	2.70	0.95
for innovations in school curricula	2.64	0.96	2.80	0.92
on how to improve my learners' interest in schooling	2.78	0.93	2.70	0.82
to source better evaluation techniques for day-to-day activities	2.50	1.03	2.50	0.85
in order to prepare my lessons well	2.53	0.94	2.80	1.03
to help me in effective delivery of instruction	2.53	0.94	2.80	0.63
for effective use of instructional materials	2.19	0.95	2.60	0.70
to become knowledgeable on recent theories of child development	2.36	1.20	2.50	0.97
for theories behind various new teaching strategies	2.61	1.13	2.60	0.97
to improve my content knowledge of school subjects	2.58	1.16	2.90	0.57
for the acquisition of more pedagogical knowledge	2.47	1.08	2.96	0.83
for more effective classroom management techniques	2.64	1.13	2.80	0.92

for skills at motivating and reinforcing my learners in learning	2.60	0.99	2.80	0.42
to acquire knowledge and skills in using modern questioning techniques in class	2.63	0.93	2.60	0.84
for further verification of research findings	1.97	1.23	2.40	0.97
to increase the level of classroom interaction i.e. teacher-student, student-student and student-material interactions	2.58	1.18	2.70	0.95
to assist me in planning and carrying out research involving my learners	2.11	1.21	2.50	0.97

8.1.4.2 *Teachers' (self-reported) use of research evidence by age*

Table 8.16 presents the results for teachers' (self-reported) use of research evidence by age (years): younger (18-35) and older (> 35). Since one missing case was excluded from the table, it displays the results for 45 participants in total: younger (n=21) and older (n=24).

Overall, both younger and older teachers' (self-reported) use of research evidence might be considered limited, as all the mean scores, aside from those for one item were lower than 3.00. Compared to other circumstances, older teachers were more likely to report using research evidence to help in improving their leaners' progress, returning the greatest mean score of 3.13.

A comparison of the two groups yielded interesting findings. The younger teachers were more likely than the older teachers to report using research evidence to become knowledgeable regarding recent theories of child development (2.43 and 2.38), or for more effective classroom management techniques (2.81 and 2.50). In all other respects (16 out of 18 items), the older teachers were more likely than younger teachers to report using research evidence in their practice. The mean scores here differed much for almost all items. On the other hand, the findings by attitude showed that although the results were mixed for teachers' general attitudes towards research evidence by age, the older teachers were more likely to adopt a new intervention in all the given circumstances. Given all these results, we can say that teachers' adoption of a new interventions and their (self-reported) use of research evidence in practice differed based on age.

Table 8.16 Teachers' (self-reported) use of research evidence by age (years)

Item	18-35	> 35

	(younger)		(older)	
Level of agreement with “I utilise information from research”:	Mean	SD	Mean	SD
to get acquainted with effective teaching strategies	2.48	0.81	2.79	0.83
to help in improving my learners’ progress	2.67	0.86	3.13	0.74
for innovations in school curricula	2.38	1.02	2.92	0.83
on how to improve my learners' interest in schooling	2.52	0.87	2.92	0.88
to source better evaluation techniques for day-to-day activities	2.29	1.06	2.67	0.92
in order to prepare my lessons well	2.43	0.98	2.67	0.92
to help me in effective delivery of instruction	2.48	0.81	2.63	0.92
for effective use of instructional materials	2.05	0.92	2.46	0.88
to become knowledgeable on recent theories of child development	2.43	1.12	2.38	1.21
for theories behind various new teaching strategies	2.52	1.21	2.67	1.01
to improve my content knowledge of school subjects	2.52	1.08	2.75	1.07
for the acquisition of more pedagogical knowledge	2.36	1.06	2.75	1.03
for more effective classroom management techniques	2.81	1.03	2.50	1.10
for skills at motivating and reinforcing my learners in learning	2.43	0.93	2.78	0.83
to acquire knowledge and skills in using modern questioning techniques in class	2.57	1.03	2.61	0.77
for further verification of research findings	1.81	1.17	2.25	1.19
to increase the level of classroom interaction i.e. teacher-student, student-student and student-material interactions	2.43	1.21	2.75	1.07
to assist me in planning and carrying out research involving my learners	1.95	1.12	2.33	1.17

8.1.4.3 *Teachers’ (self-reported) use of research evidence by job*

Table 8.17 displays the results for teachers’ (self-reported) use of research evidence by job: classroom teachers (n=28) and headteachers/principals (n=17) participants. As mentioned previously, ‘other’ jobs (n=1) are not presented in the table.

Even though both classroom teachers and headteachers/principals were generally positive when expressing their general attitudes towards use of research evidence, their (self-reported) use of evidence in practice was limited in almost all respects. Compared to other circumstances, headteachers/principals were more likely to report using research evidence to improve their learners' interest in schooling, or to enhance their learners' progress with the greatest mean scores of 3.24 and 3.06 respectively.

The most striking result to emerge from comparing the two groups is that headteachers/principals were much more likely than classroom teachers to report using research evidence in all respects. The differences in mean scores were quite sizeable for almost all items. As mentioned previously in relation to attitudes, although teachers' general attitudes towards research evidence did not vary much by job, headteachers/ principals were more likely than classroom teachers to report a desire to adopt a new intervention in some respects, particularly one based on evidence. Taken together, we can state that headteachers/principals reported placing a higher value on research evidence, and used it more often in their practice than classroom teachers.

Table 8.17 Teachers' (self-reported) use of research evidence by job

Item	Classroom teacher		Headteacher*	
Level of agreement with "I utilise information from research":	Mean	SD	Mean	SD
to get acquainted with effective teaching strategies	2.43	0.79	2.94	0.75
to help in improving my learners' progress	2.71	0.81	3.24	0.75
for innovations in school curricula	2.43	1.00	3.00	0.71
on how to improve my learners' interest in schooling	2.54	0.88	3.06	0.83
to source better evaluation techniques for day-to-day activities	2.21	1.03	2.89	0.70
in order to prepare my lessons well	2.46	1.00	2.71	0.85
to help me in effective delivery of instruction	2.39	0.96	2.82	0.64
for effective use of instructional materials	2.07	0.90	2.53	0.80
to become knowledgeable on recent theories of child development	2.18	1.09	2.65	1.17
for theories behind various new teaching strategies	2.43	1.10	2.82	1.01
to improve my content knowledge of school subjects	2.39	1.13	3.00	0.79
for the acquisition of more pedagogical knowledge	2.31	1.08	2.94	0.83
for more effective classroom management techniques	2.57	1.20	2.76	0.83
for skills at motivating and reinforcing my learners in	2.39	0.96	2.98	0.62

learning				
to acquire knowledge and skills in using modern questioning techniques in class	2.50	0.96	2.74	0.75
for further verification of research findings	1.82	1.16	2.35	1.11
to increase the level of classroom interaction i.e. teacher-student, student-student and student-material interactions	2.32	1.12	3.00	1.00
to assist me in planning and carrying out research involving my learners	2.11	1.20	2.24	1.09

* Headteacher/principal etc.

8.1.4.4 *Teachers' (self-reported) use of research evidence by experience*

Table 8.18 presents the results for teachers' (self-reported) use of research evidence by experience: Less experienced (n=19) and experienced (n=25) participants. Those who did not prefer to mention their experience, missing (n=2), are not presented in the table.

From an overall perspective, both less experienced and experienced teachers' use of research evidence can be considered limited. All mean scores were lower than 3.00, aside from one item. Compared to other circumstances, experienced teachers were most likely to report using research evidence to help improve their learners' progress with the greatest mean score of 3.16.

Similar to the results for teachers' use of research evidence in practice by age and job, the mean scores differed meaningfully across the two groups. As shown in the table below, experienced teachers were much more likely than less experienced teachers to report using research evidence in their practice in all respects except for one item. Less experienced teachers were more likely than experienced teachers to report using research evidence for more effective classroom management techniques, with mean scores of 2.74 and 2.60 respectively. However, the differences in mean scores for this item did not differ much relative to other items. With regard to attitudes, experienced teachers were slightly more likely to report that they would adopt a new intervention in all respects. However, the results here seemed more meaningful considering the differences in the mean scores.

Table 8.18 Teachers' (self-reported) use of research evidence by experience

Item	Less experienced		Experienced	
Level of agreement with "I utilise information from research":	Mean	SD	Mean	SD
to get acquainted with effective teaching strategies	2.47	0.84	2.80	0.82
to help in improving my learners' progress	2.63	0.90	3.16	0.69
for innovations in school curricula	2.32	1.06	2.92	0.81
on how to improve my learners' interest in schooling	2.53	0.90	2.92	0.86
to source better evaluation techniques for day-to-day activities	2.16	1.17	2.80	0.71
in order to prepare my lessons well	2.26	1.05	2.76	0.83
to help me in effective delivery of instruction	2.32	0.95	2.72	0.79
for effective use of instructional materials	1.89	0.99	2.56	0.77
to become knowledgeable on recent theories of child development	2.32	1.29	2.48	1.08
for theories behind various new teaching strategies	2.42	1.30	2.76	0.93
to improve my content knowledge of school subjects	2.32	1.25	2.92	0.86
for the acquisition of more pedagogical knowledge	2.21	1.27	2.86	0.78
for more effective classroom management techniques	2.74	1.24	2.60	0.96
for skills at motivating and reinforcing my learners in learning	2.21	1.03	2.91	2.91
to acquire knowledge and skills in using modern questioning techniques in class	2.47	1.12	2.70	2.70
for further verification of research findings	1.63	1.30	2.36	2.36
to increase the level of classroom interaction i.e. teacher-student, student-student and student-material interactions	2.26	1.33	2.88	2.88
to assist me in planning and carrying out research involving my learners	1.89	1.15	2.36	2.36

8.1.4.5 *Teachers' (self-reported) use of research evidence by degree*

Table 8.19 presents the results regarding teachers' (self-reported) use of research evidence by degree: Bachelor's degree or equivalent (n=34) and Master's degree or equivalent (n=8). The missing cases (n=3) and "other" (n=1) are not presented in the table.

Overall, both groups' (self-reported) use of research evidence in practice was limited. None of the mean scores were greater than 3.00. On the other hand, a comparison of the mean scores between the two groups yielded mixed results. Also, the mean scores did not differ much between the groups aside from few items.

Teachers with a Master's degree or equivalent were more likely than those with a Bachelor's degree or equivalent to report using research evidence to increase the level of classroom interaction (2.88 and 2.50), or for more effective classroom management techniques (3.00 and 2.56), with relatively greater differences in mean scores compared to other items. Additionally, they were more likely than those with a Bachelor's degree or equivalent to report using research evidence to assist them in planning and carrying out research involving their learners with mean scores of 2.38 and 2.06 respectively. A possible explanation for this might be that teachers with a Master's degree or equivalent may have become more confident to conduct their own research in practice after taking part in further academic research or improving their knowledge about research evidence in their post-graduate education. On the other hand, teachers with a Bachelor's degree or equivalent were more likely to say that they use research for skills at motivating and reinforcing their learners in learning (2.67 and 2.38), or help them in effective delivery of instruction (2.65 and 2.13). However, those with a Master's degree or equivalent were also more or equally likely to use research evidence in some similar questions. Therefore, there was no convincing evidence to have clear conclusions for these items. From an overall perspective, consequently, the results indicated that teachers' (self-reported) use of research evidence did not differ much by degree.

Table 8.19 Teachers' (self-reported) use of research evidence by degree

Item	Master's degree *		Bachelor's degree *	
Level of agreement with "I utilise information from research":	Mean	SD	Mean	SD
to get acquainted with effective teaching strategies	2.63	0.92	2.62	2.62
to help in improving my learners' progress	2.75	1.04	2.97	2.97

for innovations in school curricula	2.75	1.04	2.65	2.65
on how to improve my learners' interest in schooling	2.88	0.83	2.68	2.68
to source better evaluation techniques for day-to-day activities	2.38	1.30	2.47	2.47
in order to prepare my lessons well	2.63	1.06	2.59	2.59
to help me in effective delivery of instruction	2.13	0.99	2.65	2.65
for effective use of instructional materials	2.25	0.89	2.24	2.24
to become knowledgeable on recent theories of child development	2.38	1.30	2.44	2.44
for theories behind various new teaching strategies	2.75	1.04	2.56	2.56
to improve my content knowledge of school subjects	2.63	1.51	2.62	2.62
for the acquisition of more pedagogical knowledge	2.63	1.30	2.55	2.55
for more effective classroom management techniques	3.00	1.07	2.56	2.56
for skills at motivating and reinforcing my learners in learning	2.38	0.74	2.67	2.67
to acquire knowledge and skills in using modern questioning techniques in class	2.75	1.04	2.58	2.58
for further verification of research findings	2.00	1.51	2.06	2.06
to increase the level of classroom interaction i.e. teacher-student, student-student and student-material interactions	2.88	1.25	2.50	2.50
to assist me in planning and carrying out research involving my learners	2.38	1.19	2.06	2.06

*or equivalent

8.1.2 Conclusion

A total of 46 teachers from nine primary schools in England were asked about their attitudes towards research evidence and use of research evidence in practice.

Teachers were first asked eight questions about their general attitudes towards research evidence. Overall, teachers' general attitudes towards use of research evidence in schools might be considered positive. They were willing to use any new intervention in the given circumstances, but they were more willing to use it if it was developed by researchers. Teachers were then asked seven questions about influences that might affect their adoption of a new intervention. Teachers were quite likely to report adopting a new intervention in almost all respects, particularly if it was required by law, or they felt they had enough training to use it correctly. But they were less likely to report using it if it was intuitively appealing, or being used by colleagues who were happy with it, or based on evidence compared to other circumstances. This indicates that teachers reported placing a higher value on various influences than evidence while adopting a new intervention, which may lead to unwarranted use of programme.

On other hand, teachers were asked 18 questions about their (self-reported) use of research evidence in practice. Overall, the teachers' (self-reported) use of research evidence may be considered limited, particularly when comparing it to their attitudes towards research evidence. They were more likely to report using research evidence to improve their learners' progress and interest in schooling, and less likely to use it for further verification of research findings or to assist them in planning and carrying out research involving their learners. Perhaps this means they were more interested in improving their learners' progress directly, rather than in engaging with research and becoming more critical about research evidence.

Teachers' attitudes towards the use of research evidence, and their (self-reported) use of research evidence were examined based on their demographic characteristics (gender, age, job, experience and degree). Compared to the results for the variables gender and degree, those relating to age, job and experience may be considered more secure, as the distribution of participants was more balanced for these subgroups. Overall, there was no convincing evidence that teachers' general attitudes towards research evidence differed much or meaningfully from that of any subgroups. However, the mean scores for some items differed by subgroup. Teachers who were younger, less experienced and classroom teachers were more likely than their comparison subgroup (older, experienced and headteachers respectively) to report that research-based interventions or methods are not useful in practice. However, other questions regarding teachers' attitudes with regard to the research evidence did not support this, providing mixed results.

When considering questions regarding what influences may affect teachers' adoption of a new intervention, teachers who were female, older, headteachers/principals, experienced and those with a Master's degree or equivalent were more likely than their comparison group (teachers who were male, younger, classroom teachers, less experienced and with a Bachelor's degree or equivalent respectively) to report adopting a new intervention based on evidence. However, the mean scores did not vary much for this item among some of the subgroups (gender, experience and degree). In addition, the aforementioned subgroups were not only more likely than the equivalent comparison group to report using a new intervention based on evidence, but also to adopt it in all or most other respects. As mentioned previously, this might not be considered ideal in this study as being receptive to all approaches, without taking account of research evidence might have a negative or harmful impact in practice. Perhaps results by age and job can be considered more meaningful. Older teachers and headteachers/principals were much more likely than their comparison group (younger or classroom teachers) to report adopting an intervention based on evidence. Moreover, headteachers/principals were also more likely to report adopting an evidence-based intervention compared to almost all other options.

The results as presented by subgroup were more meaningful for teachers' (self-reported) use of research evidence in practice. In particular, headteachers/principals were more likely than classroom teachers to report using research evidence in all instances. The majority of the mean scores differed markedly between these two groups. Moreover, male, older and experienced teachers were more likely than their comparison group (female, younger and less experienced teachers) to report using research evidence in most cases, and the differences in mean scores were quite sizeable for some of the items presented. From an overall perspective, there was no convincing evidence that the teachers' (self-reported) use of research evidence in practice differed much or meaningfully relative to their degree.

CHAPTER 9

Results of the impact evaluation

This chapter presents the results of the impact evaluation, relating the findings to the primary research questions.

9.1 Impact evaluation

The following research questions were answered in this chapter:

- What is the impact of disseminating research evidence through workshop training with supporting evidence-based resources on teachers' attitudes towards the use of research evidence?
- What is the impact of disseminating research evidence through workshop training with supporting evidence-based resources on teachers' use of research evidence in schools?
- Does the impact of disseminating research evidence through workshop training with supporting evidence-based resources on teachers' attitudes towards the use of research evidence differ according to their demographic characteristics (gender, age, job, experience and degree)?
- Does the impact of disseminating research evidence through workshop training with supporting evidence-based resources on teachers' use of research evidence differ according to their demographic characteristics (gender, age, job, experience and degree)?

The evaluation included 25 teachers, who completed both the pre- and post-survey. Table 9.1 provides the number of participants who completed the pre-post survey by group and school.

Table 9.1 The number of participants for the pre-survey and post-survey

Groups	Schools	Participants	
	School ID	Pre-survey	Post-survey
Treatment	T1	10	3
	T2	3	1
	T3	10	8
	T4	2	-

Total for treatment	4	25	12
Control	C1	3	2
	C2	2	1
	C3	2	2
	C4	8	7
	C5	6	1
Total for control	5	21	13
Total	9	46	25

Table 9.2 presents the demographic characteristics (subgroups) of the achieved sample by group (treatment or control). As shown in the table, the number of participants for each cell was limited. The current study also investigated the impact of the intervention according to subgroups. Therefore, it is important to note here that the results by subgroups should be treated with caution, considering the small sample size.

Table 9.2 The demographic characteristics of the achieved sample by group

Demographic characteristics		Treatment (n=12)	Control (n=13)
Gender	Female	11	8
	Male	1	5
Age (years)	18-25	7	4
	> 35	5	8
	Missing	-	1
Job	Classroom teacher	7	7
	Headteacher/principal etc	5	5
	Other	-	1
Experience (years)	Less experienced 0-10	7	2
	Experienced 10+	5	9
	Missing	-	2
Degree	Master’s degree or equivalent	1	1
	Bachelor’s degree or equivalent	10	10
	Other	-	1
	Missing	1	1

As mentioned previously, there were some dropouts in the evaluation. Prior to presenting the findings for the evaluation, missing data was addressed in more detail to discuss its potential impact overall.

9.1.1 Missing data and sensitivity analysis

In order to clarify the overall picture of missing cases by demographic characteristics (subgroups), Table 9.3 compares those participants who completed the pre-survey (n=46) with those who completed both the pre and post survey (25). As apparent from the table, the dropout rate was worse for those with a Master's degree or equivalent (75%) when compared to the other subgroups.

Table 9.3 The demographic characteristics for participants who completed the pre-survey and those who completed both the pre and post-survey by subgroups

Demographic characteristics		Participants who completed the pre-survey	Participants who completed both pre and post-survey	Percentage of dropout (%)
Gender	Female	36	19	47
	Male	10	6	40
Age (years)	18-25	21	11	48
	> 35	24	13	46
	Missing	1	1	-
Job	Classroom teacher	28	14	50
	Headteacher/principal etc	17	10	41
	Other	1	1	-
Experience (years)	Less experienced (0-10)	19	9	53
	Experienced (10+)	25	14	44
	Missing	2	2	-
Degree	Master's degree *	8	2	75
	Bachelor's degree*	34	20	41
	Other	1	1	-
	Missing	3	2	33

* or equivalent

Table 9.4 sets out the demographic characteristics for the achieved sample (those completed both the pre and post-survey, n=25), and the missing cases (those who only completed the pre-survey, n=21) by group (treatment or control). The treatment group (52%) experienced a higher dropout rate than the control group (38%). Dropout rate was especially notable for some of the cells, especially the small ones. The male participants in the treatment group were more likely to drop out than females. Perhaps those participants who did not complete the post-survey may not have been satisfied with the intervention, and other biases may also explain this. Similarly, those participants with a Master's degree or equivalent in the treatment group were more likely than those with a Bachelor's degree to drop out. A possible explanation for this might be that those participants with a Master's degree or equivalent may have been more reluctant if they had often encountered similar evaluations/interventions during their academic studies. Or they may have viewed themselves as more confident about research evidence, thereby leading to a loss of interest during the evaluation process. However, the sample size for each cell was relatively limited, and thus such different rates of loss may have been largely due to chance. Overall, the distribution was not balanced by gender and degree. As mentioned previously, readers should be able to interpret the results with caution by subgroup, particularly by gender and degree.

Table 9.4 The demographic characteristics for the achieved sample (those completed both pre and post survey) and missing cases (those who only completed the pre-survey) by group.

Demographic characteristics		Intervention		Control	
		Achieved (n=12)	Missing (n=13)	Achieved (n=13)	Missing (n=8)
Gender	Female	11	10	8	7
	Male	1	3	5	1
Age (years)	18-25	7	8	4	2
	> 35	5	5	8	6
	Missing			1	
Job	Classroom teacher	7	11	7	3
	Headteacher/principal etc	5	2	5	5
	Other	-		1	
Experience (years)	Less experienced (0-10)	7	9	2	1
	Experienced (10+)	5	4	9	7
	Missing	-		2	

Degree	Master's degree	1	4	1	2
	Bachelor's degree	10	8	10	6
	Other	-	-	1	-
	Missing	1	1	1	-

* or equivalent

The missing cases are also addressed according to "The number of counterfactual cases that would be needed to disturb the finding (NNTD)" (Gorard et al., 2017, p.45), and a comparison of mean scores. According to this test, if the NNTD is bigger, it would take more missing (or counterfactual cases) to reverse its effect. Tables 9.5 and 9.6 present the NNTD scores by attitudes and research use respectively. The number of missing cases (or counterfactual cases) in the current study was 21, which means that if the NNTD were lower than 21, the missing cases would reverse the effect.

Table 9.5 NNTD by attitudes

Item	Smaller cell	Number of missing cases	Effect size	NNTD
Research-based interventions/methods are not useful in practice	21	21	0.72	15
Experience is more important than using manualised interventions/methods	21	21	0.04	1
I am willing to use new and different types of interventions/methods developed by researchers	21	21	0.34	7
I like to use new types of interventions/methods to help my students	21	21	0.15	3
I am willing to try new types of interventions/methods even if I have to follow a teaching/training manual	21	21	0.30	6
I know better than academic researchers how to care for my students	21	21	0.22	5
I would not use manualised interventions/methods	21	21	0.29	6
I would try a new intervention/method even if it were very different from what I am used to doing	21	21	0.60	13

If you received training in an intervention that was new to you, how likely would you be to adopt it if:				
Evidence said it worked?	21	21	0.48	10
It was intuitively appealing?	21	21	0.29	6
It “made sense” to you?	21	21	0.39	8
It was required by your school (headteacher, principal etc.)?	21	21	0.86	18
It was required by law?	21	21	0.10	2
It was being used by colleagues who were happy with it?	21	21	0.25	5
You felt you had enough training to use it correctly?	21	21	0.77	16

As shown in Tables 9.5 and 9.6, none of NNTD were greater than 21. Therefore, it can be argued that the findings of the evaluation may have been affected by missing cases, and thus readers should interpret the results with caution.

Table 9.6 NNTD by research use

Level of agreement with “I utilise information from research”:	Smaller cell	Number of missing cases	Effect size	NNTD
to get acquainted with effective teaching strategies	21	21	0.78	16
to help in improving my learners’ progress	21	21	0.75	16
for innovations in school curricula	21	21	0.40	8
on how to improve my learners' interest in schooling	21	21	0.46	10
to source better evaluation techniques for day-to-day activities	21	21	0.51	11
in order to prepare my lessons well	21	21	0.62	13
to help me in effective delivery of instruction	21	21	0.32	7
for effective use of instructional materials	21	21	0.30	6
to become knowledgeable on recent theories of child development	21	21	0.43	9
for theories behind various new teaching strategies	21	21	0.18	4

to improve my content knowledge of school subjects	21	21	0.07	1
for the acquisition of more pedagogical knowledge	21	21	0.23	5
for more effective classroom management techniques	21	21	0.74	16
for skills at motivating and reinforcing my learners in learning	21	21	0.37	8
to acquire knowledge and skills in using modern questioning techniques in class	21	21	0.35	7
for further verification of research findings	21	21	0.12	3
to increase the level of classroom interaction i.e. teacher-student, student-student and student-material interactions	21	21	0.29	6
to assist me in planning and carrying out research involving my learners	21	21	0.28	6

Those participants who completed the post-survey may have differed considerably in terms of their pre-survey mean scores compared with those who did not complete the post-survey, and this biased the findings. Therefore, the mean scores for the pre-survey were compared for those participants who did not complete the post survey (missing) and for those who completed the post-survey (after missing) in Tables 9.7 and 9.8 by attitudes and research use. Additionally, the mean scores were presented for those who completed the pre-survey (baseline) to facilitate the comparison.

The baseline scores did not vary much between the groups, except for a few items. Overall, those who did not complete the post survey (missing) tended to receive higher mean scores. Some of the differences in mean scores were also quite sizeable. In this respect, it is beneficial to examine the situation for both the treatment and control group. For example, including missing cases would increase the mean scores for the treatment group, but decrease those for the control group. However, this would not be enough to reverse the mean scores for the pre-survey. Alternatively, including the missing cases could make the treatment scores higher than that for the control by reversing the pre-survey results for the treatment and control groups. A good example of this might be the first item. After missing cases, the mean score of the treatment group (1.08) was lower than that of the control group (1.54). However, if the missing cases had been included (baseline scores), this would have reversed the result, thereby making the treatment group (1.60) higher than the control group (1.43). This might be a consequence of chance or bias. A possible explanation for this item might be that the first question was a negative item in terms of attitudes and grammar, and so some teachers may have misread the question. If such cases were not equally distributed to both groups, then this would generate differences of this nature in mean scores. The small sample size might also be more inclined to be affected by missing cases. In this respect, differences in the pre-survey mean scores could be addressed by considering both the treatment and control group to determine whether the missing cases would alter the results considerably or not. Those items whose mean scores would have been reversed if missing cases had been included were coloured in Tables 9.7 and 9.8.

Table 9.7 The comparison of pre-survey mean scores by attitudes

	Treatment			Control		
	Baseline n=25	Missing n=13	After missing n=12	Baseline n=21	Missing n=8	After missing N=13
Research-based interventions/methods are not useful in practice	1.60	2.08	1.08	1.43	1.25	1.54
Experience is more important than using manualised interventions/methods	2.00	1.92	2.08	1.81	2.13	1.62
I am willing to use new and different types of interventions/methods developed by researchers	3.08	3.00	3.17	3.29	3.50	3.15
I like to use new types of interventions/methods to help my students	3.00	2.92	3.08	3.14	3.13	3.15
I am willing to try new types of interventions/methods even if I have to follow a teaching/training manual	2.68	2.62	2.76	2.71	2.75	2.69
I know better than academic researchers how to care for my students	1.56	1.54	1.58	1.48	1.50	1.46
I would not use manualised	0.76	0.54	1.00	0.64	0.59	0.67

interventions/methods						
I would try a new intervention/method even if it were very different from what I am used to doing	2.88	2.85	2.92	3.00	3.13	2.92
If you received training in an intervention that was new to you, how likely would you be to adopt it if:						
Evidence said it worked?	3.04	2.92	3.17	3.00	3.13	2.92
It was intuitively appealing?	2.87	3.08	2.65	2.81	3.38	2.46
It "made sense" to you?	3.08	3.15	3.00	3.00	3.63	2.62
It was required by your school (headteacher, principal etc.)?	3.20	3.00	3.42	3.14	3.25	3.08
It was required by law?	3.48	3.38	3.58	3.48	3.50	3.46
It was being used by colleagues who were happy with it?	2.96	2.85	3.08	2.90	3.13	2.77
You felt you had enough training to use it correctly?	3.29	3.18	3.42	3.38	3.75	3.15

As shown in both Tables 9.7 and 9.8, if the missing respondents had completed the post-survey, this would have been enough to reverse either the treatment or control group mean scores for several items.

Table 9.8 The comparison of pre-survey mean scores by research use

Item	Treatment			Control		
Level of agreement with "I utilise information from research":	Baseline n=25	Missing n=13	After missing n=12	Baseline n=21	Missing n=8	After missing N=13
to get acquainted with effective teaching strategies	2.68	2.54	2.83	2.62	2.75	2.54
to help in improving my learners' progress	2.88	2.77	3.00	3.00	3.25	2.85
for innovations in school curricula	2.64	2.62	2.67	2.71	3.00	2.54
on how to improve my learners' interest in schooling	2.84	2.69	3.00	2.67	2.75	2.62

to source better evaluation techniques for day-to-day activities	2.56	2.46	2.67	2.43	2.63	2.31
in order to prepare my lessons well	2.48	2.62	2.33	2.71	2.63	2.77
to help me in effective delivery of instruction	2.56	2.38	2.75	2.62	2.25	2.85
for effective use of instructional materials	2.20	2.15	2.25	2.38	2.50	2.31
to become knowledgeable on recent theories of child development	2.64	2.62	2.67	2.10	2.25	2.00
for theories behind various new teaching strategies	2.72	2.85	2.58	2.48	2.63	2.38
to improve my content knowledge of school subjects	2.68	2.62	2.75	2.62	3.00	2.38
for the acquisition of more pedagogical knowledge	2.58	2.66	2.50	2.57	2.50	2.62
for more effective classroom management techniques	2.92	2.69	3.17	2.38	2.50	2.31
for skills at motivating and reinforcing my learners in learning	2.59	2.46	2.72	2.71	2.63	2.77
to acquire knowledge and skills in using modern questioning techniques in class	2.66	2.54	2.80	2.57	2.63	2.54
for further verification of research findings	2.00	2.00	2.00	2.14	2.13	2.15
to increase the level of classroom interaction i.e. teacher-student, student-student and student-material interactions	2.60	2.38	2.83	2.62	2.88	2.46
to assist me in planning and carrying out research involving my learners	2.32	2.31	2.33	2.05	1.75	2.23

In conclusion, the evaluation involved an RCT that experienced a considerable dropout rate due to the Covid-19 pandemic. The missing data and sensitivity analyses indicate that the evaluation could have been substantially affected by the missing data. The NNTD scores revealed that missing cases may have been sufficient to reverse the results. However, this does not mean that if missing cases completed the post-survey, they would certainly have reversed the impact. Overall, readers should interpret the results presented here with caution. In particular, the results by gender and degree should be considered as less reliable, compared to those for the other subgroups.

9.1.2 Findings from the impact evaluation

The results of the impact evaluation involving 25 participants (treatment 13, control 12) are presented here. The results of the impact evaluation by subgroup (demographic characteristics) are then summarised briefly for each subgroup.

9.1.2.1 What is the impact of disseminating research evidence through workshop training with supporting evidence-based resources on teachers' attitudes towards the use of research evidence?

The participants were first asked eight questions regarding their general attitudes towards the research evidence. Table 9.9 presents the pre-survey and post-survey results. The results for some items are presented in detail here to help readers comprehend how to interpret the tables.

As is apparent from the table, some of the effect sizes were positive (four out of eight items). A positive effect size here indicated that the treatment group made bigger gains, or that the decline was bigger for the control group. In other words, the treatment group were ahead relative to the control group in terms of gains (post-mean – pre-mean). For example, for the second item in the table, "experience is more important than using manualised interventions/methods", the treatment group had a higher average agreement score than the control group at the outset, with mean scores of 2.08 and 1.62 respectively. After the intervention, the treatment group remained ahead compared to the control group, with mean scores of 2.42 and 1.92 respectively. This demonstrates that both groups made positive progress, but that the treatment group made bigger gains (+0.34) than the control group (+0.30). The difference in gain scores was +0.04. The effect size was then calculated by dividing the difference in gain (+0.04) by overall SD (0.90), representing an effect size of +0.04. We can state that greater gains were achieved by teachers in the treatment group. However, since the item was negative in terms of general attitudes, there was no evidence of a beneficial impact from the intervention on the treatment group for this item.

On the other hand, both groups can make negative gains from pre- to post-survey, but the decline may be greater for one of them. For example, at the outset, the control group had a higher average agreement score (3.15) than the treatment group (3.08) for the following statement: I like to use new interventions to help my students. Both treatment and control groups made negative gains from the pre- to post survey, with gain scores of -0.25 and -0.15 respectively. Meanwhile, the control group remained ahead (3.00) compared to the treatment group (2.83) after the intervention. However, the difference in gains between the two groups was -0.10, indicating that the decline was greater for the treatment group (ES= -0.15). This suggests that there was no evidence of a beneficial impact on the treatment group for this item from the intervention.

Looking at the table below from an overall perspective, we can observe that the results were not promising. While the effect sizes for the negative items (coloured) in terms of attitudes were positive (ranging from +0.04 to +0.72), those for the others were negative (ranging from -0.15 to -0.60). Some of the effect sizes were also quite sizeable. This indicates that the treatment group were ahead in terms of gain scores from the pre- to post survey for negative items, but behind for the remaining questions. Overall, therefore, we can conclude that there was no evidence of a beneficial impact on teachers' general attitudes following the intervention.

For three of the four negative items, the treatment group had a higher average agreement score than the control group at the outset, and remained ahead with bigger gains following the intervention. The treatment group are now more likely than control group to state that experience is more important than using manualised interventions/methods (ES= +0.04), or that they know better than academic researchers how to care for their students (ES= +0.22), or that they would not use manualised interventions/methods (ES= +0.29). Perhaps, considering the difference in context between the US and UK, "care" would have been better expressed as "improve my students' attainment", due to the fact that participants in the current study may have interpreted the term in a variety of ways. However, it should be noted that both groups were asked the same questions in the evaluation. For the remaining negative item, the control group had a higher average agreement score than the intervention group at the outset, stating that research-based interventions/methods are not useful in practice. However, while the treatment group made positive gains (+0.50), the control group experienced a decline (-0.77) with regard to this item, representing a quite sizeable effect size of +0 .72.

The treatment group had a higher average agreement score than the control group at the outset, and they reported that they were willing to use new interventions if developed by researchers, or even if they had to follow a manual. However, the control group were ahead in terms of gains from the pre- to post-survey for these items compared to the treatment group. The effect sizes were -0.34 and -0.30. The control group had a higher average agreement score than the treatment group at the outset, and remained ahead, stating that they like to use new interventions to help their students (ES= -0.15). Lastly, both the treatment and control group were equally likely at the outset to say that they would try a new intervention, even if it were very different from what they are used to doing. However, while the control group made positive gains (+0.16), the treatment group experienced a decline (-0.42). The effect size was -0.60.

Table 9.9 Comparison of the pre- and post-intervention survey results, attitudes

Item	Group	Pre mean	Post mean	Gain	SD	Effect size
Research-based interventions/methods are not useful in practice	Treatment	1.08	1.58	+0.50	1.77	+0.72
	Control	1.54	0.77	-0.77		
Experience is more important than using manualised interventions/methods	Treatment	2.08	2.42	+0.34	0.90	+0.04
	Control	1.62	1.92	+0.30		
I am willing to use new and different types of interventions/methods developed by researchers	Treatment	3.17	2.83	-0.34	0.99	-0.34
	Control	3.15	3.15	0.00		
I like to use new types of interventions/methods to help my students	Treatment	3.08	2.83	-0.25	0.65	-0.15
	Control	3.15	3.00	-0.15		
I am willing to try new types of interventions/methods even if I have to follow a teaching/training manual	Treatment	2.76	2.75	-0.01	1.07	-0.30
	Control	2.69	3.00	+0.31		
I know better than academic researchers how to care for my students	Treatment	1.58	2.00	+0.42	1.17	+0.22
	Control	1.46	1.62	+0.16		
I would not use manualized interventions/methods	Treatment	1.00	1.08	+0.08	1.26	+0.29
	Control	0.67	0.38	-0.29		

I would try a new intervention/method even if it were very different from what I am used to doing	Treatment	2.92	2.50	-0.42	0.97	-0.60
	Control	2.92	3.08	+0.16		

The participants were asked a further seven questions regarding influences that may affect their use of a new intervention. As shown in Table 9.10, the results were not encouraging. All the effect sizes in the table below were negative (ranging from -0.10 to -0.86), some of them being quite sizeable. This means the control group were ahead relative to the treatment group in terms of gains from the pre-to post survey.

The treatment group had a higher average agreement score than the control group at the outset, and stated that they would use a new intervention based on evidence. However, while the treatment group experienced a decline (-0.17), the control group made positive gains (+0.23) from the pre-to post survey for this item. The effect size was -0.48. This indicates no evidence of a beneficial impact on teachers' use of a new intervention based on evidence following the intervention. On the other hand, the control group were ahead compared to the treatment group in terms of gains from the pre-to post-survey in all other respects. The effect sizes ranged from -0.10 to -0.86. In particular, the treatment group are now less likely than the control group to report that they would use a new intervention if required by their school (headteacher, principal etc.) (ES= -0.86), or if they felt they had enough training to use it correctly (ES= -0.77).

Perhaps the results would have been encouraging if the treatment group had made higher positive gains than the control group for the first item, indicating that they would use a new intervention based on evidence, and fewer gains compared to the control group for the remaining circumstances. However, the results indicated that the treatment group were behind relative to the control group in all the circumstances. Aside from the first item referring to the evidence, lower gains or negative effect sizes for the treatment group can be considered good in all circumstances considering that they may lead to unwarranted use of a programme. On the other hand, lower gains or a negative effect size for the treatment group may be considered reasonable in the current study. A possible explanation here might also be that the treatment group might have been more sceptical than the control group regarding research evidence after the intervention, considering that the intervention involving the workshop and materials highlighted the value of judging the quality of the research evidence. This issue is addressed in the discussion chapter. In addition, since the evaluation was a small scale RCT with considerable dropout due to the Covid-19, the results might have been affected by both bias and chance.

Table 9.10 Comparison of the pre- and post-intervention survey results, attitudes

If you received training in an intervention that was new to you, how likely would you be to adopt it if:	Group	Pre mean	Post mean	Gain	SD	Effect size
Evidence said it worked?	Treatment	3.17	3.00	-0.17	0.84	-0.48
	Control	2.92	3.15	+0.23		
It was intuitively appealing?	Treatment	2.65	2.58	-0.07	1.04	-0.29
	Control	2.46	2.69	+0.23		
It “made sense” to you?	Treatment	3.00	3.08	+0.08	0.98	-0.39
	Control	2.62	3.08	+0.46		
It was required by your school (headteacher, principal etc.)?	Treatment	3.42	3.00	-0.42	0.84	-0.86
	Control	3.08	3.38	+0.30		
It was required by law?	Treatment	3.58	3.50	-0.08	0.79	-0.10
	Control	3.46	3.46	0.00		
It was being used by colleagues who were happy with it?	Treatment	3.08	3.25	+0.17	0.84	-0.25
	Control	2.77	3.15	+0.38		
You felt you had enough training to use it correctly?	Treatment	3.42	3.25	-0.17	0.73	-0.77
	Control	3.15	3.54	+0.39		

9.1.2.2 What is the impact of disseminating research evidence through workshop training with supporting evidence-based resources on teachers’ use of research evidence in schools?

Following the questions regarding attitudes, the teachers were asked 18 questions about their (self-reported) use of research evidence in practice. Table 9.11 presents both the pre-survey and post- survey results. The results were considered mixed from an overall perspective. As apparent from the table below, of 18 questions, 14 yielded negative effect sizes ranging from -0.12 to -0.78, some of which were quite sizeable. The remaining four items yielded positive effect sizes ranging from +0.07 to +0.62. These results mean the control group were ahead relative to the treatment group in terms of gains from the pre-to post survey in most respects.

The control group had higher average agreement scores than the treatment group at the outset, and reported using research evidence to prepare their lessons well, or to assist them with effective delivery of instruction, or effective use of instructional materials. However, the treatment group made larger gains for these items, and moved ahead compared to the control group after the intervention. The effect sizes were +0.62, +0.32 and +0.30. Treatment group had a higher average agreement score (2.75) than the control group (2.38) to report at the outset, using research evidence to improve their content knowledge of school subjects. Both groups made positive gains, although the treatment made greater positive gains (+0.23) than the control group (+0.16) and remained ahead following the intervention. The effect size was +0.07. In all other respects the treatment teachers were behind in gains from the pre-to post-survey compared to the control group. In particular, they were behind in gains compared to the control group to report using research evidence to become acquainted with effective teaching strategies (ES= -0.78), or to help in improving their learners' progress (ES=-0.75), or develop more effective classroom management techniques (ES= -0.74).

In conclusion, the control group were ahead in gains compared to the treatment group in most respects. Hence, there was no convincing evidence of a beneficial impact on teachers' (self-reported) use of research evidence from the intervention overall. A possible explanation for this might be that the treatment teachers may have become aware of the importance of judging the quality of research evidence, thereby leading them to develop more sceptical attitudes towards research evidence. This might have made the treatment group teachers less enthusiastic about using research evidence in practice. As mentioned previously, the participants were given training with additional supported resources, such as research summaries and an evidence kit. During the workshop, some of the participants also expressed views that might be considered here to enrich existing data. This may also assist us in comprehending what might have happened.

Table 9.11 Comparison of the pre- and post-intervention survey results, research use

Level of agreement with "I utilise information from research":	Group	Pre mean	Post mean	Gain score	SD	Effect size
to get acquainted with effective teaching strategies	Treatment	2.83	2.33	-0.50	1.04	-0.78
	Control	2.54	2.85	+0.31		
to help in improving my learners' progress	Treatment	3.00	2.50	-0.50	0.97	-0.75
	Control	2.85	3.08	+0.23		
for innovations in school curricula	Treatment	2.67	2.75	+0.08	0.94	-0.40
	Control	2.54	3.00	+0.46		
on how to improve my learners' interest in schooling	Treatment	3.00	2.75	-0.25	0.83	-0.46
	Control	2.62	2.75	+0.13		

to source better evaluation techniques for day-to-day activities	Treatment	2.67	2.46	-0.21	1.02	-0.51
	Control	2.31	2.62	+0.31		
in order to prepare my lessons well	Treatment	2.33	2.81	+0.48	1.01	+0.62
	Control	2.77	2.62	-0.15		
to help me in effective delivery of instruction	Treatment	2.75	2.90	+0.15	0.74	+0.32
	Control	2.85	2.76	-0.09		
for effective use of instructional materials	Treatment	2.25	2.67	+0.42	0.89	+0.30
	Control	2.31	2.46	+0.15		
to become knowledgeable on recent theories of child development	Treatment	2.67	2.75	+0.08	0.89	-0.43
	Control	2.00	2.46	+0.46		
for theories behind various new teaching strategies	Treatment	2.58	2.67	+0.09	1.10	-0.18
	Control	2.38	2.67	+0.29		
to improve my content knowledge of school subjects	Treatment	2.75	2.98	+0.23	0.97	+0.07
	Control	2.38	2.54	+0.16		
for the acquisition of more pedagogical knowledge	Treatment	2.50	2.50	0.00	1.01	-0.23
	Control	2.62	2.85	+0.23		
for more effective classroom management techniques	Treatment	3.17	2.92	-0.25	1.07	-0.74
	Control	2.31	2.85	+0.54		
for skills at motivating and reinforcing my learners in learning	Treatment	2.72	2.57	-0.15	1.04	-0.37
	Control	2.77	3.00	+0.23		
to acquire knowledge and skills in using modern questioning techniques in class	Treatment	2.80	2.67	-0.13	0.75	-0.35
	Control	2.54	2.67	+0.13		
for further verification of research findings	Treatment	2.00	2.01	+0.01	1.29	-0.12
	Control	2.15	2.31	+0.16		
to increase the level of classroom interaction i.e. teacher-student, student-student and student-material interactions	Treatment	2.83	2.58	-0.25	1.12	-0.29
	Control	2.46	2.54	+0.08		
to assist me in planning and carrying out research involving my learners	Treatment	2.33	2.42	+0.09	1.09	-0.28
	Control	2.23	2.62	+0.39		

Even if they were given a summary of research reports, participants might have been concerned about their complexity, assuming that they had to read them:

I think there is a lot in there that you feel does not need to be there potentially.

Perhaps they may have found the evidence kit difficult, as there was a wide variety of interventions presented in the kit, and they may have struggled to obtain sufficient information about them:

> *I think if you didn't know anything about any of them, it is really difficult to choose which is best.*

This indicates that even an evidence kit, or a summary of research report, can be assumed to be a simple or effective means to disseminate research evidence by researchers, but may be found difficult to get evidence into use by users. In practice, hence, the teachers might have found it easier to do what their colleagues recommended rather than using research evidence:

> *I heard about it and heard it works well.*

While adopting an intervention or approach, the teachers may have taken account of cost, or their own experience, which might have become a barrier to applying research-based strategies into practice.

> *I liked the fact that it was relatively cheap per pupil, and I have to confess I have experience of it.*

9.1.2.3 Does the impact of disseminating research evidence through workshop training with supporting evidence-based resources on teachers' attitudes towards the use of research evidence differ according to their demographic characteristics (gender, age, job, experience and degree)?

This study also set out to investigate the impact of the intervention according to the following subgroups: gender, age, job, experience and degree. As mentioned previously, it is important to note that readers should interpret the results of the subgroup analysis with caution, due to the small sample size. Comparing to other subgroups, the distribution of the participants was less balanced for gender and degree. Thus, the results for these two subgroups might be less secure than those for the others.

First, the impact of the intervention is addressed depending on the subgroups. We know that the intervention in the current study did not lead to a beneficial impact for the treatment group, with the exception of several items regarding teachers' (self-reported) use of research evidence. However, some subgroups might have been affected positively from the intervention. Therefore, the impact of the intervention on each subgroup is first explained briefly. Secondly, even if the subgroups are affected similarly (e.g., harmful impact) by the intervention, they might still vary in terms of gain and effect size. For example, both female and male teachers in the treatment group can make positive gains, and the effect size might be positive for both groups after the intervention, although the intervention may have a bigger impact for one of them. Therefore, the results for the subgroups are also compared with each other. For example, both female and male teachers in the treatment group made positive bigger gains than those in their comparison group for the following item: Research-based interventions/methods are not useful in practice. However, the intervention had a bigger impact on male teachers (ES= +1.47) than females (ES= +0.40).

9.1.2.3.1 The impact on attitudes by gender

Table 9.12 presents the pre and post survey results for teachers' general attitudes towards the use of research evidence by gender.

Overall, it was apparent that the results were mixed for both groups, with no convincing evidence of a beneficial impact on female or male teachers' general attitudes towards research evidence. Male teachers in the treatment group were behind in terms of gains from pre-to post survey, when compared to those in the control group for two negative items: Experience is more important than using manualised interventions/methods (ES= -1.56), and I know better than academic researchers how to care for my students (ES= -0.34). A lower gain for these items indicates a beneficial impact on male teachers' general attitudes towards research evidence resulting from the intervention. Female teachers in the treatment group were ahead in terms of their gains from the pre-to post survey compared to those in the control group to report that they like to use new interventions to help their students (ES= +0.15), and were less likely to report that they know better than academic researchers how to care for their students (ES= -0.07). These results indicate a beneficial impact on female teachers' general attitudes towards research evidence from the intervention for these items. However, there was no convincing evidence that there was a beneficial impact for females and males in any other respect.

The results were again mixed when female and male teachers were compared. After considering the negative items for attitudes, we can see that the intervention had a bigger negative/harmful impact on males than females in most respects (six out of eight items). However, while the female teachers in the treatment group made positive gains, male teachers in the treatment group experienced a decline with the following two negative items: Experience is more important than using manualised interventions/methods (ES= +0.22 for female and -1.56 for male), and I know better than academic researchers how best to care for my students. (ES= -0.07 for female and -0.34 for male). These results show a more beneficial impact from the treatment on male teachers than female teachers for these items. In conclusion, there was no convincing evidence that the treatment had a bigger beneficial or harmful impact on males than females in terms of teachers' general attitudes towards the research evidence.

Table 9.12 Comparison of the pre- and post-intervention survey results by gender, attitudes

Item	Group	Pre mean	Post mean	Gain Score	SD	Effect size
Research-based interventions/methods are not useful in practice	Treatment (females)	1.09	1.55	+0.46	1.77	+0.40
	Control (females)	1.00	0.75	-0.25		
	Treatment (males)	1.00	2.00	+1.00	1.77	+1.47
	Control (males)	2.40	0.80	-1.60		
Experience is more important than using manualised interventions/methods	Treatment (females)	2.00	2.45	+0.45	0.90	+0.22
	Control (females)	1.63	1.88	+0.25		
	Treatment (males)	3.00	2.00	-1.00	0.90	-1.56
	Control (males)	1.60	2.00	+0.40		
I am willing to use new and different types of interventions/methods developed by researchers	Treatment (females)	3.28	2.91	-0.37	0.99	-0.12
	Control (females)	3.13	2.88	-0.25		
	Treatment (males)	2.00	2.00	0.00	0.99	-0.40
	Control (males)	3.20	3.60	+0.40		
I like to use new types of interventions/methods to help my students	Treatment (females)	3.18	2.91	-0.27	0.65	+0.15
	Control (females)	3.00	2.63	-0.37		
	Treatment (males)	2.00	2.00	0.00	0.65	-0.31
	Control (males)	3.40	3.60	+0.20		
I am willing to try new types of interventions /methods even if I have to follow a teaching/training manual	Treatment (females)	2.82	2.82	0.00	1.07	0.00
	Control (females)	3.00	3.00	0.00		
	Treatment (males)	2.00	2.00	0.00	1.07	-0.75
	Control (males)	2.20	3.00	+0.80		
I know better than academic researchers how to care for my students	Treatment (females)	1.45	2.00	+0.55	1.17	-0.07
	Control (females)	1.25	1.88	+0.63		
	Treatment (males)	3.00	2.00	-1.00	1.17	-0.34

	Control (males)	1.80	1.20	-0.60		
I would not use manualised interventions/methods	Treatment (females)	1.09	1.00	-0.09	1.26	+0.22
	Control (females)	0.75	0.38	-0.37		
	Treatment (males)	0.00	2.00	+2.00	1.26	+1.70
	Control (males)	0.54	0.40	-0.14		
I would try a new intervention/method even if it were very different from what I am used to doing	Treatment (females)	3.00	2.55	-0.45	0.97	-0.34
	Control (females)	3.00	2.88	-0.12		
	Treatment (males)	2.00	2.00	0.00	0.97	-0.62
	Control (males)	2.80	3.40	+0.60		

Table 9.13 presents the results with regard to the further seven questions about the influences that might affect teachers' use of a new intervention. Overall, in all respects, neither the female nor the male teachers in the treatment group were ahead in terms of gains from the pre-to post survey compared to their control group, which generated negative effect sizes for all items. For all items aside from the first one, a lower gain or negative effect size might be reasonable or even preferable, due to the fact that such use of a new intervention might lead to unwarranted use of a programme. However, both the female and male teachers in the treatment group were behind in terms of gains from the pre-to post survey to repot that they would use a new intervention based on evidence with effect sizes of -0.37 and -0.48 respectively. This indicates that there was no convincing evidence of a beneficial impact on either female or male teachers in the treatment group.

When comparing the two subgroups, the intervention was found to have had a bigger impact on males than females in all circumstances, except for one. All the effect sizes were negative, but we cannot say that this certainly represented a bigger "harmful" impact on males than females, as a negative progress might be reasonable for all items except for the first one. The intervention had a greater impact on males (ES= -0.48) than females (ES= -0.37) for the first item which related to using a new intervention based on evidence. This means the intervention seems to have had a more harmful impact on males than females for this item. Consequently, overall there was no convincing evidence of a more beneficial or harmful impact on males or females from the intervention.

Table 9.13 Comparison of the pre- and post-intervention survey results by gender, attitudes

If you received training in an intervention that was new to	Group	Pre mean	Post mean	Gain Score	SD	Effect size

you, how likely would you be to adopt it if:						
Evidence said it worked?	Treatment (females)	3.18	3.00	-0.18	0.84	-0.37
	Control (females)	3.00	3.13	+0.13		
	Treatment (males)	3.00	3.00	0.00	0.84	-0.48
	Control (males)	2.80	3.20	+0.40		
It was intuitively appealing?	Treatment (females)	2.71	2.64	-0.07	1.04	-0.19
	Control (females)	2.50	2.63	+0.13		
	Treatment (males)	2.00	2.00	0.00	1.04	-0.38
	Control (males)	2.40	2.80	+0.40		
It “made sense” to you?	Treatment (females)	3.00	3.18	+0.18	0.98	-0.46
	Control (females)	2.50	3.13	+0.63		
	Treatment (males)	3.00	2.00	-1.00	0.98	-1.22
	Control (males)	2.80	3.00	+0.20		
It was required by your school (headteacher, principal etc.)?	Treatment (females)	3.36	3.09	-0.27	0.84	-0.77
	Control (females)	3.00	3.38	+0.38		
	Treatment (males)	4.00	2.00	-2.00	0.84	-2.62
	Control (males)	3.20	3.40	+0.20		
It was required by law?	Treatment (females)	3.64	3.73	+0.09	0.79	-0.04
	Control (females)	3.63	3.75	+0.12		
	Treatment (males)	3.00	1.00	-2.00	0.79	-2.28
	Control (males)	3.20	3.00	-0.20		
It was being used by colleagues who were happy with it?	Treatment (females)	3.09	3.27	+0.18	0.84	-0.38
	Control (females)	2.75	3.25	+0.50		
	Treatment (males)	3.00	3.00	0.00	0.84	-0.24
	Control (males)	2.80	3.00	+0.20		
You felt you had enough training to use it correctly?	Treatment (females)	3.36	3.36	0.00	0.73	-0.68
	Control (females)	3.13	3.63	+0.50		
	Treatment (males)	4.00	2.00	-2.00	0.73	-3.01
	Control (males)	3.20	3.40	+0.20		

9.1.2.3.2 The impact on attitudes by age

Table 9.14 shows the pre and post survey results detailing teachers’ general attitudes towards the use of research evidence according to age (younger= 18-35 or older > 35).

From an overall perspective, we can see that the results provided more convincing evidence for older teachers than younger teachers. There was no beneficial impact on older teachers from the intervention considering that older teachers in the treatment group were ahead in terms of gains for negative items (effect sizes ranging from +0.10 to +1.27), but behind for the remainder (effect sizes ranging from -0.42 to -1.75), when compared to those in the control group. Of the eight items, four had a beneficial impact on younger teachers. This means that the intervention seems to have improved younger teachers' general attitudes towards research evidence in some respects.

When younger and older teachers were compared to one another, the results were mixed. Older teachers fell behind younger teachers in terms of a beneficial impact from the intervention in most respects (six of eight items). As mentioned above, the impact of the intervention on younger teachers' general attitudes appears beneficial in some respects. In terms of teachers' general attitudes towards the research evidence, the treatment seems to have had a more harmful or less beneficial impact on older teachers than younger teachers in most respects.

Table 9.14 Comparison of the pre- and post-intervention survey results by age, attitudes

Item	Group (years)	Pre mean	Post mean	Gain score	SD	Effect size
Research-based interventions/methods are not useful in practice	Treatment (18-35)	1.57	1.71	+0.14	1.77	+0.22
	Control (18-35)	1.50	1.25	-0.25		
	Treatment (> 35)	0.40	1.40	+1.00	1.77	+1.27
	Control (> 35)	1.63	0.38	-1.25		
Experience is more important than using manualised interventions/methods	Treatment (18-35)	2.43	2.43	0.00	0.90	-0.56
	Control (18-35)	1.25	1.75	+0.50		
	Treatment (> 35)	1.60	2.40	+0.80	0.90	+0.76
	Control (> 35)	1.88	2.00	+0.12		
I am willing to use new and different types of interventions/methods developed by researchers	Treatment (18-35)	3.14	3.14	0.00	0.99	+0.25
	Control (18-35)	3.25	3.00	-0.25		
	Treatment (> 35)	3.20	2.40	-0.80	0.99	-1.06
	Control (> 35)	3.00	3.25	+0.25		
I like to use new types of interventions/methods to help my students	Treatment (18-35)	3.14	3.00	-0.14	0.65	-0.22
	Control (18-35)	3.00	3.00	0.00		
	Treatment (> 35)	3.00	2.60	-0.40	0.65	-0.42

	Control (> 35)	3.13	3.00	-0.13		
I am willing to try new types of interventions /methods even if I have to follow a teaching/training manual	Treatment (18-35)	2.57	3.00	+0.43	1.07	+0.40
	Control (18-35)	2.50	2.50	0.00		
	Treatment (> 35)	3.00	2.40	-0.60	1.07	-1.14
	Control (> 35)	2.63	3.25	+0.62		
I know better than academic researchers how to care for my students	Treatment (18-35)	1.86	2.29	+0.43	1.17	+0.58
	Control (18-35)	1.50	1.25	-0.25		
	Treatment (> 35)	1.20	1.60	+0.40	1.17	+0.23
	Control (> 35)	1.50	1.63	+0.13		
I would not use manualised interventions/methods	Treatment (18-35)	1.00	1.29	+0.29	1.26	+0.23
	Control (18-35)	0.50	0.50	0.00		
	Treatment (> 35)	1.00	0.80	-0.20	1.26	+0.10
	Control (> 35)	0.71	0.38	-0.33		
I would try a new intervention/method even if it were very different from what I am used to doing	Treatment (18-35)	2.86	3.00	+0.14	0.97	+0.40
	Control (18-35)	2.75	2.50	-0.25		
	Treatment (> 35)	3.00	1.80	-1.20	0.97	-1.75
	Control (> 35)	2.88	3.38	+0.50		

Note: 18-35= younger teachers; > 35= older teachers

Table 9.15 presents the results for the further seven questions regarding those influences that might affect teachers' use of a new intervention. Overall, there was no convincing evidence of a beneficial impact on younger or older teachers. Younger teachers in the treatment group were ahead in terms of gains compared to those in the control group to report that they would adopt a new intervention if required by law with an effect size of +0.46. The older teachers in the treatment and control group made no gains, with an effect size of 0.00 for one item. In all other respects (five of seven items), both the younger and older teachers in the treatment group were behind in gains compared to their control group, which led to negative effect sizes. It would have been preferable if the treatment group teachers were more positive about using a new intervention based on evidence after the study. However, both younger and older teachers in the treatment group were behind in gains compared to the control group, as they were apparently less likely to adopt a new intervention based on evidence with effect sizes -0.73 and -0.57 respectively. Thus, there was no convincing evidence of a beneficial impact on younger or older teachers from the intervention.

The results were also mixed when comparing the two subgroups with one another. The treatment apparently had a bigger negative impact on younger teachers than older teachers in terms of the adoption of a new intervention in most circumstances (five out of seven items), most of which might have led to unwarranted use of a programme. There was a bigger negative impact on younger teachers than older teachers when using a new intervention, based on evidence with effect sizes of -0.73 and -0.57 respectively. This indicates that the intervention had a more harmful impact on younger teachers than older teachers with regard to this item. However, a bigger negative impact does not necessarily mean a more harmful impact for the remainder. Given the mixed results, overall there was no convincing evidence that the treatment had a bigger beneficial or harmful impact on younger teachers than older teachers.

Table 9.15 Comparison of the pre- and post-intervention survey results by age, attitudes

If you received training in an intervention that was new to you, how likely would you be to adopt it if:	Group (years)	Pre mean	Post mean	Gain Score	SD	Effect size
Evidence said it worked?	Treatment (18-35)	2.86	3.00	+0.14	0.84	-0.73
	Control (18-35)	2.25	3.00	+0.75		
	Treatment (> 35)	3.60	3.00	-0.60	0.84	-0.57
	Control (> 35)	3.25	3.13	-0.12		
It was intuitively appealing?	Treatment (18-35)	2.43	2.71	+0.28	1.04	-0.21
	Control (18-35)	2.00	2.50	+0.50		
	Treatment (> 35)	2.97	2.40	-0.57	1.04	-0.55
	Control (> 35)	2.75	2.75	0.00		
It “made sense” to you?	Treatment (18-35)	2.71	3.14	+0.43	0.98	-0.07
	Control (18-35)	2.25	2.75	+0.50		
	Treatment (> 35)	3.40	3.00	-0.40	0.98	-0.66
	Control (> 35)	2.88	3.13	+0.25		
It was required by your school (headteacher, principal etc.)?	Treatment (18-35)	3.43	3.14	-0.29	0.84	-1.54
	Control (18-35)	2.50	3.50	+1.00		
	Treatment (> 35)	3.40	2.80	-0.60	0.84	-0.71
	Control (> 35)	3.25	3.25	0.00		
It was required by law?	Treatment (18-35)	3.57	3.43	-0.14	0.79	+0.46
	Control (18-35)	3.25	2.75	-0.50		
	Treatment (> 35)	3.60	3.60	0.00	0.79	-0.32
	Control (> 35)	3.50	3.75	+0.25		
It was being used by colleagues who	Treatment (18-35)	2.86	3.14	+0.28	0.84	-0.86

were happy with it?	Control (18-35)	2.25	3.25	+1.00		
	Treatment (> 35)	3.40	3.40	0.00	0.84	0.00
	Control (> 35)	3.00	3.00	0.00		
You felt you had enough training to use it correctly?	Treatment (18-35)	3.43	3.29	-0.14	0.73	-1.22
	Control (18-35)	2.50	3.25	+0.75		
	Treatment (> 35)	3.40	3.20	-0.20	0.73	-0.62
	Control (> 35)	3.38	3.63	+0.25		

Note: 18-35= younger teachers; > 35= older teachers

9.1.2.3.3 The impact on attitudes by job

Table 9.16 displays the pre and post survey results of teachers' general attitudes towards use of research evidence by job (classroom teachers and headteachers/principals). Overall, the results provide more convincing evidence for headteachers/principals than classroom teachers. Headteachers/principals in the treatment group were ahead in gains for the negative items compared to those in the control group, but behind for the remaining questions. This indicates that in all respects there was no evidence of a beneficial impact on headteachers/principals' general attitudes resulting from the intervention. However, the intervention had a beneficial impact on classroom teachers' general attitudes towards research evidence in some cases. Overall, however, there was no convincing evidence suggesting a beneficial impact on classroom teachers' general attitudes towards research evidence from the intervention.

The results were more convincing when the two subgroups were compared with other. In all respects, the impact of the intervention on classroom teachers' general attitudes towards research evidence appears more beneficial or less harmful compared to those of headteachers/principals.

Table 9.16 Comparison of the pre- and post-intervention survey results by job, attitudes

Item	Group	Pre mean	Post mean	Gain Score	SD	Effect size
Research-based interventions/methods are not useful in practice	Treatment (classroom)	1.14	1.43	+0.29	1.77	+0.24
	Control (classroom)	1.43	1.29	-0.14		
	Treatment (headteacher)	1.00	1.80	+0.80	1.77	+1.58
	Control (headteacher)	2.00	0.00	-2.00		
Experience is more important	Treatment (classroom)	2.29	2.43	+0.14	0.90	-0.32

than using manualised interventions/methods	Control (classroom)	1.43	1.86	+0.43		
	Treatment (headteacher)	1.80	2.40	+0.60	0.90	+0.44
	Control (headteacher)	1.80	2.00	+0.20		
I am willing to use new and different types of interventions/methods developed by researchers	Treatment (classroom)	3.14	2.86	-0.28	0.99	-0.14
	Control (classroom)	3.14	3.00	-0.14		
	Treatment (headteacher)	3.20	2.80	-0.40	0.99	-0.81
	Control (headteacher)	3.00	3.40	+0.40		
I like to use new types of interventions/methods to help my students	Treatment (classroom)	2.86	2.71	-0.15	0.65	+0.22
	Control (classroom)	3.00	2.71	-0.29		
	Treatment (headteacher)	3.40	3.00	-0.40	0.65	-0.92
	Control (headteacher)	3.20	3.40	+0.20		
I am willing to try new types of interventions /methods even if I have to follow a teaching/training manual	Treatment (classroom)	2.29	2.86	+0.57	1.07	+0.53
	Control (classroom)	2.71	2.71	0.00		
	Treatment (headteacher)	3.40	2.60	-0.80	1.07	-1.50
	Control (headteacher)	2.40	3.20	+0.80		
I know better than academic researchers how to care for my students	Treatment (classroom)	1.71	2.14	+0.43	1.17	+0.12
	Control (classroom)	1.14	1.43	+0.29		
	Treatment (headteacher)	1.40	1.80	+0.40	1.17	+0.68
	Control (headteacher)	2.00	1.60	-0.40		
I would not use manualised interventions/methods	Treatment (classroom)	1.29	1.00	-0.29	1.26	-0.12
	Control (classroom)	0.43	0.29	-0.14		
	Treatment (headteacher)	0.60	1.20	+0.60	1.26	+1.06
	Control (headteacher)	1.14	0.40	-0.74		
I would try a new intervention/method even if it were very different from what I am used to doing	Treatment (classroom)	2.57	2.71	+0.14	0.97	+0.44
	Control (classroom)	3.00	2.71	-0.29		
	Treatment (headteacher)	3.40	2.20	-1.20	0.97	-2.06
	Control (headteacher)	2.60	3.40	+0.80		

Note: Classroom=classroom teacher; headteacher= headteacher/principals etc.

The results for the further seven questions regarding influences that might affect teachers' use of a new intervention were not promising for either group (Table 9.17). In all respects, compared to those in their control group, neither the classroom teachers nor the headteachers/principals in the treatment group were ahead in gain to report that they would adopt a new intervention. Aside from the first item regarding using a new intervention based on evidence, lower gains or negative progress might be reasonable. However, both classroom teachers and headteachers/principals in the treatment group were behind in gains, in terms of desire to use a new intervention based on evidence, with effect sizes of -0.50 and -0.71 respectively.

When comparing classroom teachers and headteachers/principals, the results were mixed. The impact appears more harmful for headteachers/principals (ES= -0.71) than classroom teachers (ES= -0.50), in terms of using a new intervention based on evidence. However, there was also a bigger impact on headteachers/principals for some items. Overall, therefore, there was no convincing evidence that the intervention had a more harmful or beneficial impact on any of the two groups.

Table 9.17 Comparison of the pre- and post-intervention survey results by job, attitudes

If you received training in an intervention that was new to you, how likely would you be to adopt it if:	Group	Pre mean	Post mean	Gain Score	SD	Effect size
Evidence said it worked?	Treatment (classroom)	2.71	2.86	+0.15	0.84	-0.50
	Control (classroom)	2.57	3.14	+0.57		
	Treatment (headteacher)	3.80	3.20	-0.60	0.84	-0.71
	Control (headteacher)	3.20	3.20	0.00		
It was intuitively appealing?	Treatment (classroom)	2.43	2.86	+0.43	1.04	-0.13
	Control (classroom)	2.14	2.71	+0.57		
	Treatment (headteacher)	2.97	2.20	-0.77	1.04	-0.74
	Control (headteacher)	2.60	2.60	0.00		
It “made sense” to you?	Treatment (classroom)	2.86	3.14	+0.28	0.98	-0.58
	Control (classroom)	2.29	3.14	+0.85		
	Treatment (headteacher)	3.20	3.00	-0.20	0.98	-0.41
	Control (headteacher))	2.80	3.00	+0.20		
It was required by your school (head teacher, principal etc.)?	Treatment (classroom)	3.29	2.86	-0.43	0.84	-1.02
	Control (classroom)	2.86	3.29	+0.43		
	Treatment (headteacher)	3.60	3.20	-0.40	0.84	-0.95
	Control (headteacher)	3.20	3.60	+0.40		
It was required by law?	Treatment (classroom)	3.43	3.29	-0.14	0.79	0.00
	Control (classroom)	3.43	3.29	-0.14		
	Treatment (headteacher)	3.80	3.80	0.00	0.79	-0.51

	Control (headteacher)	3.40	3.80	+0.40		
It was being used by colleagues who were happy with it?	Treatment (classroom)	3.00	3.14	+0.14	0.84	-0.52
	Control (classroom)	2.71	3.29	+0.58		
	Treatment (headteacher)	3.20	3.40	+0.20	0.84	-0.24
	Control (headteacher)	2.60	3.00	+0.40		
You felt you had enough training to use it correctly?	Treatment (classroom)	3.29	3.14	-0.15	0.73	-0.99
	Control (classroom)	2.86	3.43	+0.57		
	Treatment (headteacher)	3.60	3.40	-0.20	0.73	-0.55
	Control (headteacher)	3.40	3.60	+0.20		

Note: Classroom=classroom teacher; headteacher= headteacher/principals etc.

9.1.2.3.4 The impact on attitudes by experience

Table 9.18 presents pre and post survey results describing teachers' general attitudes towards research evidence by experience. Experience is shown in years in the table: 0-10 (less experienced) and 10+ (experienced).

The results were mixed. Experienced teachers in the treatment group were ahead in gains for all negative items except for one, compared those in the control group, but behind for the remaining questions. This shows no convincing evidence of a beneficial impact on experienced teachers' general attitudes towards using research evidence following the intervention. Of the eight items, five indicated a beneficial impact for less experienced teachers from the intervention. This means the intervention seems to have helped less experienced teachers in some respects.

Apart from one item, the impact of the intervention on less experienced teachers' general attitudes towards research evidence appears more beneficial or less harmful compared to experienced teachers.

Table 9.18 Comparison of the pre- and post-intervention survey results by experience, attitudes

Item	Group (years)	Pre mean	Post mean	Gain score	SD	Effect size
Research-based interventions/methods are not useful in practice	Treatment (0-10)	1.57	1.71	+0.14	1.77	+0.93
	Control (0-10)	2.00	0.50	-1.50		
	Treatment (10+)	0.40	1.40	+1.00	1.77	+1.19
	Control (10+)	1.44	0.33	-1.11		

Experience is more important than using manualised interventions/methods	Treatment (0-10)	2.43	2.43	0.00	0.90	-0.56
	Control (0-10)	1.00	1.50	+0.50		
	Treatment (10+)	1.60	2.40	+0.80	0.90	+0.77
	Control (10+)	1.89	2.00	+0.11		
I am willing to use new and different types of interventions/methods developed by researchers	Treatment (0-10)	3.14	3.14	0.00	0.99	+0.51
	Control (0-10)	3.50	3.00	-0.50		
	Treatment (10+)	3.20	2.40	-0.80	0.99	-0.92
	Control (10+)	3.00	3.11	+0.11		
I like to use new types of interventions/methods to help my students	Treatment (0-10)	3.14	3.00	-0.14	0.65	-0.22
	Control (0-10)	3.50	3.50	0.00		
	Treatment (10+)	3.00	2.60	-0.40	0.65	-0.45
	Control (10+)	3.00	2.89	-0.11		
I am willing to try new types of interventions /methods even if I have to follow a teaching/training manual	Treatment (0-10)	2.57	3.00	+0.43	1.07	+0.40
	Control (0-10)	2.50	2.50	0.00		
	Treatment (10+)	3.00	2.40	-0.60	1.07	-1.07
	Control (10+)	2.56	3.11	+0.55		
I know better than academic researchers how to care for my students	Treatment (0-10)	1.86	2.29	+0.43	1.17	-0.49
	Control (0-10)	1.00	2.00	+1.00		
	Treatment (10+)	1.20	1.60	+0.40	1.17	+0.24
	Control (10+)	1.44	1.56	+0.12		
I would not use manualised interventions/methods	Treatment (0-10)	1.00	1.29	+0.29	1.26	+0.63
	Control (0-10)	0.50	0.00	-0.50		
	Treatment (10+)	1.00	0.80	-0.20	1.26	-0.02
	Control (10+)	0.74	0.56	-0.18		
I would try a new intervention/method even if it were very different from what I am used to doing	Treatment (0-10)	2.86	3.00	+0.14	0.97	+0.66
	Control (0-10)	3.00	2.50	-0.50		
	Treatment (10+)	3.00	1.80	-1.20	0.97	-1.69
	Control (10+)	2.78	3.22	+0.44		

Note: less experienced= 0-10; experienced=10+

Table 9.19 illustrates the results for the further seven questions regarding the influences that might affect teachers' use of a new intervention. The results were not encouraging for experienced teachers, but were promising for less experienced teachers. The experienced teachers in the treatment group were behind in gains compared to those in the control group in all respects. What was striking about the results provided in the table is that the less experienced teachers in the treatment group were ahead in gains (+0.14), compared to those in the control group (0.00), for the first item relating to using a new intervention based on evidence. The effect size was +0.17. In other words, less experienced teachers in the treatment group were more likely to say that they would adopt a new intervention based on evidence after participating in the study. In addition, less experienced teachers in the treatment group were behind in gains compared to those in the control group for the remaining items, which led to negative effect sizes ranging from -0.18 to -2.13. These results might also be considered promising for less experienced teachers, because such new interventions may lead to unwarranted use of a programme. In summary, the intervention seems to have helped less experienced teachers to adopt a new intervention based on evidence, and to avoid using a new intervention in other circumstances, which leads to a beneficial impact on less experienced teachers arising from the intervention.

Table 9.19 Comparison of the pre- and post-intervention survey results by experience, attitudes

If you received training in an intervention that was new to you, how likely would you be to adopt it if:	Group (years)	Pre mean	Post mean	Gain Score	SD	Effect size
Evidence said it worked?	Treatment (0-10)	2.86	3.00	+0.14	0.84	+0.17
	Control (0-10)	3.00	3.00	0.00		
	Treatment (10+)	3.60	3.00	-0.60	0.84	-0.71
	Control (10+)	3.11	3.11	0.00		
It was intuitively appealing?	Treatment (0-10)	2.43	2.71	+0.28	1.04	-0.21
	Control (0-10)	2.00	2.50	+0.50		
	Treatment (10+)	2.97	2.40	-0.57	1.04	-0.65
	Control (10+)	2.67	2.78	+0.11		
It “made sense” to you?	Treatment (0-10)	2.71	3.14	+0.43	0.98	-0.58
	Control (0-10)	2.50	3.50	+1.00		
	Treatment (10+)	3.40	3.00	-0.40	0.98	-0.74
	Control (10+)	2.78	3.11	+0.33		
It was required by your school (headteacher, principal etc.)?	Treatment (0-10)	3.43	3.14	-0.29	0.84	-2.13
	Control (0-10)	2.50	4.00	+1.50		
	Treatment (10+)	3.40	2.80	-0.60	0.84	-0.85
	Control (10+)	3.22	3.33	+0.11		
It was required by law?	Treatment (0-10)	3.57	3.43	-0.14	0.79	-0.18
	Control (0-10)	3.50	3.50	0.00		

	Treatment (10+)	3.60	3.60	0.00	0.79	-0.28
	Control (10+)	3.56	3.78	+0.22		
It was being used by colleagues who were happy with it?	Treatment (0-10)	2.86	3.14	+0.28	0.84	-0.86
	Control (0-10)	2.50	3.50	+1.00		
	Treatment (10+)	3.40	3.40	0.00	0.84	-0.26
	Control (10+)	2.89	3.11	+0.22		
You felt you had enough training to use it correctly?	Treatment (0-10)	3.43	3.29	-0.14	0.73	-1.56
	Control (0-10)	3.00	4.00	+1.00		
	Treatment (10+)	3.40	3.20	-0.20	0.73	-0.74
	Control (10+)	3.22	3.56	+0.34		

Note: less experienced= 0-10; experienced=10+

9.1.2.3.5 The impact on attitudes by degree

The results by degree should be treated with particular caution, due to the small sample size for teachers with a Master's degree or equivalent in the evaluation. Table 9.20 shows the pre and post survey results for teachers' general attitudes towards research evidence by degree. Overall, there was no convincing evidence of a beneficial impact on any of the two subgroups' general attitudes towards research evidence. Of the eight items, six indicate a bigger harmful or less beneficial impact on teachers with a Bachelor's degree or equivalent than those with a Master's degree or equivalent in terms of their general attitudes towards the research evidence.

Table 9.20 Comparison of the pre- and post-intervention survey results by degree, attitudes

Item	Group	Pre mean	Post mean	Gain Score	SD	Effect size
Research-based interventions/methods are not useful in practice	Treatment (master)	3.00	2.00	-1.00	1.77	+1.13
	Control (master)	3.00	0.00	-3.00		
	Treatment (bachelor)	0.90	1.50	+0.60	1.77	+0.85
	Control (bachelor)	1.60	0.70	-0.90		
Experience is more important than using manualised interventions/methods	Treatment (master)	3.00	3.00	0.00	0.90	0.00
	Control (master)	1.00	1.00	0.00		
	Treatment (bachelor)	1.90	2.40	+0.50	0.90	+0.22
	Control (bachelor)	1.70	2.00	+0.30		
I am willing to use new and different types of interventions/methods	Treatment (master)	3.00	3.00	0.00	0.99	0.00
	Control (master)	3.00	3.00	0.00		

developed by researchers	Treatment (bachelor)	3.30	2.90	-0.40	0.99	-0.61
	Control (bachelor)	3.00	3.20	+0.20		
I like to use new types of interventions/methods to help my students	Treatment (master)	3.00	3.00	0.00	0.65	0.00
	Control (master)	3.00	3.00	0.00		
	Treatment (bachelor)	3.20	2.90	-0.30	0.65	-0.46
	Control (bachelor)	3.00	3.00	0.00		
I am willing to try new types of interventions /methods even if I have to follow a teaching/training manual	Treatment (master)	3.00	3.00	0.00	1.07	0.00
	Control (master)	3.00	3.00	0.00		
	Treatment (bachelor)	2.80	2.80	0.00	1.07	-0.47
	Control (bachelor)	2.40	2.90	+0.50		
I know better than academic researchers how to care for my students	Treatment (master)	3.00	3.00	0.00	1.17	-0.85
	Control (master)	2.00	1.00	-1.00		
	Treatment (bachelor)	1.30	1.90	+0.60	1.17	+0.60
	Control (bachelor)	1.50	1.40	-0.10		
I would not use manualised interventions/methods	Treatment (master)	2.00	1.00	-1.00	1.26	+0.79
	Control (master)	2.00	0.00	-2.00		
	Treatment (bachelor)	1.00	1.00	0.00	1.26	+0.13
	Control (bachelor)	0.57	0.40	-0.17		
I would try a new intervention/method even if it were very different from what I am used to doing	Treatment (master)	2.00	3.00	+1.00	0.97	+1.03
	Control (master)	3.00	3.00	0.00		
	Treatment (bachelor)	3.10	2.50	-0.60	0.97	-0.93
	Control (bachelor)	2.70	3.00	+0.30		

Note: Master = Master's degree or equivalent and Bachelor= Bachelor's degree or equivalent

With respect to the further seven questions regarding the influences that might affect teachers' use of a new intervention, in some respects the results might be considered encouraging for teachers with a Master's degree or equivalent, but not promising for those with a Bachelor's degree or equivalent (Table 9.21). Teachers with a Master's degree or equivalent in the treatment group were ahead in gains, compared to those in their control group, to report using a new intervention in some circumstances (four out of seven items), including an intervention based on evidence (ES= +1.19). However, three of these items (apart from the intervention based evidence) may cause a harmful impact in practice. A bigger gain only for the intervention based on evidence would demonstrate a more beneficial impact on teachers with a Master's degree or equivalent from the intervention.

On the other hand, teachers with a Bachelor's degree or equivalent in the treatment group were behind in gains, compared to those in their control group, to report that they would adopt a new intervention in all respects. Overall, there was no convincing evidence of a beneficial impact on teachers with Bachelor's degree or equivalent from the intervention.

Table 9.21 Comparison of the pre- and post-intervention survey results by degree, attitudes

If you received training in an intervention that was new to you, how likely would you be to adopt it if:	Group	Pre mean	Post mean	Gain Score	SD	Effect size
Evidence said it worked?	Treatment (master)	2.00	3.00	+1.00	0.84	+1.19
	Control (master)	3.00	3.00	0.00		
	Treatment (bachelor)	3.30	3.00	-0.30	0.84	-0.71
	Control (bachelor)	2.80	3.10	+0.30		
It was intuitively appealing?	Treatment (master)	2.00	3.00	+1.00	1.04	+0.96
	Control (master)	1.00	1.00	0.00		
	Treatment (bachelor)	2.78	2.60	-0.18	1.04	-0.46
	Control (bachelor)	2.50	2.80	+0.30		
It "made sense" to you?	Treatment (master)	3.00	4.00	+1.00	0.98	+1.02
	Control (master)	1.00	1.00	0.00		
	Treatment (bachelor)	3.00	3.10	+0.10	0.98	-0.41
	Control (bachelor)	2.70	3.20	+0.50		
It was required by your school (headteacher, principal etc.)?	Treatment (master)	3.00	3.00	0.00	0.84	-1.19
	Control (master)	2.00	3.00	+1.00		
	Treatment (bachelor)	3.40	3.10	-0.30	0.84	-0.83
	Control (bachelor)	3.00	3.40	+0.40		
It was required by law?	Treatment (master)	3.00	4.00	+1.00	0.79	+1.27
	Control (master)	4.00	4.00	0.00		
	Treatment (bachelor)	3.70	3.70	0.00	0.79	-0.13
	Control (bachelor)	3.30	3.40	+0.10		
It was being used by colleagues who were happy with it?	Treatment (master)	3.00	3.00	0.00	0.84	-1.19
	Control (master)	1.00	2.00	+1.00		
	Treatment (bachelor)	3.10	3.30	+0.20	0.84	-0.24
	Control (bachelor)	2.80	3.20	+0.40		
You felt you had enough training to	Treatment (master)	3.00	3.00	0.00	0.73	-1.37

use it correctly?	Control (master)	3.00	4.00	+1.00		
	Treatment (bachelor)	3.40	3.40	0.00	0.73	-0.55
	Control (bachelor)	3.00	3.40	+0.40		

Note: Master = Master's degree or equivalent; Bachelor= Bachelor's degree or equivalent

9.1.2.4 Does the impact of disseminating research evidence through workshop training with supporting evidence-based resources on teachers' use of research evidence differ according to their demographic characteristics (gender, age, job, experience and degree)?

Teachers were asked 18 questions regarding their (self-reported) use of research evidence. The results from the evaluation are presented below by subgroup.

9.1.2.4.1 The impact on research use by gender

Table 9.22 shows pre and post survey results for teachers' use of research evidence by gender. From an overall perspective, the results were mixed for both females and males. Female teachers in the treatment group were ahead in gains compared to those in the control group, to report using research evidence to prepare their lessons well (ES= +0.24), or to help them in effective delivery of instruction (ES= +0.50), or for the effective use of instructional materials (ES= +0.48). Male teachers in the treatment group were ahead in gains compared to those in the control group in terms of using research evidence for innovations in school curricula (ES= +0.85), or to prepare their lessons well (ES= +2.29), or for further verification of research findings (ES= +0.47). Both female and male teachers in the treatment group were behind in gains compared to their control groups to use evidence in almost all other instances.

The results were also mixed when the two sub-groups were compared with each other. The effect sizes varied markedly between females and males for some of the items. Overall, however, there was no convincing evidence the intervention had a greater beneficial or harmful impact on female or male teachers regarding their (self-reported) use of research evidence in practice.

Table 9.22 Comparison of the pre- and post-intervention survey results by gender, research use

Level of agreement with "I utilise information from research":	Group	Pre mean	Post mean	Gain Score	SD	Effect size
to get acquainted with effective	Treatment (females)	2.82	2.36	-0.46	1.04	-0.80

teaching strategies	Control (females)	2.38	2.75	+0.37		
	Treatment (males)	3.00	2.00	-1.00	1.04	-1.15
	Control (males)	2.80	3.00	+0.20		
to help in improving my learners' progress	Treatment (females)	3.09	2.55	-0.54	0.97	-0.68
	Control (females)	2.88	3.00	+0.12		
	Treatment (males)	2.00	2.00	0.00	0.97	-0.41
	Control (males)	2.80	3.20	+0.40		
for innovations in school curricula	Treatment (females)	2.73	2.73	0.00	0.94	-0.67
	Control (females)	2.25	2.88	+0.63		
	Treatment (males)	2.00	3.00	+1.00	0.94	+0.85
	Control (males)	3.00	3.20	+0.20		
on how to improve my learners' interest in schooling	Treatment (females)	3.00	2.73	-0.27	0.83	-0.59
	Control (females)	2.50	2.72	+0.22		
	Treatment (males)	3.00	3.00	0.00	0.83	0.00
	Control (males)	2.80	2.80	0.00		
to source better evaluation techniques for day-to-day activities	Treatment (females)	2.64	2.50	-0.14	1.02	-0.38
	Control (females)	2.25	2.50	+0.25		
	Treatment (males)	3.00	2.00	-1.00	1.02	-1.37
	Control (males)	2.40	2.80	+0.40		
in order to prepare my lessons well	Treatment (females)	2.45	2.82	+0.37	1.01	+0.24
	Control (females)	2.50	2.63	+0.13		
	Treatment (males)	1.00	2.71	+1.71	1.01	+2.29
	Control (males)	3.20	2.60	-0.60		
to help me in effective delivery of instruction	Treatment (females)	2.73	2.98	+0.25	0.74	+0.50
	Control (females)	2.75	2.63	-0.12		
	Treatment (males)	3.00	2.00	-1.00	0.74	-1.31
	Control (males)	3.00	2.97	-0.03		
for effective use of instructional materials	Treatment (females)	2.18	2.73	+0.55	0.89	+0.48
	Control (females)	2.13	2.25	+0.12		
	Treatment (males)	3.00	2.00	-1.00	0.89	-1.35
	Control (males)	2.60	2.80	+0.20		
to become knowledgeable on recent theories of child development	Treatment (females)	2.73	2.82	+0.09	0.89	-0.46
	Control (females)	1.75	2.25	+0.50		
	Treatment (males)	2.00	2.00	0.00	0.89	-0.45
	Control (males)	2.40	2.80	+0.40		

for theories behind various new teaching strategies	Treatment (females)	2.55	2.73	+0.18	1.10	-0.05
	Control (females)	2.38	2.50	+0.12		
	Treatment (males)	3.00	2.00	-1.00	1.10	-1.39
	Control (males)	2.40	2.93	+0.53		
to improve my content knowledge of school subjects	Treatment (females)	2.73	3.07	+0.34	0.97	-0.03
	Control (females)	2.13	2.50	+0.37		
	Treatment (males)	3.00	2.00	-1.00	0.97	-0.82
	Control (males)	2.80	2.60	-0.20		
for the acquisition of more pedagogical knowledge	Treatment (females)	2.45	2.64	+0.19	1.01	-0.18
	Control (females)	2.38	2.75	+0.37		
	Treatment (males)	3.00	1.00	-2.00	1.01	-1.98
	Control (males)	3.00	3.00	0.00		
for more effective classroom management techniques	Treatment (females)	3.09	3.09	0.00	1.07	-0.58
	Control (females)	2.13	2.75	+0.62		
	Treatment (males)	4.00	1.00	-3.00	1.07	-3.18
	Control (males)	2.60	3.00	+0.40		
for skills at motivating and reinforcing my learners in learning	Treatment (females)	2.69	2.71	+0.02	1.04	-0.11
	Control (females)	2.75	2.88	+0.13		
	Treatment (males)	3.00	1.00	-2.00	1.04	-2.31
	Control (males)	2.80	3.20	+0.40		
to acquire knowledge and skills in using modern questioning techniques in class	Treatment (females)	2.87	2.73	-0.14	0.75	-0.47
	Control (females)	2.50	2.71	+0.21		
	Treatment (males)	2.00	2.00	0.00	0.75	0.00
	Control (males)	2.60	2.60	0.00		
for further verification of research findings	Treatment (females)	2.00	2.02	+0.02	1.29	-0.47
	Control (females)	1.88	2.50	+0.62		
	Treatment (males)	2.00	2.00	0.00	1.29	+0.47
	Control (males)	2.60	2.00	-0.60		
to increase the level of classroom interaction i.e. teacher-student, student-student and student-material interactions	Treatment (females)	2.73	2.64	-0.09	1.12	-0.20
	Control (females)	2.50	2.63	+0.13		
	Treatment (males)	4.00	2.00	-2.00	1.12	-1.79
	Control (males)	2.40	2.40	0.00		
to assist me in planning and carrying out research involving my learners	Treatment (females)	2.27	2.45	+0.18	1.09	-0.06
	Control (females)	2.50	2.75	+0.25		
	Treatment (males)	3.00	2.00	-1.00	1.09	-0.73

	Control (males)	2.60	2.40	-0.20		

9.1.2.4.2 The impact on research use by age

Table 9.23 below presents the pre and post survey results for teachers' use of research evidence by age. Overall, there was no convincing evidence that the intervention improved younger or older teachers' (self-reported) use of research evidence in practice. Younger teachers in the treatment group were ahead in gains compared to those in the control group, to report using research evidence to prepare their lessons well (ES= +0.67), to improve effective delivery of instruction (ES= +0.45), to become knowledgeable on recent theories of child development (ES= +0.60), for theories behind various new teaching strategies (ES= +0.62), or to improve their content knowledge regarding school subjects (ES= +0.19). Older teachers in the treatment group were ahead in gains compared to those in the control group, in terms of using research evidence to prepare their lessons well (ES= +0.45), to improve effective delivery of instruction (ES=+0.12), or for effective use of instructional materials (ES= +0.60). Both younger and older teachers in the treatment group were behind in gains compared to those in their control group in all other respects.

The results were somewhat clearer when the two subgroups were compared with each other. Of the 18 items, 14 indicate that the treatment had a bigger negative or less beneficial impact on older teachers than younger teachers. As mentioned above, the intervention did not promise to improve the use of research evidence for both younger and older teachers in most respects. However, the intervention appears less effective for older teachers to improve the use of research evidence in almost all respects.

Table 9.23 Comparison of the pre- and post-intervention survey results by age, research use

Level of agreement with "I utilize information from research":	Group (years)	Pre mean	Post mean	Gain Score	SD	Effect size
to get acquainted with effective teaching strategies	Treatment (18-35)	2.57	2.57	0.00	1.04	-0.72
	Control (18-35)	1.75	2.50	+0.75		
	Treatment (> 35)	3.20	2.00	-1.20	1.04	-1.27
	Control (> 35)	2.88	3.00	+0.12		
to help in improving my learners' progress	Treatment (18-35)	2.71	2.57	-0.14	0.97	-0.66
	Control (18-35)	1.75	2.25	+0.50		
	Treatment (> 35)	3.40	2.40	-1.00	0.97	-1.29
	Control (> 35)	3.25	3.50	+0.25		

for innovations in school curricula	Treatment (18-35)	2.29	2.86	+0.57	0.94	-0.19
	Control (18-35)	1.75	2.50	+0.75		
	Treatment (> 35)	3.20	2.60	-0.60	0.94	-0.90
	Control (> 35)	2.88	3.13	+0.25		
on how to improve my learners' interest in schooling	Treatment (18-35)	2.71	2.71	0.00	0.83	-0.30
	Control (18-35)	1.75	2.00	+0.25		
	Treatment (> 35)	3.40	2.80	-0.60	0.83	-0.83
	Control (> 35)	2.88	2.97	+0.09		
to source better evaluation techniques for day-to-day activities	Treatment (18-35)	2.29	2.65	+0.36	1.02	-0.38
	Control (18-35)	1.25	2.00	+0.75		
	Treatment (> 35)	3.20	2.20	-1.00	1.02	-1.11
	Control (> 35)	2.75	2.88	+0.13		
in order to prepare my lessons well	Treatment (18-35)	2.14	2.82	+0.68	1.01	+0.67
	Control (18-35)	2.25	2.25	0.00		
	Treatment (> 35)	2.60	2.80	+0.20	1.01	+0.45
	Control (> 35)	2.88	2.63	-0.25		
to help me in effective delivery of instruction	Treatment (18-35)	2.71	3.00	+0.29	0.74	+0.45
	Control (18-35)	2.25	2.21	-0.04		
	Treatment (> 35)	2.80	2.77	-0.03	0.74	+0.12
	Control (> 35)	3.00	2.88	-0.12		
for effective use of instructional materials	Treatment (18-35)	2.00	2.43	+0.43	0.89	-0.08
	Control (18-35)	1.50	2.00	+0.50		
	Treatment (> 35)	2.60	3.00	+0.40	0.89	+0.60
	Control (> 35)	2.63	2.50	-0.13		
to become knowledgeable on recent theories of child development	Treatment (18-35)	2.43	2.71	+0.28	0.89	+0.60
	Control (18-35)	2.00	1.75	-0.25		
	Treatment (> 35)	3.00	2.80	-0.20	0.89	-0.93
	Control (> 35)	2.00	2.63	+0.63		
for theories behind various new teaching strategies	Treatment (18-35)	2.14	2.57	+0.43	1.10	+0.62
	Control (18-35)	2.25	2.00	-0.25		
	Treatment (> 35)	3.20	2.80	-0.40	1.10	-0.77
	Control (> 35)	2.38	2.83	+0.45		
to improve my content knowledge of school subjects	Treatment (18-35)	2.57	3.00	+0.43	0.97	+0.19
	Control (18-35)	2.00	2.25	+0.25		
	Treatment (> 35)	3.00	2.95	-0.05	0.97	-0.05

	Control (> 35)	2.50	2.50	0.00		
for the acquisition of more pedagogical knowledge	Treatment (18-35)	2.14	2.29	+0.15	1.01	-0.35
	Control (18-35)	1.75	2.25	+0.50		
	Treatment (> 35)	3.00	2.80	-0.20	1.01	-0.20
	Control (> 35)	3.00	3.00	0.00		
for more effective classroom management techniques	Treatment (18-35)	3.14	2.86	-0.28	1.07	-0.73
	Control (18-35)	2.00	2.50	+0.50		
	Treatment (> 35)	3.20	3.00	-0.20	1.07	-0.78
	Control (> 35)	2.25	2.88	+0.63		
for skills at motivating and reinforcing my learners in learning	Treatment (18-35)	2.57	2.57	0.00	1.04	-0.24
	Control (18-35)	2.00	2.25	+0.25		
	Treatment (> 35)	2.93	2.56	-0.37	1.04	-0.60
	Control (> 35)	3.00	3.25	+0.25		
to acquire knowledge and skills in using modern questioning techniques in class	Treatment (18-35)	2.71	2.71	0.00	0.75	-0.67
	Control (18-35)	2.00	2.50	+0.50		
	Treatment (> 35)	2.92	2.60	-0.32	0.75	-0.36
	Control (> 35)	2.63	2.58	-0.05		
for further verification of research findings	Treatment (18-35)	1.57	1.71	+0.14	1.29	-0.09
	Control (18-35)	1.50	1.75	+0.25		
	Treatment (> 35)	2.60	2.43	-0.17	1.29	-0.22
	Control (> 35)	2.38	2.50	+0.12		
to increase the level of classroom interaction i.e. teacher-student, student-student and student-material interactions	Treatment (18-35)	2.71	2.57	-0.14	1.12	-0.57
	Control (18-35)	1.75	2.25	+0.50		
	Treatment (> 35)	3.00	2.60	-0.40	1.12	-0.25
	Control (> 35)	2.75	2.63	-0.12		
to assist me in planning and carrying out research involving my learners	Treatment (18-35)	2.00	2.29	+0.29	1.09	-0.19
	Control (18-35)	1.75	2.25	+0.50		
	Treatment (> 35)	2.80	2.60	-0.20	1.09	-0.53
	Control (> 35)	2.25	2.63	+0.38		

Note: 18-35= younger teachers; > 35= older teachers

9.1.2.4.3 The impact on research use by job

Table 9.24 below illustrates the pre and post survey results for teachers' use of research evidence by job (classroom teachers and headteachers/principals). The results were mixed for both groups. The classroom teachers in the treatment group were ahead in gains relative to those in their control group to report using research evidence to prepare their lessons well

(ES= +0.53), or to help them in effective delivery of instruction (ES= +0.42), or for effective use of instructional materials (ES= +0.16), or for theories behind various new teaching strategies (ES= +0.14), and for further verification of the research findings (ES= +0.11). On the other hand, the headteachers/principals in the treatment group were ahead in gains compared to those in the control group to say that they use research evidence to improve their content knowledge of school subjects (ES= +0.15), or prepare their lessons (ES= +0.59), and for effective use of instructional materials (ES= +0.22). Both groups, however, were behind in gains relative to those in the control group with regard to reporting use of research evidence in most other respects.

The results were mixed when the two subgroups were compared. Overall there was no convincing evidence that the intervention had a bigger harmful or beneficial impact on any of the two groups' use of research evidence in practice.

Table 9.24 Comparison of the pre- and post-intervention survey results by job, research use

Level of agreement with "I utilize information from research":	Group	Pre mean	Post mean	Gain Score	SD	Effect size
to get acquainted with effective teaching strategies	Treatment (classroom)	2.57	2.43	-0.14	1.04	-0.68
	Control (classroom)	2.00	2.57	+0.57		
	Treatment (headteacher)	3.20	2.20	-1.00	1.04	-1.15
	Control (headteacher)	3.00	3.20	+0.20		
to help in improving my learners' progress	Treatment (classroom)	2.71	2.43	-0.28	0.97	-0.58
	Control (classroom)	2.43	2.71	+0.28		
	Treatment (headteacher)	3.40	2.60	-0.80	0.97	-1.24
	Control (headteacher)	3.20	3.60	+0.40		
for innovations in school curricula	Treatment (classroom)	2.29	2.71	+0.42	0.94	-0.31
	Control (classroom)	1.86	2.57	+0.71		
	Treatment (headteacher)	3.20	2.80	-0.40	0.94	-0.64
	Control (headteacher)	3.20	3.40	+0.20		
on how to improve my learners' interest in schooling	Treatment (classroom)	2.71	2.57	-0.14	0.83	-0.82
	Control (classroom)	2.00	2.54	+0.54		
	Treatment (headteacher)	3.40	3.00	-0.40	0.83	-0.24
	Control (headteacher)	3.20	3.00	-0.20		
to source better evaluation	Treatment (classroom)	2.14	2.51	+0.37	1.02	-0.21

techniques for day-to-day activities	Control (classroom)	1.71	2.29	+0.58		
	Treatment (headteacher)	3.40	2.40	-1.00	1.02	-1.18
	Control (headteacher)	2.80	3.00	+0.20		
in order to prepare my lessons well	Treatment (classroom)	2.14	2.82	+0.68	1.01	+0.53
	Control (classroom)	2.43	2.57	+0.14		
	Treatment (headteacher)	2.60	2.80	+0.20	1.01	+0.59
	Control (headteacher)	3.00	2.60	-0.40		
to help me in effective delivery of instruction	Treatment (classroom)	2.57	3.00	+0.43	0.74	+0.42
	Control (classroom)	2.57	2.69	+0.12		
	Treatment (headteacher)	3.00	2.77	-0.23	0.74	-0.04
	Control (headteacher)	3.00	2.80	-0.20		
for effective use of instructional materials	Treatment (classroom)	2.00	2.57	+0.57	0.89	+0.16
	Control (classroom)	1.86	2.29	+0.43		
	Treatment (headteacher)	2.60	2.80	+0.20	0.89	+0.22
	Control (headteacher)	2.60	2.60	0.00		
to become knowledgeable on recent theories of child development	Treatment (classroom)	2.14	2.57	+0.43	0.89	0.00
	Control (classroom)	1.71	2.14	+0.43		
	Treatment (headteacher)	3.40	3.00	-0.40	0.89	-1.35
	Control (headteacher)	2.00	2.80	+0.80		
for theories behind various new teaching strategies	Treatment (classroom)	2.00	2.29	+0.29	1.10	+0.14
	Control (classroom)	2.29	2.43	+0.14		
	Treatment (headteacher)	3.40	3.20	-0.20	1.10	-0.85
	Control (headteacher)	2.20	2.93	+0.73		
to improve my content knowledge of school subjects	Treatment (classroom)	2.29	2.71	+0.42	0.97	-0.15
	Control (classroom)	2.00	2.57	+0.57		
	Treatment (headteacher)	3.40	3.35	-0.05	0.97	+0.15
	Control (headteacher)	2.60	2.40	-0.20		
for the acquisition of more pedagogical knowledge	Treatment (classroom)	2.00	2.14	+0.14	1.01	-0.29
	Control (classroom)	2.14	2.57	+0.43		
	Treatment (headteacher)	3.20	3.00	-0.20	1.01	-0.40
	Control (headteacher)	3.00	3.20	+0.20		
for more effective classroom management techniques	Treatment (classroom)	3.00	2.71	-0.29	1.07	-1.07
	Control (classroom)	1.86	2.71	+0.85		
	Treatment (headteacher)	3.40	3.20	-0.20	1.07	-0.56
	Control (headteacher)	2.60	3.00	+0.40		

for skills at motivating and reinforcing my learners in learning	Treatment (classroom)	2.43	2.29	-0.14	1.04	-0.40
	Control (classroom)	2.43	2.71	+0.28		
	Treatment (headteacher)	3.13	2.96	-0.17	1.04	-0.55
	Control (headteacher)	3.00	3.40	+0.40		
to acquire knowledge and skills in using modern questioning techniques in class	Treatment (classroom)	2.57	2.43	-0.14	0.75	-0.51
	Control (classroom)	2.43	2.67	+0.24		
	Treatment (headteacher)	3.12	3.00	-0.12	0.75	-0.43
	Control (headteacher)	2.40	2.60	+0.20		
for further verification of research findings	Treatment (classroom)	1.43	1.71	+0.28	1.29	+0.11
	Control (classroom)	1.86	2.00	+0.14		
	Treatment (headteacher)	2.80	2.43	-0.37	1.29	-0.60
	Control (headteacher)	2.20	2.60	+0.40		
to increase the level of classroom interaction i.e. teacher-student, student-student and student-material interactions	Treatment (classroom)	2.43	2.43	0.00	1.12	-0.38
	Control (classroom)	2.00	2.43	+0.43		
	Treatment (headteacher)	3.40	2.80	-0.60	1.12	-0.36
	Control (headteacher)	2.80	2.60	-0.20		
to assist me in planning and carrying out research involving my learners	Treatment (classroom)	2.00	2.14	+0.14	1.09	-0.65
	Control (classroom)	1.86	2.71	+0.85		
	Treatment (headteacher)	2.80	2.80	0.00	1.09	0.00
	Control (headteacher)	2.40	2.40	0.00		

Note: Classroom=classroom teacher; headteacher= headteacher/principals etc.

9.1.2.4.4 The impact on research use by experience

Table 9.25 shows the pre and post survey results for teachers' use of research evidence by experience. Overall, there was no convincing evidence of a beneficial impact on less experienced or experienced teachers' (self-reported) use of research evidence in practice. The less experienced teachers in the treatment group were ahead in gains compared to those in their control group, in terms of reporting using research evidence to become knowledgeable on recent theories of child development (ES= +0.31), or to prepare their lessons effectively (ES= +0.18), or for further verification of research findings (ES= +0.11). Experienced teachers were ahead in gains compared to those in their control group to report using research evidence for the effective use of instructional materials (ES= +0.71), or to prepare their lessons well (ES= +0.42), or to help them in effective delivery of instruction (ES= +0.26), or to improve their content knowledge of school subjects (ES= +0.07). In all other respects, both the less experienced and experienced teachers in the treatment group were behind in gains compared to those in their control group in terms of reporting use of research evidence.

On the other hand, overall there was no convincing evidence that the treatment had a comparatively greater beneficial or harmful impact on less experienced or experienced teachers' (self-reported) use of research evidence in practice.

Table 9.25 Comparison of the pre- and post-intervention survey results by experience, research use

Level of agreement with "I utilize information from research":	Group (years)	Pre mean	Post mean	Gain Score	SD	Effect size
to get acquainted with effective teaching strategies	Treatment (0-10)	2.57	2.57	0.00	1.04	-1.44
	Control (0-10)	1.50	3.00	+1.50		
	Treatment (10+)	3.20	2.00	-1.20	1.04	-1.26
	Control (10+)	2.78	2.89	+0.11		
to help in improving my learners' progress	Treatment (0-10)	2.71	2.57	-0.14	0.97	-1.18
	Control (0-10)	1.50	2.50	+1.00		
	Treatment (10+)	3.40	2.40	-1.00	0.97	-1.26
	Control (10+)	3.11	3.33	+0.22		
for innovations in school curricula	Treatment (0-10)	2.29	2.86	+0.57	0.94	-0.99
	Control (0-10)	1.00	2.50	+1.50		
	Treatment (10+)	3.20	2.60	-0.60	0.94	-0.87
	Control (10+)	2.78	3.00	+0.22		
on how to improve my learners' interest in schooling	Treatment (0-10)	2.71	2.71	0.00	0.83	-0.60
	Control (0-10)	1.50	2.00	+0.50		
	Treatment (10+)	3.40	2.80	-0.60	0.83	-0.82
	Control (10+)	2.78	2.86	+0.08		
to source better evaluation techniques for day-to-day activities	Treatment (0-10)	2.29	2.65	+0.36	1.02	-1.12
	Control (0-10)	1.00	2.50	+1.50		
	Treatment (10+)	3.20	2.20	-1.00	1.02	-0.98
	Control (10+)	2.67	2.67	0.00		
in order to prepare my lessons well	Treatment (0-10)	2.14	2.82	+0.68	1.01	+0.18
	Control (0-10)	2.00	2.50	+0.50		
	Treatment (10+)	2.60	2.80	+0.20	1.01	+0.42
	Control (10+)	2.78	2.56	-0.22		
to help me in effective delivery of	Treatment (0-10)	2.71	3.00	+0.29	0.74	-0.28

instruction	Control (0-10)	2.00	2.50	+0.50		
	Treatment (10+)	2.80	2.77	-0.03	0.74	+0.26
	Control (10+)	2.89	2.67	-0.22		
for effective use of instructional materials	Treatment (0-10)	2.00	2.43	+0.43	0.89	-1.20
	Control (0-10)	1.00	2.50	+1.50		
	Treatment (10+)	2.60	3.00	+0.40	0.89	+0.71
	Control (10+)	2.56	2.33	-0.23		
to become knowledgeable on recent theories of child development	Treatment (0-10)	2.43	2.71	+0.28	0.89	+0.31
	Control (0-10)	2.00	2.00	0.00		
	Treatment (10+)	3.00	2.80	-0.20	0.89	-0.72
	Control (10+)	2.00	2.44	+0.44		
for theories behind various new teaching strategies	Treatment (0-10)	2.14	2.57	+0.43	1.10	-0.06
	Control (0-10)	2.00	2.50	+0.50		
	Treatment (10+)	3.20	2.80	-0.40	1.10	-0.54
	Control (10+)	2.44	2.63	+0.19		
to improve my content knowledge of school subjects	Treatment (0-10)	2.57	3.00	+0.43	0.97	-0.59
	Control (0-10)	1.50	2.50	+1.00		
	Treatment (10+)	3.00	2.95	-0.05	0.97	+0.07
	Control (10+)	2.56	2.44	-0.12		
for the acquisition of more pedagogical knowledge	Treatment (0-10)	2.14	2.29	+0.15	1.01	-0.84
	Control (0-10)	1.50	2.50	+1.00		
	Treatment (10+)	3.00	2.80	-0.20	1.01	-0.20
	Control (10+)	2.89	2.89	0.00		
for more effective classroom management techniques	Treatment (0-10)	3.14	2.86	-0.28	1.07	-1.20
	Control (0-10)	2.00	3.00	+1.00		
	Treatment (10+)	3.20	3.00	-0.20	1.07	-0.71
	Control (10+)	2.22	2.78	+0.56		
for skills at motivating and reinforcing my learners in learning	Treatment (0-10)	2.57	2.57	0.00	1.04	-0.96
	Control (0-10)	1.50	2.50	+1.00		
	Treatment (10+)	2.93	2.56	-0.37	1.04	-0.57
	Control (10+)	2.89	3.11	+0.22		
to acquire knowledge and skills in using modern questioning techniques in class	Treatment (0-10)	2.71	2.71	0.00	0.75	-0.67
	Control (0-10)	2.00	2.50	+0.50		
	Treatment (10+)	2.92	2.60	-0.32	0.75	-0.52
	Control (10+)	2.56	2.63	+0.07		

for further verification of research findings	Treatment (0-10)	1.57	1.71	+0.14	1.29	+0.11
	Control (0-10)	1.50	1.50	0.00		
	Treatment (10+)	2.60	2.43	-0.17	1.29	-0.30
	Control (10+)	2.22	2.44	+0.22		
to increase the level of classroom interaction i.e. teacher-student, student-student and student-material interactions	Treatment (0-10)	2.71	2.57	-0.14	1.12	-1.46
	Control (0-10)	1.00	2.50	+1.50		
	Treatment (10+)	3.00	2.60	-0.40	1.12	-0.16
	Control (10+)	2.78	2.56	-0.22		
to assist me in planning and carrying out research involving my learners	Treatment (0-10)	2.00	2.29	+0.29	1.09	-0.65
	Control (0-10)	1.50	2.50	+1.00		
	Treatment (10+)	2.80	2.60	-0.20	1.09	-0.50
	Control (10+)	2.22	2.56	+0.34		

Note: less experienced= 0-10; experienced=10+

9.1.2.4.5 The impact on research use by degree

Table 9.26 shows the pre and post survey results for teachers’ use of research evidence by degree. Overall, the results were mixed. Teachers with a Master’s degree or equivalent in the treatment group were ahead compared to those in the control group in reporting their use of research evidence on how to improve their learners' interest in schooling (ES= +1.20), or to source better evaluation techniques for day-to-day activities (ES= +0.53), or to prepare their lessons well (ES= +0.99), or to help them in effective delivery of instruction (ES= +2.70), or for effective use of instructional materials (ES= +1.12). Teachers with a Bachelor’s degree or equivalent in the treatment group were ahead in gains compared to those in their control group to report using research evidence to prepare their lessons well (ES= +0.40), to help them in effective delivery of instruction (ES= +0.14), or for effective use of instructional materials (ES= +0.34), or to improve their content knowledge of school subjects (ES= +0.19), or for the acquisition of more pedagogical knowledge (ES= +0.10), or for further verification of research findings (ES= +0.17). Both the subgroups in the treatment group were behind in gains compared to those in their control group in most other respects.

When the two subgroups were contrasted, there was no convincing evidence that the treatment had a greater beneficial or harmful impact on any of the two subgroups’ (self-reported) use of research evidence in practice.

Table 9.26 Comparison of the pre- and post-intervention survey results by degree, research use

Level of agreement with "I utilize information from research":	Group (years)	Pre mean	Post mean	Gain Score	SD	Effect size
to get acquainted with effective teaching strategies	Treatment (master)	2.00	3.00	+1.00	1.04	0.00
	Control (master)	3.00	4.00	+1.00		
	Treatment (bachelor)	2.90	2.30	-0.60	1.04	-0.96
	Control (bachelor)	2.30	2.70	+0.40		
to help in improving my learners' progress	Treatment (master)	2.00	3.00	+1.00	0.97	0.00
	Control (master)	3.00	4.00	+1.00		
	Treatment (bachelor)	3.20	2.50	-0.70	0.97	-1.13
	Control (bachelor)	2.60	3.00	+0.40		
for innovations in school curricula	Treatment (master)	2.00	3.00	+1.00	0.94	0.00
	Control (master)	3.00	4.00	+1.00		
	Treatment (bachelor)	2.80	2.70	-0.10	0.94	-0.53
	Control (bachelor)	2.30	2.70	+0.40		
on how to improve my learners' interest in schooling	Treatment (master)	3.00	3.00	0.00	0.83	+1.20
	Control (master)	3.00	2.00	-1.00		
	Treatment (bachelor)	3.00	2.70	-0.30	0.83	-0.82
	Control (bachelor)	2.30	2.68	+0.38		
to source better evaluation techniques for day-to-day activities	Treatment (master)	2.00	2.54	+0.54	1.02	+0.53
	Control (master)	3.00	3.00	0.00		
	Treatment (bachelor)	2.70	2.50	-0.20	1.02	-0.69
	Control (bachelor)	2.00	2.50	+0.50		
in order to prepare my lessons well	Treatment (master)	2.00	3.00	+1.00	1.01	+0.99
	Control (master)	2.00	2.00	0.00		
	Treatment (bachelor)	2.50	2.80	+0.30	1.01	+0.40
	Control (bachelor)	2.60	2.50	-0.10		
to help me in effective delivery of instruction	Treatment (master)	2.00	3.00	+1.00	0.74	+2.70
	Control (master)	3.00	2.00	-1.00		
	Treatment (bachelor)	2.80	2.98	+0.18	0.74	+0.14
	Control (bachelor)	2.60	2.68	+0.08		
for effective use of instructional materials	Treatment (master)	2.00	3.00	+1.00	0.89	+1.12
	Control (master)	2.00	2.00	0.00		
	Treatment (bachelor)	2.20	2.70	+0.50	0.89	+0.34
	Control (bachelor)	2.10	2.30	+0.20		

to become knowledgeable on recent theories of child development	Treatment (master)	3.00	3.00	0.00	0.89	-1.12
	Control (master)	1.00	2.00	+1.00		
	Treatment (bachelor)	2.70	2.80	+0.10	0.89	-0.34
	Control (bachelor)	1.90	2.30	+0.40		
for theories behind various new teaching strategies	Treatment (master)	3.00	2.00	-1.00	1.10	-0.91
	Control (master)	2.00	2.00	0.00		
	Treatment (bachelor)	2.50	2.80	+0.30	1.10	-0.06
	Control (bachelor)	2.20	2.57	+0.37		
to improve my content knowledge of school subjects	Treatment (master)	3.00	3.00	0.00	0.97	0.00
	Control (master)	1.00	1.00	0.00		
	Treatment (bachelor)	2.70	3.08	+0.38	0.97	+0.19
	Control (bachelor)	2.30	2.50	+0.20		
for the acquisition of more pedagogical knowledge	Treatment (master)	3.00	2.00	-1.00	1.01	-1.98
	Control (master)	2.00	3.00	+1.00		
	Treatment (bachelor)	2.40	2.70	+0.30	1.01	+0.10
	Control (bachelor)	2.50	2.70	+0.20		
for more effective classroom management techniques	Treatment (master)	4.00	3.00	-1.00	1.07	-0.93
	Control (master)	2.00	2.00	0.00		
	Treatment (bachelor)	3.00	3.10	+0.10	1.07	-0.65
	Control (bachelor)	2.00	2.80	+0.80		
for skills at motivating and reinforcing my learners in learning	Treatment (master)	2.00	2.00	0.00	1.04	-0.96
	Control (master)	3.00	2.00	-1.00		
	Treatment (bachelor)	2.76	2.78	+0.02	1.04	-0.46
	Control (bachelor)	2.50	3.00	+0.50		
to acquire knowledge and skills in using modern questioning techniques in class	Treatment (master)	3.00	2.00	-1.00	0.75	-1.33
	Control (master)	2.00	2.00	0.00		
	Treatment (bachelor)	2.86	2.80	-0.06	0.75	-0.44
	Control (bachelor)	2.30	2.57	+0.27		
for further verification of research findings	Treatment (master)	2.00	0.00	-2.00	1.29	-3.88
	Control (master)	1.00	4.00	+3.00		
	Treatment (bachelor)	2.00	2.22	+0.22	1.29	+0.17
	Control (bachelor)	2.00	2.00	0.00		
to increase the level of classroom interaction i.e. teacher-student, student-student and student-material	Treatment (master)	3.00	2.00	-1.00	1.12	0.00
	Control (master)	3.00	2.00	-1.00		
	Treatment (bachelor)	2.70	2.70	0.00	1.12	-0.27

interactions	Control (bachelor)	2.20	2.50	+0.30		
to assist me in planning and carrying out research involving my learners	Treatment (master)	2.00	1.00	-1.00	1.09	-0.92
	Control (master)	2.00	2.00	0.00		
	Treatment (bachelor)	2.30	2.60	+0.30	1.09	-0.28
	Control (bachelor)	1.90	2.50	+0.60		

Note: Master = Master's degree or equivalent and Bachelor= Bachelor's degree or equivalent

9.2.1 Conclusion

The evaluation involved 46 participants in total, 25 of whom completed both the pre- and post-survey (treatment 13, control 12). The study was conducted to investigate the impact of disseminating research evidence through workshop training with supporting evidence-based resources on teachers' attitudes towards research evidence and their use of it in practice. Readers should interpret the results with caution due to the high dropout rate caused by the Covid-19 pandemic. The results were less secure for the smaller subgroups, especially for gender and degree due to the small numbers of male teachers and those with a Master's degree or equivalent.

After the intervention, there was no convincing evidence of a beneficial impact upon teachers' attitudes with regard to the use of research evidence considering the results of teachers' general attitudes towards research evidence, and the influences that might affect their adoption of a new intervention. The results were mixed for teachers' (self-reported) use of research evidence in practice. The intervention seems to have improved teachers' use of research evidence in some cases, but the treatment group teachers were behind in gains compared to the control group in terms of reporting using research evidence in most respects. Overall, the results might not be considered encouraging.

The impact evaluation was also addressed by subgroup, depending on the participants' demographic characteristics (gender, age, job, experience, degree). Overall, there was no convincing evidence of a beneficial impact on any of the subgroups' general attitudes towards the use of research evidence, although some subgroups indicated a beneficial impact in some respects. However, in terms of general attitudes, the intervention had a greater harmful or less beneficial impact on teachers who were male, older, headteachers/principals, experienced, and those with a Bachelor's degree or equivalent, compared to their comparison subgroup (teachers who were female, younger, classroom teachers, less experienced, and with a Master's degree or equivalent) in most instances.

The results relating to the influences that might affect teachers' use of a new intervention were not encouraging for almost all the subgroups. Teachers with a Master's degree or equivalent were more likely to use a new intervention based on evidence after the intervention, but they were also more likely to adopt a new intervention in some other cases, potentially leading to unwarranted adoption of a programme. Also, it should be noted that the results by degree might be less secure when compared to the results for other subgroups. Therefore, there was no convincing evidence of a beneficial impact on teachers with a Master's degree or equivalent. The most interesting and convincing evidence was that after the intervention, less experienced teachers were more likely than experienced teachers to report that they would adopt a new intervention based on evidence, and less likely to use a new intervention in all other respects which may produce a harmful impact in practice. In summary, the results concerning influences appear promising for less experienced teachers, but mixed or not encouraging for the comparison group (experienced teachers), or any of the other subgroups.

The results relating to research use were also mixed for all the subgroups. From an overall perspective, there was no convincing evidence that the intervention improved any of the subgroup members' (self-reported) use of research evidence in practice, or that the treatment had a bigger beneficial or harmful impact on any of the subgroups compared to their comparison subgroup. Amongst the other findings, the results by age provided more convincing evidence in terms of change in likelihood of research use. The intervention had a bigger harmful or less beneficial impact on older teachers than younger teachers in most respects.

SECTION 4

CONCLUSION

This is the concluding section of the thesis. It consists of two chapters (Chapters 10 and 11). Chapter 10 summarises and discusses the key findings of the study, and Chapter 11 addresses the implications, limitations and presents the research conclusion.

CHAPTER 10

Discussion

This chapter summarises and discusses the findings reported in the study.

10.1 The findings of the systematic review

A systematic review was conducted to provide evidence regarding the most effective ways of disseminating research evidence to teachers.

10.1.1 What is the existing evidence on the most effective ways of disseminating research evidence to teachers?

The review involved both descriptive and narrative analysis.

10.1.1.1Descriptive findings of the review

Although the current study involved a large-scale systematic review, covering a total of 68,817 studies, only 24 studies were ultimately included in the analysis. The review was designed to reveal the existing evidence on various dissemination approaches, rather than a specific route, which means the number of studies for each dissemination approach were more limited in the review. Another point to consider is that the included studies mostly involved multiple outcome measures, such as student attainment and teachers' attitudes towards the research evidence, which again reduced the number of studies when we were aiming to analyse the impact of a specific dissemination approach on a specific outcome measure.

Most of the studies included in the review were rather weak in terms of providing robust evidence. Only a few RCTs were performed involving a large-sample size. The included studies were rated using the 'sieve' approach developed by Gorard et al. (2017), whose scoring ranges from 0🔒 (low-quality) to 4🔒 (high-quality). Of the 24 studies included, only four **(Lord et al., 2017a; Lord et al., 2017b; Wiggins et al., 2019; Rose et al., 2017)** were rated higher than 2🔒 in terms of generating high-quality evidence.

The standard literature review suggested that we have witnessed considerable progress to generate robust evidence in EBP over recent decades, but no equivalent progress has been made to provide high-quality evidence regarding how to best disseminate research evidence to users, which was the rationale for the current study. The descriptive findings for this review might be considered important as they support the rationale for the current study. Moreover, this study has been also supported by a systematic review by Gorard et al. (2020a), which was published when the current study was in progress. Although the authors employed a large-scale systematic review with broader inclusion criteria, involving studies in other fields such as health, they identified only a few high-quality studies.

The characteristics of the studies included in the review might be considered interesting for several reasons. All four studies that were rated higher than 2🔒 were funded by the EEF (sometimes with other foundations or institutions) (see **Lord et al., 2017a; Lord et al., 2017b; Wiggins et al., 2019; Rose et al., 2017**). A possible explanation for this could be that researchers working in universities may be more likely to encounter barriers such as lack of time, budget and human resources, when seeking to conduct large-scale RCTs.

Studies examining end-user outcomes were inclined to yield a more negative impact than those concerning attitudes and behaviours. There could be several explanations for this result. First this might be explained by the quality of the studies themselves. Studies on student outcomes typically provide more robust evidence than those on the other two outcome measures. Weak studies may have been affected by bias or other factors, such as conflict of interest (Col), thereby potentially indicating a more beneficial impact even if the actual impact was negative. Secondly, the systematic review demonstrated that passive or light active approaches did not work well in practice, and the best studies tended to adopt such interventions to improve the use of research and student attainment. Lastly, this may be explained by the fact that, as noted by Gorard (2020), improving student attainment might be more of a challenge than impacting teachers' attitudes and research use.

10.1.1.2 The findings of the narrative analysis

All the interventions undertaken were classified into six categorical approaches considering each evaluation's distinguishing features: Passive with or without active support, active single-component, active multi-component, collaborative, technology-supported, and embedding evidence in the curriculum. Overall, there was no equally convincing evidence for each route, and thus it was not possible to reach definitive conclusions regarding the approaches' effectiveness in practice. Nonetheless, the review yielded important findings with which to identify the more promising dissemination approaches to evaluate.

The clearest finding to emerge from the systematic review was that simply disseminating research summaries or evidence-based materials to teachers (passive dissemination), even sometimes with light or active support, was ineffective in practice (see **Lord et al., 2017a; Lord et al., 2017b**). This is consistent with the findings of another systematic review published by Gorard et al. (2020a). The authors pointed out that we should consider research evidence not only to adopt the most promising approaches, but also to avoid ineffective strategies so as not to waste time and money. In this respect, it was apparent that we should avoid simply disseminating research evidence to teachers considering the review findings.

The results on passive dissemination approaches need be addressed in greater detail to avoid some readers drawing erroneous conclusions. In the standard literature review, many authors suggest that research evidence should be presented in a format that readers can easily access, digest, and apply in their practice (see Higgins, 2020; Nelson & O'Beirne, 2014; See, 2020). However, some readers may consider the review findings indicating that sharing research summaries, toolkits or evidence-based resources with teachers, did not work in practice, and thus claim that we should abandon efforts to summarise and translate evidence into simpler forms. The review findings do not suggest that we should no longer make efforts to ensure research evidence is more accessible or straightforward. The findings highlighted a requirement for further efforts to get evidence into use, rather than relying only on passive dissemination. A series of efforts have been undertaken to develop an evidence kit or toolkit, such as summarising research evidence and judging the quality of that evidence, which might even be demanding for many researchers. Researchers may benefit from the existing research summaries, toolkits or other simple forms of evidence, and make further efforts to disseminate research evidence.

Although the systematic review provided less secure evidence on the other dissemination approaches, some comparisons can be made considering the quality, quantity and impact of the evaluations. The weakest evidence provided by the review perhaps related to collaborative approaches in a total of five studies. Even if some of the studies noted a positive impact, they were rated 1🔒 in terms of providing high-quality evidence. More secure evidence generated by (**See at al., 2016**), rated 2🔒, found no evidence of a beneficial impact. Overall, there was no convincing evidence to conclude that collaborative approaches were effective as means to disseminate research evidence. A possible explanation for why studies involving collaborative approaches were weak might be that allowing teachers to engage in research and design their own practices may have been challenging for a study with a large-sample size.

Studies involving active multi-component approaches (e.g., workshop plus follow up support) may be considered more promising than passive, collaborative and active-single component approaches. In this method of dissemination, researchers combined a series of efforts to disseminate research evidence. Unlike the other approaches, all studies adopting an intervention based on technology supported routes (**Ely et al., 2014; Ely et al., 2018; Mady, 2013**) or embedding evidence in curriculum (**Clarke et al., 2011; Doabler et al., 2014**) resulted in a positive impact. However, the number of studies included in the review were somewhat limited, with a total of five studies for the two approaches. None of these studies were rated above 2🔒.

The findings of the systematic review might be addressed taking account of the models introduced in the traditional literature review. There was no convincing evidence to conclude that ‘evidence-informed models’ or ‘evidence-based models’ were more effective to get evidence into use. The MAGIC model introduced in the literature review (Cabinet Office, 2018) involves simple one way connections (an example of linear models) and suggests that evidence should be in a format that users can easily comprehend, interpret and use. However, the review findings indicate that simply disseminating research evidence, even if it is translated into (allegedly) useful formats such as toolkits or research summaries, does not work to get evidence into use.

On the other hand, evidence-informed approaches and some models introduced in the literature, such as the models suggested by Rickinson et al. (2020) and the EPPI Centre (Gough et al., 2021) emphasize the importance of “engagement” with research evidence. In their model, Rickinson et al. (2020) advocates that users should be considered active recipients using cognitive skills, such as critical engagement, when utilising research evidence. The systematic review indicated that there was no convincing evidence that active single-component and collaborative approaches were effective to get evidence into use. However, there are things to consider while addressing the findings of the review. Collaborative approaches in the review mostly allowed teachers to engage with plain evidence and then develop their own actions plans (see See at al., 2016). Engagement with plain evidence might require more skills, knowledge and support for users, and thus teachers might have found such form of evidence more difficult. Another explanation for active single-component approaches might be that teachers might have needed further and more intensive support considering the fact that the review showed that active multi-component approaches were relatively more promising than active-single component approaches.

In conclusion, the review clearly indicated that we should avoid using an approach that relies solely on sharing evidence-based resources, such as providing research summaries or evidence kits with teachers in order to get evidence into use. Such approaches may waste time and money resulting in an inconclusive or harmful impact. In the current study, therefore, it was decided to make additional efforts to disseminate research evidence to teachers. Compared to other approaches, technology supported routes, embedding evidence in curriculum and active-multi component approaches were shown to be more promising. Even if these methods were not supported by high-quality studies, there was no high-quality evidence indicating that they were ineffective. Thus, the current study developed an intervention utilising active-multi component approach. Teacher training through workshop were considered feasible given the timeframe, budget and resources available. Teachers were also supported with access to additional resources, such as evidence kits and research summaries.

10.2 The findings from the pre-survey

A total of 46 teachers completed the pre-survey of the evaluation, which asked questions about teachers' attitudes towards research evidence, and their use of research evidence.

10.2.1 What are teachers' attitudes towards the use of research evidence in schools?

Overall, the teachers' general attitudes towards research evidence may be considered positive. This finding seems to be consistent with the results of studies summarised in the literature review (see Fraser et al., 2018; Judkins et al., 2014; Mahoney, 2013; Nelson et al., 2017; Penuel et al., 2017; Procter, 2013; Walker et al., 2019; Williams & Coles, 2007).

When teachers were asked about the influences that may affect their adoption of a new intervention, they responded that they were quite likely to adopt a new intervention in almost all cases. Teachers were less likely to report that they would adopt a new intervention if it was intuitively appealing, or being used by colleagues who were happy with it, or based on evidence, and more likely to use it if it was required by law or school, or if they felt they had received sufficient training to use it correctly. This means that teachers reported placing a higher value on some of the proposed influences than on evidence, which may lead to negative impact in practice.

In particular, teachers were much more likely to report using a new intervention if was required by law. In this case, if research evidence is embedded in a context such as the curriculum, teachers might be more likely to use it just because it is required by law. The findings from the systematic review also indicated that embedding evidence in the curriculum was one of the more promising dissemination approaches compared to others (see **Clarke et al., 2011; Doabler et al., 2014**). However, such dissemination may refer to an evidence-based model rather than being evidence-informed (see Siddiqui, 2020). Unlike the model (quality use of evidence) suggested by Rickinson et al. (2020) considering teachers active recipients, such way of dissemination (embedding evidence in a curriculum) might be considered a top-down approach without allowing teachers actively and critically engage with research evidence. However, this approach differs from passive dissemination approaches (simply sharing research summaries with teachers) summarised in the review in terms of the form of evidence as research evidence is engineered and embedded in a context that teachers can, or even have to, use.

After the requirement by law, teachers were more likely to report using a new intervention if they felt they had received enough training to use it correctly. In addition, they were less likely to report using a new intervention being used by colleagues who were happy with it compared to almost all other circumstances. We might suggest that if teachers have sufficient training and skills to use a new intervention based on evidence, they may then be more likely to use it, rather than adopting a new intervention based on their colleagues' experience. If teachers lack the requisite skills and knowledge, they may consult colleagues first, even if they want to use research evidence. In order to support this conclusion, we may also refer to previous studies and suggestions in the standard literature review.

The previous studies summarised in the standard literature review showed that teachers may initially tend to apply their own or colleagues' experience, rather than evidence (see Judkins et al., 2014; Mahoney, 2013; Nelson et al., 2017; Procter, 2013; Walker et al., 2019; Williams & Coles, 2007). A study by Fraser et al. (2018) demonstrated that even if teachers accepted the value of research evidence derived from reports, they were more reliant on local educators when asked to judge the effectiveness of educational programmes. In another study by Nelson et al. (2017), teachers identified their colleagues as one of the easiest to access sources of information. However, it should be noted that this study and the other studies summarised only present teachers' (self-reported) attitudes towards research evidence. In reality, even if teachers were to have the necessary training and skills about a new intervention based on evidence, they may still prefer to consult their experienced colleagues first.

10.2.2 To what extent do teachers use research evidence in practice?

The results from the pre-survey indicated that teachers' (self-reported) use of research evidence may be considered limited, especially when compared to their general attitudes towards the use of research evidence. This finding seems to be consistent with the findings of the studies presented in the literature review (see Judkins et al., 2014; Mahoney, 2013; Nelson et al., 2017; Procter, 2013; Walker et al., 2019; Williams & Coles, 2007).

Teachers were more likely to report using research evidence to directly improve their teaching and student attainment, rather than adopting it to further verify findings, or carry out their own research involving their learners. A possible explanation for this might be that teachers were under pressure to improve their teaching and student attainment over the short term. An additional explanation may be that a lack of necessary training and skills about research evidence may have prevented teachers to engage in educational research.

A study by Nelson and Steele (2007) suggested that attitudes towards the use of research evidence are likely to influence practitioners' use of evidence-based strategies in practice. Many researchers have attempted to affect teachers' attitudes towards research evidence positively (see Ely et al., 2018; Griggs et al., 2016; Ogunleye, 2014; Purper, 2015; Speight et al., 2016). Also, 'demand for research' was an issue considered in the model developed by the EPPI Centre (Gough et al., 2021). However, the pre-survey results indicated that although teachers' attitudes towards research evidence were positive, their use of research evidence was somewhat limited in practice. As mentioned in the literature review, positive attitudes do not guarantee the adoption of research evidence in practice. We might state that the results in the current study further support this claim. On the other hand, positive attitudes might not always be essential. Teachers may use evidence just because they are required to so. Therefore, perhaps teachers' attitudes might be considered more important when they are expected to find and use research evidence themselves, or carry out their own research.

10.2.3 Do teachers' attitudes towards the use of research evidence differ according to their demographic characteristics (gender, age, job, experience and degree)?

The current study also analysed teachers' attitudes towards research evidence and their (self-reported) use of research evidence according to their demographic characteristics: gender, age, job, experience and degree.

Overall, there was no convincing evidence that teachers' general attitudes regarding the use of research evidence differed meaningfully by subgroup. The results by degree were mixed, which suggests the current study did not provide convincing evidence to support Procter, (2013) suggesting that teachers who have had previous research engagement during their post-graduate studies may place a higher value on research evidence.

The questions regarding the influences that might affect teachers' adoption of a new intervention yielded mixed, but interesting findings. The results by age and job were more meaningful. Older teachers and headteachers/principals were much more likely than their comparison group (younger and classroom teachers) to report that they would adopt an intervention based on evidence. In particular, headteachers/principals also reported placing a higher value on evidence when adopting a new intervention compared to almost all other circumstances. This finding by job is also addressed according to the results of teachers' (self-reported) use of research evidence detailed below.

Teachers who were female, experienced and with a Master's degree or equivalent were more likely than their comparison group (teachers who were male, less experienced and with a Bachelor's degree or equivalent respectively) to report that they would adopt a new intervention based evidence to their practice. But the results by gender, experience and degree should be considered as relatively less secure, considering that the differences in mean scores were low, and that teachers were also more likely to adopt a new intervention in some other respects, which might then lead to a negative impact in practice.

10.2.4 Does teachers' use of research evidence differ according to their demographic characteristics (gender, age, job, experience and degree)?

Overall, the results for the teachers' (self-reported) use of research evidence by subgroup were more meaningful than their general attitudes towards research evidence were. Perhaps the most convincing evidence was that headteachers/principals were more likely than classroom teachers to report using research evidence in all respects, with quite sizeable differences in mean scores. This seems consistent with findings about influences indicating that headteachers/principals were more likely than classroom teachers to report willingness to adopt a new intervention based on evidence. One possible explanation might be that classroom teachers may have faced additional difficulties and barriers such as lack of time, skills and knowledge, when seeking to use research evidence in practice. Alternatively, headteachers/principals may have felt themselves to be more responsible due to their position in the school, and also tended to report more positive responses regarding the use of research evidence.

On other hand, male, older and experienced teachers were more likely than their comparison group (female, younger and less experienced teachers) to report using research evidence in practice in most respects. The results obtained did not provide convincing evidence that teachers with a Master's degree or equivalent, or those with a Bachelor's degree or equivalent were comparatively less or more likely to report using research evidence in practice. These results may be examined again in future research addressing similar subgroups.

10.3 The findings of the impact evaluation

Of the 46 teachers who took part in the evaluation, 25 completed both the pre-survey and post-survey, which represents an overall (treatment and control) dropout of 46% at the participant level. Readers should therefore interpret the results reported here with caution.

10.3.1 What is the impact of disseminating research evidence through workshop training with supporting evidence-based resources on teachers' attitudes towards research evidence and their (self-reported) use of research evidence?

The results of the impact evaluation indicated that the intervention (workshop training with supporting evidence-based resources) was not promising to improve teachers' general attitudes towards the research evidence. None of the eight questions relating to teachers' general attitudes towards research evidence provided convincing evidence of a beneficial impact from the intervention.

Teachers were also asked a further seven questions regarding influences that might affect their adoption of a new intervention. These results were once again not encouraging. Lower gains for all seven questions, except for the first one (that an intervention based on evidence) would be reasonable for the treatment group as they may lead to harmful impact in practice. In all respects, however, the treatment group were behind compared to the control group in terms of gains from the pre- to post survey. This indicates no convincing evidence of a beneficial impact from the intervention.

Teachers were asked 18 questions about their (self-reported) use of research evidence. The results were mixed. The treatment group were behind in gains compared to the control group from pre-to post survey in most respects. Overall, therefore, there was no convincing evidence of a beneficial impact on teachers' (self-reported) use of research evidence from the intervention.

A possible explanation for the negative findings may be that the intervention could have led teachers to become more sceptical of research evidence in general, rather than becoming more discriminating when deciding between robust and weak evidence. The intervention intended to help teachers understand and interpret research evidence, and did highlight the importance of judging and assessing the trustworthiness of research evidence considering not all evidence is equal. Moreover, teachers were given some real-life examples and discussed these by addressing evidence of approaches that may not actually be trustworthy. These might have led the treatment participants to become more concerned about trusting and using research evidence, without making them sufficiently confident regarding how to make their judgements informed regarding quality of evidence. We may refer to a study by Nägel et al. (2022) to support this explanation. The authors found that increasing teachers' scepticism toward research knowledge might reduce their use of research evidence in practice.

Alternatively, the teachers may have found identifying good research evidence more demanding than expected. As mentioned in the literature review, a single study, even if it is an RCT, which is considered the 'gold standard' for evaluations (Torgerson & Torgerson, 2020), may not be sufficient to provide conclusive answers for education. Therefore, the literature emphasised the importance of systematic reviews and meta-analyses to deal with the issues and barriers regarding single studies (Gorard et al., 2020a; Higgins, 2020). In addition, as Gorard et al. (2020a) pointed out, the quality of evidence from any piece of research should also be judged by taking account of its chief characteristics, such as design and research sample. Given these, we can suggest that judging the quality of research evidence is not straightforward. In conclusion, the treatment teachers may have felt less enthusiastic about research evidence in their practice considering that they may have become more aware of the challenges and difficulties identifying high-quality evidence, get it into practice and achieve a beneficial impact.

Another possible explanation might be that teachers may have been more discriminating between robust and weak research evidence, and thus used only high-quality research evidence in their practice. In other words, teachers may have replaced previous research evidence they had used with high-quality research evidence. In the literature, surveys often involve questions asking about teachers' use of "evidence", or "research" or "research evidence" without referring the quality of evidence. Similarly, in the current study the teachers were asked whether they use research evidence in their practice. Therefore, one scenario is that teachers' use of research evidence may have remained the same, but the quality of that evidence may have been improved, which may have led to improvements in student outcomes. In summary, we might not increase teachers' attitudes or use of "research evidence" in practice, but may still see a beneficial impact on student attainment if teachers replace "evidence" they use with "high-quality research evidence".

Given these possible scenarios mentioned above, quality of evidence, and how and who judges it should be considered key issues when interpreting the findings of the current study and planning further research; as is addressed in the implications of the current study. Another systematic review conducted by Gorard et al. (2020a) indicated that giving access to plain or partially simplified research evidence was ineffective to get research evidence into use. In their study, the results were still negative or inconclusive when knowledge-brokers disseminated such evidence to users using short courses. Their study indicated that a promising way might be disseminating engineering evidence to users actively or iteratively through a trusted conduit. Although the model suggested by Campbell and Levin (2012) involves mediators/intermediaries, users should have skills, knowledge and time to be able to find and interpret relevant research evidence. Given the findings of the current study, it seems that such light support with mediators might be insufficient for teachers when we expect them to find, interpret and use plain or partially simplified research evidence. Also, efforts to improve teachers' skills and knowledge about research evidence might make teachers more concerned about trusting research evidence, without making them sufficiently confident regarding how to identify and use robust evidence, which was one of the possible scenarios to explain the findings of the current study.

The impact evaluation in this study was an RCT, which was subject to high dropout due to Covid-19. Thus, the results may have been affected by bias and chance, and led to negative results.

The participants were given workshop training with evidence-based resources, e.g., an evidence kit and research summaries. Given the participants' views during this workshop (see section 9.1.2.2 for further details), another explanation might be that teachers may have found the research summaries and evidence kits, which are often considered useful (allegedly) and easier to understand, difficult to interpret and use.

As mentioned before, the descriptive results from the systematic review indicated that studies generating weak evidence typically show more positive results compared to those providing higher-quality evidence. Given the low-quality of evidence on the intervention based on workshop training with supporting evidence-based resources (multi active-component approach) in the review, the studies demonstrating a beneficial impact on this approach may have been affected by other factors, such as bias or chance, leading to positive results even if the actual impact was negative or inconclusive. Perhaps, hence, the last explanation is that workshop training with supporting evidence-based resources might be an ineffective method to disseminate evidence to teachers, and thus getting evidence into use might require further efforts or alternative dissemination approaches.

10.3.2 Does the impact of disseminating research evidence through workshop training with supporting evidence-based resources on teachers' attitudes towards research evidence and their use of research evidence differ according to their demographic characteristics?

The impact of the intervention on teachers' attitudes towards research evidence, and their (self-reported) use of research evidence were addressed according to the following demographic characteristics: gender, age, job, experience and degree. The results by subgroups, especially for gender and degree, should be interpreted with caution, due to the unbalanced distribution of the participants.

In terms of teachers' general attitudes towards the use of research evidence, the results were mixed or discouraging for all subgroups after the intervention. Comparisons of the subgroups yielded some meaningful results. In most respects, the intervention seems to have had a greater harmful or less beneficial impact on teachers who were male, older, headteachers/principals, experienced, held only a Bachelor's degree or equivalent compared to their comparison subgroup (teachers who were female, younger, classroom teachers, less experienced, with a Master's degree or equivalent).

Meanwhile, the results detailing influences that may affect teachers' adoption of a new intervention demonstrated no convincing evidence of a beneficial impact on any subgroup aside from less experienced teachers. After the intervention, less experienced teachers in the treatment group were more likely than their comparison group to say that they would adopt a new intervention based on evidence, and less likely to report using a new intervention in all other circumstances which may lead to negative or harmful impact in practice. Using a new intervention based on evidence avoiding others might be considered preferable, and thus we can consider the results regarding the influences encouraging for less experienced teachers. A possible explanation for this might be that less experienced teachers may have tended to be more receptive to ideas shared in the workshop compared to experienced teachers, considering that experienced teachers might have taken part in a number of evaluations in their lives and had lengthier teaching careers, which may have made them more resistant to change. While less experienced teachers may be satisfied with new interventions, experienced teachers' enthusiasm may wane during an intervention period. However, the results above only indicate teachers' reported attitudes rather than their use of research evidence in practice. Whether the results about teachers' (self-reported) use of research evidence demonstrated a beneficial impact on less experienced teachers or any of the subgroups from the intervention is addressed below.

The findings regarding the teachers' (self-reported) use of research evidence were mixed, and not encouraging in any of the subgroups. Overall there was no convincing evidence that the treatment had a greater harmful or beneficial impact on any of the subgroups' (self-reported) use of research evidence when compared to their comparison subgroup. However, the results by age were more convincing and meaningful. In most respects, the treatment was less effective or more harmful for older teachers than younger teachers in terms of getting evidence into use. As mentioned above, less experienced teachers were more likely than experienced teachers to report that they would adopt an intervention based on research evidence, but the results here indicated that they were no more likely than experienced teachers to report using research evidence in practice. Perhaps less experienced teachers in the treatment group may have intended to use research evidence, but experienced barriers (e.g., lack of skills and knowledge about research evidence) that may have prevented them from doing so.

CHAPTER 11
Implications and conclusion

This chapter summarises some of the limitations of the systematic review and impact evaluation, and then presents the implications and conclusions of the study.

11.1 Limitations of the systematic review

A traditional literature review only identified a few studies that evaluated one or more ways of disseminating research evidence to teachers. Therefore, a large-scale systematic review with broad inclusion criteria was conducted. Although the review included weak pre-post evaluations in addition to RCTs, the number of studies identified was only 24. The intention of reviewing these was to reveal existing evidence on a variety of possible dissemination approaches rather than a predetermined route. Although the dissemination approaches described in the papers reviewed were classified into broad categories, there were only a few studies for each. The identification of only a few studies per dissemination route can be considered a limitation of the current study.

A further issue to consider here as a limitation was the quality of the studies included. Of the 24 studies discussed, only four were rated higher than 2🔒 (out of 4🔒), meaning that only a few studies provided even moderate quality evidence. This made it difficult to reach clear conclusions regarding the majority of the dissemination approaches (except for the passive ones, sometimes with active support).

We cannot claim that the systematic review identified all possible relevant studies; thus, missing reports may represent a limitation of this review. However, the issue is not whether studies were missed, but whether these hard to find studies would have changed the overall conclusions.

11.2 Limitations of the impact evaluation

For the evaluation phase of the study, a total of 46 teachers were recruited at baseline, which represents a relatively small-scale RCT. Compared to studies addressing end-user outcomes (e.g., student attainment), studies involving teachers tend to involve a smaller sample size. However, 46 teachers might still be considered a limited number of participants for a RCT. Therefore, the first limitation to mention is the sample size for the evaluation.

A further concern was that the study was affected by the Covid-19 pandemic in terms of the high number of missing cases. Due to the pandemic, participants were given extra time to complete the post-survey. Nevertheless the study still faced a considerable dropout rate for the post-survey. The missing cases are perhaps unsurprising, as they typically arise in any evaluation involving pre-post evaluations through surveys. However, the pandemic increased the number of missing cases. The attrition rates calculated at student level for the treatment, control and overall were 52%, 38% and 46% respectively.

In order to investigate how these missing cases may have affected the results, a sensitivity analysis and mean scores comparison were performed. For the sensitivity analysis, "The number of counterfactual cases that would be needed to disturb the finding (NNTD)" (Gorard et al., 2017, p.45) was computed. As the NNTD rises, the number of missing cases (or counterfactual cases) needed to reverse the effect increases. As a consequence of the considerable dropout, the NNTD scores were smaller than the number of missing cases for each item (n=21). It emerged that if the missing cases had completed the post-survey against the impact found in the current study, they could have reversed the impact. Of course, this does not mean that the results would certainly have been different if the missing cases completed the post-survey. The NNTD is a very stringent test.

The current study also compared the mean scores for the pre-survey between participants who completed only pre-survey and those who completed both pre-survey and post-surveys. It indicated a possibility that some of the items may have been affected by bias or other factors. In addition, the subgroup analysis involved smaller sample sizes for the cells, some of which were not balanced. Taking these concerns together, readers should interpret the results with caution, particularly with regard to the smaller subgroup analyses.

11.3 Implications

The standard literature reviewed highlighted a need to make research evidence readily available and more useful (see Higgins, 2020; Nelson & O'Beirne, 2014; See, 2020), and this was supported with the views of educators in practice (see Williams & Coles, 2003). In the literature, the term useful was used to refer to allegedly simpler forms of evidence, which teachers or users can easily understand and use. Over recent decades, hence, many efforts have been undertaken to translate evidence from primary studies (journal papers) into research summaries, website portals or toolkits, as they are thought to be more useful than plain evidence. These efforts were explained well by White (2020), who employed an evidence architecture showing the stages of evidence translation thus far. However, one of the clearest findings to emerge from the systematic review is that simply disseminating research evidence passively to teachers, including sharing research summaries or evidence-based recourses such as evidence kits, did not work in practice. Even if this process was sometimes supported by light active support, there was still no convincing evidence of a beneficial impact. This finding was supported by some of the highest quality evidence in the review. Therefore, one clear implication was that researchers, providers or educators should not merely rely on passive dissemination approaches (sharing research summaries or toolkits with users) to get evidence into use or hope to see a beneficial impact in practice. However, it is important to note that this does not mean we should give up on translating research evidence into a simpler form to make it easier for educators or researchers to use. The findings simply underline the need to we should also make further efforts to get evidence into use after such translation.

The systematic review indicated that technology-supported routes, embedding evidence in the curriculum and active multi-component dissemination approaches were the most promising. Although there was no high-quality evidence indicating that these approaches were effective, there was no high-quality evidence showing any harmful or negative impacts for them either. The current study addressed the review findings and adopted an intervention involving workshop training with supporting evidence-based resources as an active multi-component dissemination approach, considering budget and time. The impact evaluation indicated no convincing evidence of a beneficial impact on teachers' attitudes towards research evidence or their (self-reported) use of research evidence. In some respects, there were improvements in terms of research use, but these were not enough to provide convincing evidence from an overall perspective.

Given the findings of the review and the impact evaluation, researchers, policymakers or educators should bear in mind that getting evidence into use, and generating a beneficial impact is not straightforward process. The results here indicate that further efforts, perhaps more comprehensive ones, should be made. In this regard, researchers, funders, and foundations such as the EEF, which was the main provider of high-quality studies included in the review, should focus on more advanced dissemination approaches, taking account of the findings of the current study. Perhaps they may also choose to support and fund studies addressing technology-supported routes, embedding evidence in curriculum compared with other approaches. Or at the very least they should bear in mind that simply disseminating research evidence does not work.

In particular, the findings relating to embedding evidence in a curriculum as a dissemination approach can be seen as more promising than most other approaches, considering the similar findings of the review by Gorard et al. (2020a), which suggest that research evidence can be heavily translated into a useful form (engineering evidence) so that users may use it regardless of their knowledge of that evidence. This is also consistent with the claims made in the current study, which argues a scenario whereby teachers use a curriculum or other resources in which evidence is already embedded, may overcome many of the barriers (e.g., teachers' skills, workload, attitudes) to getting evidence into use. As mentioned before, this then makes the method for disseminating research evidence an umbrella issue in some respects. This finding may also partially explain why we should continue to translate research evidence into simpler forms considering that researchers could easily benefit from existing research summaries or toolkits to embed research evidence into curriculum or other resources.

The current study mainly addressed two issues while discussing the negative or inconclusive results of the impact evaluation. As mentioned previously, as a result of the intervention highlighting the importance of judging the trustworthiness and quality of research evidence, teachers may have ended up being more sceptical about all research evidence rather than discriminating between weak and high-quality evidence. Given this scenario, we should perhaps not ask teachers to identify high-quality research evidence to fit their practice. It may be better if teachers were given training on how best to use high-quality research evidence, rather than on how to identify it. This implication also requires us to reconsider who should judge the quality of research evidence, and by applying what criteria. Perhaps more effort is required to generate high-quality evidence addressing a wide range of educational issues. After which, research providers, conduits or intermediaries, and research centres should then focus on identifying robust research evidence rather than expecting teachers to do so. Considering the growing capacity and knowledge regarding how to judge the quality of research evidence in the aforementioned actors, the identification of robust evidence can be done before teachers are introduced to any teaching approach. Moreover, researchers or intermediaries may play a crucial role in presenting such robust evidence to teachers.

In the second scenario, teachers might have been more discriminating between good and bad evidence, and thereby using only robust evidence, avoiding approaches based on weak evidence. We should address whether this is harmful for student outcomes or not, compared to the misuse of evidence or use of unreliable evidence, due to the fact that the replacement of weak evidence with robust evidence may also lead to a beneficial impact in practice even if there is no increase in evidence use. Given this possibility, we may still wish to train teachers to identify robust evidence and use it in their practice, assuming they will use effective strategies and avoid adopting ineffective ones. Therefore, we may reconsider our efforts with regard to changing teachers' attitudes to "research evidence" and getting it into use, as positive attitudes towards weak research evidence could be harmful. In order to determine whether teachers only select high-quality evidence, we would need to redesign our interventions, outcome measures and data collections instruments according to the distinction between use of "high-quality research evidence" and "weak evidence", which is addressed in the implications for future research.

Even if the current study did not yield secure evidence by subgroups, it indicated that the impact of the intervention on teachers' attitudes towards research evidence and their use of research evidence differed among some of the subgroups (e.g., experience, age) in some respects. This means that how to best disseminate research evidence to teachers may vary depending on teachers' demographic characteristics.

The pre-survey results indicated that teachers' (self-reported) use of research evidence was limited in practice, particularly compared to their attitudes towards research evidence. Perhaps we should focus more on research use and end-user outcomes, considering that positive attitudes towards research evidence do not guarantee improved research use and student outcomes. As mentioned in the discussion, teachers might encounter difficulties in getting evidence into use even if they wish to use it. We should consider here issues such as teachers' skills and workload when addressing the question of how research evidence should be disseminated to teachers. The results by subgroups demonstrated that headteachers/principals were much more likely than classroom teachers to report using research evidence in all respects, which means that research use in practice may vary depending on the subgroup. In this respect, we should also address issues in EBP accounting for teachers' demographic characteristics. Some teachers may face more difficulties and benefit less from research evidence compared to others.

The MAGIC model presented in the literature review (Cabinet Office, 2018) seems a top-down approach and suggests that research evidence should be translated into a format that users can easily comprehend, interpret and utilise. This model might give more information about what form of evidence can be considered more useful, perhaps discriminating between partially simplified (e.g., research summaries) and heavily translated (engineering) research evidence. The model might also consider involving more active, particularly advanced, components with further support.

The literature review shows that most teachers have no sufficient time and skills to find, interpret and use evidence. Moreover, efforts to improve teachers' skills and knowledge may unintentionally lead them to develop sceptical attitudes towards all research evidence, without make them confident regarding how to judge the quality of research evidence. The model suggested by Campbell and Levin (2012) might consider who and how can or should identify robust evidence. In the model, perhaps mediators/intermediates might identify robust evidence and heavily translate it into useful format so that teachers might use it even if they have no sufficient time and skills to find and interpret evidence.

The models suggested by Rickinson et al. (2020) and the EPPI Centre (Gough et al., 2021) involves 'engagement' with research evidence. In particular, the model by Rickinson et al. (2020) embraces an evidence-informed model and advocates that users should be active recipients and engage critically with evidence. Given the findings of the current study indicating no convincing evidence that collaborative approaches allowing teachers to engage with plain or partially simplified evidence were effective, these models might also take account of the form of evidence when they expect users to engage with research evidence. Users might be less likely to benefit from plain or partially simplified evidence even if they become active and engage with research evidence.

11.3.1 Implications for future research

The findings of the systematic review further confirm that there is a lack of causal evidence on how best to disseminate research evidence to teachers, considering that the review identified a few studies providing moderate or high-quality evidence. This finding is considered important as it supports the rationale of the current study, also providing a rationale for further research on how to best disseminate research evidence. In order to ascertain the effectiveness of various dissemination approaches, further studies, particularly

RCTs involving a large-sample size with lower missing data, are needed. Researchers may also take account of the findings of the current systematic review and design their studies to contribute to this research area. This might save time for their study and leave them a longer time period to test a dissemination approach, measuring student attainment.

Although the screening also involved studies identified through search alerts after the first search in February 2019, there might still be missing recent studies, perhaps hard to find studies. Therefore, researchers should keep searching recent studies, adopting the search strings used in the current study or developing their own search strings. Future studies, both single studies and systematic reviews, can improve the findings of the current systematic review.

The current study indicated that all dissemination routes apart from the passive dissemination approaches (sometimes with active support) are worthy of investigation through large-scale trials. Of course, further research might produce different results or strengthen the existing evidence on passive approaches, which might also be considered important. However, it is crucial for researchers and educators to use their time and budgets effectively. In this respect, further studies might particularly focus on technology supported routes and embedding evidence into the curriculum. In the review, there were no studies showing a negative impact for these approaches, although the included studies were weak in terms of providing high-quality of evidence.

The author intended to conduct an efficacy trial through an RCT, but the impact evaluation carried out in the current study was affected by the Covid-19 pandemic, in the form of dropouts. Therefore, it should be repeated to provide more secure evidence on the intervention. In order to provide more robust evidence, an RCT with a large-sample size should be undertaken. The data collection instrument used in the evaluation here can be considered too long for participants. Future research may also consider placing a higher value on student outcomes than teachers' attitudes. Considering educational research is aimed at improving teaching and thereby student attainment, further studies perhaps may remove the attitude scale and focus on use of research evidence and its impact on pupils.

After the intervention, it might be useful to establish whether teachers then apply more robust evidence by discriminating high-quality and weak evidence. Therefore, future research may address the distinction between using "research evidence" and "high-quality research evidence" when designing data collection instruments. Also, involving student outcomes might be considered a useful way to determine whether there is progress when teachers replace practices based on weak evidence with those based on robust evidence.

As mentioned before, since the current study did not intend to disseminate a piece of certain research evidence and expect teachers/headteachers to use it 'accurately' in practice, the fidelity was not measured. Perhaps future studies may also involve questions assessing teachers' knowledge about research evidence as such data might be used to check to what extent teachers are actually receptive in the workshop training, or benefit from the training. A pre-post test involving questions about 'knowledge' might at least show whether the training really help teachers to understand research evidence.

The review demonstrated that studies on attitudes and evidence use tended to show a positive impact compared to those addressing end-user outcomes. Furthermore, weak studies were more likely than high-quality ones to yield positive results. Perhaps we may be more sceptical about the "beneficial impact" shown by studies involving only outcomes related to attitudes and evidence use. Such studies may have been subject to bias or other obstacles, such as conflict of interest (Col), thereby indicating a beneficial impact even if the actual impact was negative. Therefore, robust studies involving end-users outcome measures should be encouraged.

10.5 Conclusion

In the standard literature review, many researchers and educators, particularly those who are the proponents of the EBP movement, have emphasized the importance of using research evidence in practice. Over recent decades, therefore, there have been a variety of efforts to generate and summarise high-quality research evidence relating to issues in education. Even though there have been considerable improvements in terms of employing high-quality evaluations and generating more secure evidence on what works in teaching, minimal attention has been paid towards how best to disseminate such research evidence to users, thereby leading to no equivalently high-quality evidence regarding the effectiveness of dissemination approaches in EBP (Gorard et al., 2020a). Indeed, there have been numerous written works and suggestions detailing how to disseminate research evidence to users, but the majority of these were not based on causal evidence. This study attempted to contribute to this neglected area of research by investigating how best to disseminate research evidence to teachers.

In this regard, the current study was conducted to reveal existing evidence on the most effective ways to disseminate research evidence to teachers, and then investigate the impact of one promising approach (based on the review findings) on teachers' attitudes towards research evidence and their use of research evidence in practice. A large-scale systematic review was carried out, involving a comprehensive search and broad inclusion criteria. The review found a total of 68,817 records, and included 24 of these in the analysis. Unsurprisingly, most of these studies were weak in terms of generating high-quality evidence. In addition, since the systematic review embraced a wide range of dissemination approaches and outcome measures, the number of studies for each dissemination approach or outcome measure was much more limited. This further confirms the claim made in the standard literature review, suggesting that too little attention has been directed towards how to disseminate research evidence to teachers supporting the rationale of the current study.

The best evaluations in the systematic review involved passive dissemination approaches (with or without active support) such as sharing research summaries or evidence-based resources with teachers. The clearest finding presented was that such dissemination of research evidence, even sometimes with active support, did not work to get evidence into use and improve student attainment. The standard literature review suggested a need to translate research evidence into allegedly more usable forms, such as research summaries and evidence kits. The systematic review findings showed we need to make further efforts rather than relying only on such passive dissemination.

As noted by Gorard et al. (2020a), avoiding ineffective approaches is crucial not to waste sources such as time and budget. Therefore, researchers and educators should focus on more promising approaches, rather than simply sharing research summaries and evidence-based resources with teachers. The results of the systematic review indicated that embedding evidence in the curriculum, technology-supported routes and active multi-component approaches may be considered more promising when disseminating research evidence to teachers compared to other approaches in the review. Even if these approaches were only supported by weak evidence, there were at least no high-quality studies demonstrating that they did not work.

Based on the systematic review findings, an RCT was conducted to examine the impact of an intervention involving workshop training with extra supporting evidence-based resources on teachers' attitudes towards research evidence and their (self-reported) use of research evidence in practice. The intervention was considered part of an active multi-component approach in the review. The intervention was also chosen considering both the review findings and other factors such as time and budget. In total, 46 teachers were recruited from nine primary schools, randomly allocated to treatment (n=4) or control (n=5), in England. All the teachers (treatment 25 and control 21) were asked to complete a survey before and after the intervention. Of the 46 teachers, 25 completed both the pre and post-survey, which led to a high dropout rate. The impact evaluation involved 25 teachers who completed both the pre and post-survey in the analysis. Missing cases are quite common in an evaluation study when participants are asked to complete a pre and post-survey, but the Covid-19 pandemic made this considerable in the current study. Therefore, the results should be treated with caution by readers.

Prior to the analysis of the impact evaluation, the study presented the findings of the pre-survey indicating all teachers' (n=46) attitudes towards research evidence and their (self-reported) use of research evidence before the intervention. The pre-survey analysis found that even if teachers reported positive attitudes in general towards research evidence, their (self-reported) use of research evidence was limited in practice, particularly relative to their attitudes. This finding was mostly consistent with the previous studies in the literature review. Given these, we can suggest that positive attitudes towards research evidence do not ensure getting evidence into use. This study also examined whether the results varied depending on teachers' demographic characteristics (subgroups). Overall, the results by subgroup were mostly mixed or insufficiently convincing to yield a clear conclusion. The most convincing evidence was that headteachers/principals were more likely than classroom teachers to report using research evidence in practice in all respects. This shows that teachers' use of research evidence in practice may differ based on their demographic characteristics, which makes it valuable to address issues associated with EBP by the subgroups.

The impact evaluation found no convincing evidence of a beneficial impact on teachers' attitudes towards research evidence, or on their (self-reported) use of research evidence. There were only positive changes in teachers' (self-reported) use of research evidence in some cases. From an overall perspective, however, the results were not encouraging. The intervention emphasized the importance of judging the quality of research evidence. Teachers might have been more sceptical about all research evidence rather than being selective about choosing between robust and weak evidence. Alternatively, teachers might have used robust evidence and avoided approaches based on weak evidence, thereby leading to the same level use of evidence discriminating between good and bad.

The key issue to consider is who should judge the quality of evidence. Perhaps teachers should be given evidence that has already been found to be robust by researchers, research centres or intermediates, rather than asking them to identify high-quality evidence. Another implication might be that researchers should take account of the distinction between using "high-quality evidence" and "weak evidence" when they design their evaluation due the fact that the same level use of evidence may lead to a beneficial impact if teachers replace weak evidence they used with high-quality evidence.

The impact evaluation did not provide secure and convincing evidence by subgroups, particularly smaller groups. Compared to other the subgroups, results by experience and age might be considered relatively more meaningful. In terms of attitudes, the intervention had a bigger beneficial or less harmful impact on less experienced teachers than experienced teachers. The intervention even improved less experienced teachers' attitudes towards research evidence in some respects. In terms of research use, the intervention led to a less harmful or bigger beneficial impact on younger teachers than older teachers in most respects. Perhaps experienced and older teachers may have been more resistant to change, considering their greater experience in teaching. However, these findings should be interpreted with caution, due to the small-sample size and dropout rates. Since this study encountered a high level of dropout due the Covid-19 pandemic, the evaluation should be repeated with an RCT using a larger-sample size with a lower dropout rate.

The systematic review and the pre-survey analyses indicated that teachers' attitudes towards the use of research evidence were often positive, but that issues often arose in getting evidence into use, and particularly in improving student attainment. Further studies may consider removing questions relating to attitudes to decrease the number of questions in the survey, and should also involve student attainment as an outcome measure, perhaps involving a longer term for the intervention. Overall, the findings of the systematic review and impact evaluation highlight a need for further studies, particularly high-quality evaluations. In particular, research centres and foundations may play a crucial role in providing more robust causal evidence as to how best to disseminate research evidence to users, rather than merely addressing what works in teaching.

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Appendices

Appendix A. The search history and number of hits

A-1. The number of studies found through primary and secondary search

Databases / Search Engine	Number of records*	Number of records**
Applied Social Sciences Index and Abstracts – ASSIA	2,330	2,262
Australian Education Index – AEI	1,723	1,717
British Education Index – BEI	457	457
Educational Resources Information Center – ERIC	9,725	9,477
International Bibliography of the Social Sciences – IBSS	6,002	5,607
PsychINFO	6,717	6,717
Scopus	13,388	13,388
ProQuest dissertations and theses global	15,893	15,087
Social Services Abstracts – SSA	1,108	1,090
Social Science Citation Index – SSCI	7,820	7,820
Google Scholar	2,949	2,949
Total	68,112	66,571
Complementary Search		1,237
Search Alerts		1,009
Total		68,817

*The number of records shown in the search results
** The number of records that can be exported

A-2. The search history by electronic databases

Applied Social Sciences Index and Abstracts (ASSIA)

Set	Search	Databases	Results
S1	noft((("Research knowledge" OR evidence) NEAR/2 (use OR used OR using OR utilis* OR utiliz* OR uptak* OR transf* OR translat* OR modif* OR engag* OR summar* OR access* OR disseminat* OR mobilis* OR mobiliz* OR implement* OR present* OR bring* OR push* OR shar*)) OR (research NEAR/1 (use OR used OR using OR utilis* OR utiliz* OR transf* OR translat* OR disseminat*)) OR ("evidence into practice" OR "research into practice")) AND noft(facilitat* OR improv* OR promot* OR increas* OR develop* OR support* OR effective* OR better OR best OR strateg* OR pathway* OR intervention) AND noft(education OR school* OR college* OR classroom* OR teach* OR learn* OR educator* OR student* OR children OR pupil* OR achiev* OR attainment OR exam* OR attendance) NOT noft(health* OR dent* OR medic* OR nurses OR nursing OR clinic*) Limits applied	Applied Social Sciences Index & Abstracts (ASSIA)	2,330

Australian Education Index (AEI)

Set	Search	Databases	Results
S1	noft((("Research knowledge" OR evidence) NEAR/2 (use OR used OR using OR utilis* OR utiliz* OR uptak* OR transf* OR translat* OR modif* OR engag* OR summar* OR access* OR disseminat* OR mobilis* OR mobiliz* OR implement* OR present* OR bring* OR push* OR shar*)) OR (research NEAR/1 (use OR used OR using OR utilis* OR utiliz* OR transf* OR translat* OR disseminat*)) OR ("evidence into practice" OR "research into practice")) AND noft(facilitat* OR improv* OR promot* OR increas* OR develop* OR support* OR effective* OR better OR best OR strateg* OR pathway* OR intervention) AND noft(education OR school* OR college* OR classroom* OR teach* OR learn* OR educator* OR student* OR children OR pupil* OR achiev* OR attainment OR exam* OR attendance) NOT noft(health* OR dent* OR medic* OR nurses OR nursing OR clinic*) Limits applied Databases: Australian Education Index Limited by: Date: After 01 January 2000	Australian Education Index	1,723

British Education Index (BEI)

S3	(AB (("Research knowledge" OR evidence) N2 (use OR used OR using OR utilis* OR utiliz* OR uptak* OR transf* OR translat* OR modif* OR engag* OR summar* OR access* OR disseminat* OR mobilis* OR mobiliz* OR implement* OR present* OR bring* OR push* OR shar*)) OR (research N/1 (use OR used OR using OR utilis* OR utiliz* OR transf* OR translat* OR disseminat*)) OR ("evidence into practice" OR "research into practice") AND AB facilitat* OR improv* OR promot* OR increas* OR develop* OR support* OR effective* OR better OR best OR strateg* OR pathway* OR intervention AND AB education OR school* OR college* OR classroom* OR teach* OR learn* OR educator* OR student* OR children OR pupil* OR achiev* OR attainment OR exam* OR attendance NOT AB health* OR dent* OR medic* OR nurses OR nursing OR clinic*) AND (S1 OR S2) Show Less	**Search modes** - Boolean/Phrase	**View Results** (457)

Educational Resources Information Center (ERIC)

	Set	Search	Databases	Results
☑	S2	⊟ noft((("Research knowledge" OR evidence) NEAR/2 (use OR used OR using OR utilis* OR utiliz* OR uptak* OR transf* OR translat* OR modif* OR engag* OR summar* OR access* OR disseminat* OR mobilis* OR mobiliz* OR implement* OR present* OR bring* OR push* OR shar*)) OR (research NEAR/1 (use OR used OR using OR utilis* OR utiliz* OR transf* OR translat* OR disseminat*)) OR ("evidence into practice" OR "research into practice")) AND noft(facilitat* OR improv* OR promot* OR increas* OR develop* OR support* OR effective* OR better OR best OR strateg* OR pathway* OR intervention) AND noft(education OR school* OR college* OR classroom* OR teach* OR learn* OR educator* OR student* OR children OR pupil* OR achiev* OR attainment OR exam* OR attendance) NOT noft(health* OR dent* OR medic* OR nurses OR nursing OR clinic*) ✓ Limits applied Databases: ERIC Limited by: Date: After January 01 2000 Language: English	ERIC	9,725

International Bibliography of the Social Sciences (IBSS)

	Set	Search	Databases	Results
☑	S4	⊟ noft((("Research knowledge" OR evidence) NEAR/2 (use OR used OR using OR utilis* OR utiliz* OR uptak* OR transf* OR translat* OR modif* OR engag* OR summar* OR access* OR disseminat* OR mobilis* OR mobiliz* OR implement* OR present* OR bring* OR push* OR shar*)) OR (research NEAR/1 (use OR used OR using OR utilis* OR utiliz* OR transf* OR translat* OR disseminat*)) OR ("evidence into practice" OR "research into practice")) AND noft(facilitat* OR improv* OR promot* OR increas* OR develop* OR support* OR effective* OR better OR best OR strateg* OR pathway* OR intervention) AND noft(education OR school* OR college* OR classroom* OR teach* OR learn* OR educator* OR student* OR children OR pupil* OR achiev* OR attainment OR exam* OR attendance) NOT noft(health* OR dent* OR medic* OR nurses OR nursing OR clinic*) ✓ Limits applied Databases: International Bibliography of the Social Sciences (IBSS) Limited by: Date: After January 01 2000 Language: English	International Bibliography of the Social Sciences (IBSS)	6,002

PsychINFO

S3	(AB (("Research knowledge" OR evidence) N2 (use OR used OR using OR utilis* OR utiliz* OR uptak* OR transf* OR translat* OR modif* OR engag* OR summar* OR access* OR disseminat* OR mobilis* OR mobiliz* OR implement* OR present* OR bring* OR push* OR shar*)) OR (research N/1 (use OR used OR using OR utilis* OR utiliz* OR transf* OR translat* OR disseminat*)) OR ("evidence into practice" OR "research into practice") AND AB facilitat* OR improv* OR promot* OR increas* OR develop* OR support* OR effective* OR better OR best OR strateg* OR pathway* OR intervention AND AB education OR school* OR college* OR classroom* OR teach* OR learn* OR educator* OR student* OR children OR pupil* OR achiev* OR attainment OR exam* OR attendance NOT AB health* OR dent* OR medic* OR nurses OR nursing OR clinic*) AND (S1 OR S2) Show Less	**Search modes** - Boolean/Phrase	View Results (6,717)

Scopus

2	TITLE-ABS ((education OR school* OR college* OR classroom* OR teach* OR learn* OR educator* OR student* OR children OR pupil* OR achiev* OR attainment OR exam* OR attendance) AND ((("research knowledge" OR evidence) W/2 (use OR used OR using OR utilis* OR utiliz* OR uptak* OR transf* OR translat* OR modif* OR engag* OR summar* OR access* OR disseminat* OR mobilis* OR mobiliz* OR present* OR bring* OR push* OR shar*)) OR (research W/1 (use OR used OR using OR utilis* OR utiliz* OR transf* OR translat* OR disseminat*)) OR ("evidence into practice" OR "research into practice")) AND (facilitat* OR improv* OR promot* OR increas* OR develop* OR support* OR effective* OR better OR best OR strateg* OR pathway* OR intervention) AND NOT (health* OR dent* OR medic* OR nurses OR nursing OR clinic*)) AND (LIMIT-TO (PUBYEAR , 2019) OR LIMIT-TO (PUBYEAR , 2018) OR LIMIT-TO (PUBYEAR , 2017) OR LIMIT-TO (PUBYEAR , 2016) OR LIMIT-TO (PUBYEAR , 2015) OR LIMIT-TO (PUBYEAR , 2014) OR LIMIT-TO (PUBYEAR , 2013) OR LIMIT-TO (PUBYEAR , 2012) OR LIMIT-TO (PUBYEAR , 2011) OR LIMIT-TO (PUBYEAR , 2010) OR LIMIT-TO (PUBYEAR , 2009) OR LIMIT-TO (PUBYEAR , 2008) OR LIMIT-TO (PUBYEAR , 2007) OR LIMIT-TO (PUBYEAR , 2006) OR LIMIT-TO (PUBYEAR , 2005) OR LIMIT-TO (PUBYEAR , 2004) OR LIMIT-TO (PUBYEAR , 2003) OR LIMIT-TO (PUBYEAR , 2002) OR LIMIT-TO (PUBYEAR , 2001) OR LIMIT-TO (PUBYEAR , 2000)) AND (LIMIT-TO (SUBJAREA , "SOCI")) AND (LIMIT-TO (LANGUAGE , "English")) View Less	13,388 document results

ProQuest dissertations and theses global

Set	Search	Databases	Results
S2	noft((("Research knowledge" OR evidence) NEAR/2 (use OR used OR using OR utilis* OR utiliz* OR uptak* OR transf* OR translat* OR modif* OR engag* OR summar* OR access* OR disseminat* OR mobilis* OR mobiliz* OR implement* OR present* OR bring* OR push* OR shar*)) OR (research NEAR/1 (use OR used OR using OR utilis* OR utiliz* OR transf* OR translat* OR disseminat*)) OR ("evidence into practice" OR "research into practice")) AND noft(facilitat* OR improv* OR promot* OR increas* OR develop* OR support* OR effective* OR better OR best OR strateg* OR pathway* OR intervention) AND noft(education OR school* OR college* OR classroom* OR teach* OR learn* OR educator* OR student* OR children OR pupil* OR achiev* OR attainment OR exam* OR attendance) NOT noft(health* OR dent* OR medic* OR nurses OR nursing OR clinic*) Limits applied Databases: ProQuest Dissertations & Theses Global Limited by: Date: After December 31 1999 Language: English	ProQuest Dissertations & Theses Global	15,893

Social Services Abstracts (SSA)

Set	Search	Databases	Results
S1	noft((("Research knowledge" OR evidence) NEAR/2 (use OR used OR using OR utilis* OR utiliz* OR uptak* OR transf* OR translat* OR modif* OR engag* OR summar* OR access* OR disseminat* OR mobilis* OR mobiliz* OR implement* OR present* OR bring* OR push* OR shar*)) OR (research NEAR/1 (use OR used OR using OR utilis* OR utiliz* OR transf* OR translat* OR disseminat*)) OR ("evidence into practice" OR "research into practice")) AND noft(facilitat* OR improv* OR promot* OR increas* OR develop* OR support* OR effective* OR better OR best OR strateg* OR pathway* OR intervention) AND noft(education OR school* OR college* OR classroom* OR teach* OR learn* OR educator* OR student* OR children OR pupil* OR achiev* OR attainment OR exam* OR attendance) NOT noft(health* OR dent* OR medic* OR nurses OR nursing OR clinic*) Limits applied Databases: Social Services Abstracts Limited by: Date: After January 01 2000 Language: English	Social Services Abstracts	1,108

Social Science Citation Index (SSCI) – Web of Science

# 6	7,820	#3 AND #2 **Refined by:** [excluding] **WEB OF SCIENCE CATEGORIES:** (ECONOMICS OR COMPUTER SCIENCE INTERDISCIPLINARY APPLICATIONS OR ENGINEERING CIVIL OR COMPUTER SCIENCE ARTIFICIAL INTELLIGENCE OR ENGINEERING ENVIRONMENTAL OR ENGINEERING MANUFACTURING OR GERONTOLOGY OR TRANSPORTATION SCIENCE TECHNOLOGY OR CLINICAL NEUROLOGY OR ZOOLOGY OR ANTHROPOLOGY OR COMPUTER SCIENCE CYBERNETICS OR AGRICULTURAL ECONOMICS POLICY OR ENGINEERING MULTIDISCIPLINARY OR ECOLOGY OR HEALTH POLICY SERVICES OR NURSING OR PHARMACOLOGY PHARMACY OR FOOD SCIENCE TECHNOLOGY OR HEALTH CARE SCIENCES SERVICES OR ONCOLOGY OR ARCHAEOLOGY OR CRIMINOLOGY PENOLOGY) AND [excluding] **WEB OF SCIENCE CATEGORIES:** (PSYCHOLOGY CLINICAL OR TRANSPORTATION OR ERGONOMICS OR PUBLIC ENVIRONMENTAL OCCUPATIONAL HEALTH OR NEUROSCIENCES OR HOSPITALITY LEISURE SPORT TOURISM) *Indexes=SSCI Timespan=2000-2019*

A-3. The search strings for Google Scholar

<table>
<tr><td colspan="4">The keywords in the table were used to create short search string for Google Scholar.
An example of search string created by using the keywords is:

allintitle: "use of evidence" facilitate OR improve OR promote OR increase OR develop OR support OR effective OR better OR best OR strategies OR pathways OR intervention -health -medical -nursing -clinic -clinical -medicine</td></tr>
<tr><td>Allintitle
2000-2019
english</td><td>Use of evidence
Use of research evidence
Evidence use
Evidence using
Utilization of evidence
Utilization of research evidence
Utilisation of evidence
Utilisation of research evidence
Evidence utilization
Evidence utilisation
Uptake of evidence
Uptake of research evidence
Evidence uptake
Disseminating evidence
Disseminating research evidence
Evidence into practice
Evidence in practice
Engaging in evidence
Engaging in research evidence
Engage in evidence
Engage in research evidence
Modifying evidence
Modifying research evidence
Access evidence
Access research evidence
Summaries of evidence
Summaries of research evidence
Summaries evidence
Summaries research evidence
Summary of evidence</td><td>X
(combining)</td><td>facilitate OR improve OR promote OR increase OR develop OR support OR effective OR better OR best OR strategies OR pathways OR intervention -health -medical -nursing -clinic -clinical -medicine</td></tr>
</table>

	Summary of research evidence Evidence summaries Evidence summary Present evidence Present research evidence Presenting evidence Presenting research evidence Sharing evidence Sharing research evidence Transfer of evidence Transfer of research evidence Transferring evidence Transferring research evidence Translation of evidence Translation evidence Translation of research evidence Evidence translation Evidence transfer Bringing evidence Bringing research evidence Use of research Research use research knowledge use research using research knowledge using Utilization of research Utilisation of research research utilization research knowledge utilization research utilisation research knowledge utilisation Uptake of research research uptake research knowledge uptake Disseminating research research into practice research knowledge into practice research in practice research knowledge in practice Engaging in research Modifying research Access research Summaries of research Summary of research Research summaries Research knowledge summaries Research summary Research knowledge summary Present research Presenting research		

	Sharing research Research transfer Research knowledge transfer Transfer of research Transferring research Translation of research Research translation Research knowledge translation Bringing research		
Allintitle 2000-2019 english	Use of evidence Use of research evidence Evidence use Evidence using Utilization of evidence Utilization of research evidence Utilisation of evidence Utilisation of research evidence Evidence utilization Evidence utilisation Uptake of evidence Uptake of research evidence Evidence uptake Disseminating evidence Disseminating research evidence Evidence into practice Evidence in practice Engaging in evidence Engaging in research evidence Engage in evidence Engage in research evidence Modifying evidence Modifying research evidence Access evidence Access research evidence Summaries of evidence Summaries of research evidence Summaries evidence Summaries research evidence Summary of research Summary of research evidence Evidence summaries Evidence summary Present evidence Present research evidence Presenting evidence Presenting research evidence Sharing evidence Sharing research evidence	X (combining)	facilitating OR improving OR promoting OR increasing OR developing OR supporting OR effectiveness OR strategies OR pathways OR interventions -health -medical -nursing -clinic -clinical -medicine

	Transfer of evidence Transfer of research evidence Transferring evidence Transferring research evidence Translation of evidence Translation of research evidence Evidence translation Evidence transfer Bringing evidence Bringing research evidence Use of research research knowledge use research using research knowledge using Utilization of research Utilisation of research research utilization research knowledge utilization research utilisation research knowledge utilisation Uptake of research research uptake research knowledge uptake Disseminating research research into practice research knowledge into practice research in practice research knowledge in practice Engaging in research Modifying research Access research Summaries of research Summary of research Research summaries Research knowledge summaries Research summary Research knowledge summary Present research Presenting research Sharing research Research transfer Research knowledge transfer Transfer of research Transferring research Translation of research Research translation Research knowledge translation Bringing research		

Appendix B. Data extraction form

Study (Author (s), date, title)	
Location	
Design	
Data collection instruments	
Sample and population	
Missing data	
Intervention	
Outcome measures	
Results	
Notes	

Appendix C. Information sheet and consent form for headteachers or school leaders

School of Education
Durham University
Leaze's Road
Durham
DH1 1TA

Re: Helping teachers to understand research evidence 5th December 2019

Dear Headteacher,

I am writing to ask for the help of your school in research project intended to find out how best to help teachers to understand (and use) relevant research evidence in education. The project is supervised by Professors Stephen Gorard and Steve Higgins from the Durham University Evidence Centre for Education (https://www.dur.ac.uk/dece/). The research will only involve teachers who consent to participate, and will not involve other staff, pupils or parents.

What will the evaluation involve?
Schools agreeing to take part will be offered a workshop with resources to help them, and will be allocated either follow-up support (help desk) or not. This will take place in the January 2020 term or the April 2020 term. Teachers will be asked about the knowledge of and attitudes to research evidence both before and after the workshop.

What commitment would this project require?

- Willingness to allow allocation of your schools to take part in either the January or April 2020 term
- Willingness for consenting teachers to take part in the workshop and receive ongoing support where appropriate.
- Willingness to allow the collection of survey data from consenting teachers in the school.

Are there any risks?
I will not use the name of your school, staff names and pupil names in any reports arising from the research. In addition, all data obtained from the schools will be treated with the strictest confidence. The name of your school and any staff names and contact details will only be shared within the research team, and used only for the purpose of contacting your staff. Participation in data collection will be voluntary, and teachers will have the right to withdraw at any stage in the process. However, having the fullest dataset for the evaluation is valuable, and so any help and participation in the evaluation will be appreciated. The results of the study will be shared with the participating schools at the end of the research.

Evaluation Team and Contact Details
If you have any questions or a concern about any aspect of this study, please contact me
phone: 07706067087
email: caner.erkan@durham.ac.uk
or Professor Stephen Gorard (s.a.c.gorard@durham.ac.uk).

To express your school's interest to take part in this study, please complete and return the attached '*Primary School Agreement to Participate* form' .

Yours sincerely,

Caner Erkan

Helping teachers to understand research evidence

Primary School Agreement to participate in a research project (Key Stage 2)

☐ I can confirm that I have read and understood the information sheet for the above project and have had the opportunity to ask questions

☐ I understand that all results will be kept confidentially, stored safely and protected. It will be destroyed after use. No material which could identify individual children or schools will be used in any report.

☐ I will allow the data collection from teachers at my school on a voluntary and consenting basis

☐ I understand that the school will be allocated to get help in understanding research evidence in one of two terms (the school cannot pick which term is best)

☐ I consent to the school taking part in the above study

Name of School ………

Name of Headteacher ……

Name of school contact (if not Headteacher) ……………………………………………………………………………

Headteacher or school contact email address ……………………………………………………………………………

Signature of headteacher…………………………………………………………………… Date…………………………………

Please return to caner.erkan@durham.ac.uk

Appendix D. Information sheet and consent form for teachers

Durham University
School of Education

School of Education
Durham University
Leaze's Road
Durham
DH1 1TA
5th December 2019

Teacher Information Sheet

This research project intended to find out how best to help teachers to understand (and use) relevant research evidence in education. The project is supervised by Professors Stephen Gorard and Steve Higgins from the Durham University Evidence Centre for Education (https://www.dur.ac.uk/dece/). The research will only involve teachers who consent to participate, and will not involve other staff, pupils or parents.

What will the evaluation involve?
Schools agreeing to take part will be offered a workshop with resources to help them, and will be allocated either follow-up support (help desk) or not. This will take place in the January 2020 term or the April 2020 term. Before and after the intervention (workshop and follow-up support) teachers will be asked to complete two surveys that will take less than 10 minutes. This training and follow-up support will have no cost for your schools and teachers.

What commitment would this project require?

- Willingness to take part in either the January or April 2020 term
- Consenting to take part in the workshop and receive ongoing support where appropriate.
- Willingness to complete two surveys that will take less than 10 minutes.

Are there any risks?
I will not use your name in any reports arising from the research. In addition, all data obtained from you will be treated with the strictest confidence. Your name and contact details will only be shared within the research team, and used only for the purpose of contacting you. Participation in data collection will be voluntary, and you will have the right to withdraw at any stage in the process. However, having the fullest dataset for the evaluation is valuable, and so any help and participation in the evaluation will be appreciated. The results of the study will be shared with the participating schools at the end of the research.

Evaluation Team and Contact Details
If you have any questions or a concern about any aspect of this study, please contact me
phone: 07706067087
email: caner.erkan@durham.ac.uk
or Professor Stephen Gorard (s.a.c.gorard@durham.ac.uk).

To take part in this study, please complete and return the attached 'Teacher Consent Form'.

Yours sincerely,

Caner Erkan

Helping teachers to understand research evidence

Teacher Consent Form

Name of Researcher: Caner ERKAN

Please read the following statements and, If you agree, initial the corresponding box to confirm the agreement

	Yes	No
1- I confirm that I have read and understood the information sheet for the above study	☐	☐
2- I give permission for the researcher to email me for this evaluation	☐	☐
3- I understand that participation is voluntary and that I am free to withdraw at any time without giving any reason.	☐	☐
4- I consent to my data being collected, stored anonymously, and used by the researcher for the purpose of the project	☐	☐
5- I agree that I may take part in the above study.	☐	☐

Having participated in the project evaluation: I give permission for Durham University to keep and use the data I have provided during the course of the evaluation, for the purposes outlined in the information sheet.

Please complete the following:

Signed…………………Print Name…………………………….Date………………………

Email address:…………………………………….

Appendix E. The survey used in the current study, and initial versions of the scale and questionnaire

E-1. The survey used in the current study

TEACHERS' UTILIZATION OF RESEARCH, AND ATTITUDES TOWARDS THE ADOPTION OF EVIDENCE-BASED PRACTICE (EBP)

Page 1: About the study

Dear Sir/Madam,

By completing this survey you're giving consent for the data to be used anonymously by the research team from the Durham University Evidence Centre for Education. Any responses you provide will be anonymized and used for academic purposes only.

If you have any questions or a concern about any aspect of the survey, please contact: caner.erkan@durham.ac.uk

Thank you.

Caner ERKAN

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Page 2: About you

First, we ask for two things - your school name, and a unique nickname for yourself. This nickname is to allow us to link your response here with any responses you make later on the term. Please pick a nickname and remember it to use in the second survey

1. School Name

2. Nickname

Page 3: TEACHERS' UTILIZATION OF RESEARCH, AND ATTITUDES TOWARDS THE ADOPTION OF EVIDENCE-BASED PRACTICE (EBP)

Instructions: The following questions are about your perception of using new types of teaching methods, interventions, or treatments, and experience about the utilization of research. Manualized teaching intervention refers to any intervention that has specific guidelines and/or components that are outlined in a manual and/or that are to be followed in a structured/predetermined way.

Indicate the extent to which you agree with each item using the following scale: **0= Not at all; 1 = To a slight extent; 2 = To a moderate extent; 3 = To a great extent; 4 = To a very great extent.**

3. Research-based interventions/methods are not useful in practice.

- 0=Not at all
- 1=To a slight extent
- 2 =To a moderate extent
- 3=To a great extent
- 4=To a very great extent.

4. Experience is more important than using manualized interventions/methods.

- 0=Not at all
- 1=To a slight extent
- 2 =To a moderate extent
- 3=To a great extent
- 4=To a very great extent.

5. I am willing to use new and different types of interventions/methods developed by researchers.

- 0=Not at all
- 1=To a slight extent
- 2 =To a moderate extent
- 3=To a great extent
- 4=To a very great extent.

6. I like to use new types of interventions/methods to help my students.

- 0=Not at all
- 1=To a slight extent
- 2 =To a moderate extent
- 3=To a great extent
- 4=To a very great extent.

7. I am willing to try new types of interventions/methods even if I have to follow a teaching/training manual.

- 0=Not at all
- 1=To a slight extent
- 2 =To a moderate extent
- 3=To a great extent
- 4=To a very great extent.

8. I know better than academic researchers how to care for my students.

- 0=Not at all
- 1=To a slight extent
- 2 =To a moderate extent
- 3=To a great extent
- 4=To a very great extent.

9. I would not use manualized interventions/methods.

- 0=Not at all
- 1=To a slight extent
- 2 =To a moderate extent
- 3=To a great extent
- 4=To a very great extent.

10. I would try a new intervention/method even if it were very different from what I am used to doing.

- 0=Not at all
- 1=To a slight extent
- 2 =To a moderate extent
- 3=To a great extent
- 4=To a very great extent.

For questions 11-17: If you received training in an intervention that was new to you, how likely would you be to adopt it if:

11. Evidence said it worked?

- 0=Not at all
- 1=To a slight extent
- 2 =To a moderate extent
- 3=To a great extent
- 4=To a very great extent.

12. It was intuitively appealing?

- 0=Not at all
- 1=To a slight extent
- 2 =To a moderate extent
- 3=To a great extent
- 4=To a very great extent.

13. It “made sense” to you?

- 0=Not at all
- 1=To a slight extent
- 2 =To a moderate extent
- 3=To a great extent
- 4=To a very great extent.

14. It was required by your school (head teacher, principal etc.)?

- 0=Not at all

- 1=To a slight extent
- 2 =To a moderate extent
- 3=To a great extent
- 4=To a very great extent.

15. It was required by your law?

- 0=Not at all
- 1=To a slight extent
- 2 =To a moderate extent
- 3=To a great extent
- 4=To a very great extent.

16. It was being used by colleagues who were happy with it?

- 0=Not at all
- 1=To a slight extent
- 2 =To a moderate extent
- 3=To a great extent
- 4=To a very great extent.

17. You felt you had enough training to use it correctly?

- 0=Not at all
- 1=To a slight extent
- 2 =To a moderate extent
- 3=To a great extent

- 4=To a very great extent.

How much do you agree with the questions 18-35: I utilize information from research;

18. to get acquainted with effective teaching strategies

- 0=Not at all
- 1=To a slight extent
- 2 =To a moderate extent
- 3=To a great extent
- 4=To a very great extent.

19. to help in improving my learners‘ progress

- 0=Not at all
- 1=To a slight extent
- 2 =To a moderate extent
- 3=To a great extent
- 4=To a very great extent.

20. for innovations in school curricula

- 0=Not at all
- 1=To a slight extent
- 2 =To a moderate extent
- 3=To a great extent

- 4=To a very great extent.

21. on how to improve my learners' interest in schooling

- 0=Not at all
- 1=To a slight extent
- 2 =To a moderate extent
- 3=To a great extent
- 4=To a very great extent.

22. to source better evaluation techniques for day-to-day activities

- 0=Not at all
- 1=To a slight extent
- 2 =To a moderate extent
- 3=To a great extent
- 4=To a very great extent.

23. in order to prepare my lessons well

- 0=Not at all
- 1=To a slight extent
- 2 =To a moderate extent
- 3=To a great extent
- 4=To a very great extent.

24. to help me in effective delivery of instruction

- 0=Not at all
- 1=To a slight extent
- 2 =To a moderate extent
- 3=To a great extent
- 4=To a very great extent.

25. for effective use of instructional materials

- 0=Not at all
- 1=To a slight extent
- 2 =To a moderate extent
- 3=To a great extent
- 4=To a very great extent.

26. to become knowledgeable on recent theories of child development

- 0=Not at all
- 1=To a slight extent
- 2 =To a moderate extent
- 3=To a great extent
- 4=To a very great extent.

27. for theories behind various new teaching strategies

- 0=Not at all

- 1=To a slight extent
- 2 =To a moderate extent
- 3=To a great extent
- 4=To a very great extent.

28. to improve my content knowledge of school subjects

- 0=Not at all
- 1=To a slight extent
- 2 =To a moderate extent
- 3=To a great extent
- 4=To a very great extent.

29. for the acquisition of more pedagogical knowledge

- 0=Not at all
- 1=To a slight extent
- 2 =To a moderate extent
- 3=To a great extent
- 4=To a very great extent.

30. for more effective classroom management techniques

- 0=Not at all
- 1=To a slight extent
- 2 =To a moderate extent
- 3=To a great extent

- 4=To a very great extent.

31. for skills at motivating and reinforcing my learners in learning

- 0=Not at all
- 1=To a slight extent
- 2 =To a moderate extent
- 3=To a great extent
- 4=To a very great extent.

32. to acquire knowledge and skills in using modern questioning techniques in class

- 0=Not at all
- 1=To a slight extent
- 2 =To a moderate extent
- 3=To a great extent
- 4=To a very great extent.

33. for further verification of research findings

- 0=Not at all
- 1=To a slight extent
- 2 =To a moderate extent
- 3=To a great extent
- 4=To a very great extent.

34. to increase the level of classroom interaction i.e. teacher-student, student-student and student-material interactions

- 0=Not at all
- 1=To a slight extent
- 2 =To a moderate extent
- 3=To a great extent
- 4=To a very great extent.

35. to assist me in planning and carrying out research involving my learners

- 0=Not at all
- 1=To a slight extent
- 2 =To a moderate extent
- 3=To a great extent
- 4=To a very great extent.

Page 4: About you

36. Please specify your job role

- Classroom teacher
- Head teacher/principal etc. (management position) or Senior Leadership Team
- Other

37. Please indicate your gender

- Male
- Female
- Other
- Prefer not to answer

38. What is your age?

39. How long have you been teaching?

40. What is your highest level of educational attainment?

- Bachelor's degree or equivalent
- Master's degree or equivalent
- Doctorate or equivalent

○ Other

40.a. If you selected Other, please specify:

41. If you have any comments on the issues raised here, Please enter them below:

42. As part of the study, I would like to talk to some teachers in more depth about their knowledge of and attitudes to research evidence. If you're happy for me to speak to you, please provide contact details (name and telephone or email) in the box below.

Page 5: Final page

Thank you for participating in this survey

E-2. The initial version of the scale

Evidence-Based Practice Attitude Scale

EBPAS© Gregory A. Aarons, Ph.D.

Reference:

Aarons, G. A. (2004). Mental health provider attitudes toward adoption of evidence-based practice: The Evidence-Based Practice Attitude Scale. *Mental Health Services Research, 6*(2), 61-74.

The following questions ask about your feelings about using new types of therapy, interventions, or treatments. Manualized therapy refers to any intervention that has specific guidelines and/or components that are outlined in a manual and/or that are to be followed in a structured/predetermined way.

Fill in the circle indicating the extent to which you agree with each item using the following scale:

0	1	2	3	4
Not at All	To a Slight Extent	To a Moderate Extent	To a Great Extent	To a Very Great Extent

	0	1	2	3	4
1. I like to use new types of therapy/interventions to help my clients………………………..	○	○	○	○	○
2. I am willing to try new types of therapy/interventions even if I have to follow a treatment manual…………………………………………………………………………	○	○	○	○	○
3. I know better than academic researchers how to care for my clients.……………….…….	○	○	○	○	○
4. I am willing to use new and different types of therapy/interventions developed by researchers……………………………………………………………………………	○	○	○	○	○
5. Research based treatments/interventions are not clinically useful…………………..…….	○	○	○	○	○
6. Clinical experience is more important than using manualized therapy/treatment…………	○	○	○	○	○
7. I would not use manualized therapy/interventions………………………………………..	○	○	○	○	○
8. I would try a new therapy/intervention even if it were very different from what I am used to doing………………………………………………………………………....	○	○	○	○	○
For questions 9-15: If you received training in a therapy or intervention that was new to you, how likely would you be to adopt it if:					
9. it was intuitively appealing?...……………………………….……………………	○	○	○	○	○
10. it "made sense" to you?…………………………………………………………………	○	○	○	○	○
11. it was required by your supervisor?……………………………………………………	○	○	○	○	○
12. it was required by your agency?……………..………………………………………	○	○	○	○	○
13. it was required by your state?……………………….…………………………………	○	○	○	○	○
14. it was being used by colleagues who were happy with it?………………………………..	○	○	○	○	○
15. you felt you had enough training to use it correctly?……………………………………..	○	○	○	○	○

E-3. The initial version of the questionnaire

APPENDIX V
TEACHERS' UTILIZATION OF RESEARCH FINDINGS QUESTIONNAIRE
(TURFQ)

Dear Sir/Madam,

This study is a research endeavour based in the Early Childhood Education Unit, Department of Teacher Education, University of Ibadan. Kindly provide all information to the best of your knowledge of the issues raised. All information provided will be used for academic purpose only and will be treated with utmost confidentiality.

Thank you.

Yours Faithfully,

Mrs. Yewande Ogunleye

Section A: Socio-Demographic Data
Name of School:...
Gender: Male ☐ Female ☐

Section B: Utilization of Research

Kindly tick ☑ the extent to which you utilize information from research using Likert Scale of Always, Sometimes, Rarely or Never.

Item	I utilize information from research:	Always	Sometimes	Rarely	Never
1	to get acquainted with effective teaching strategies				
2	for innovations in school curricula				
3	on how to improve my learners interest in schooling				
4	to source for better evaluation techniques in day-to-day activities				
5	in order to prepare my lessons well				
6	to help me in effective delivery of instruction				
7	to get facts on the development of locally available instructional materials				
8	for effective use of instructional materials				
9	to become knowledgeable on recent theories of child development				
10	for theories behind the various new teaching strategies				
11	to improve my content knowledge of school subjects				
12	for the acquisition of more pedagogical knowledge				
13	for more effective classroom management techniques				
14	for skills at motivating and reinforcing my				

	learners in learning				
15	to acquire knowledge and skills in using modern questioning techniques in class				
16	for further verification of research findings				
17	to help in improving my learners' achievement				
18	to increase the level of classroom interaction i.e. teacher-student, student-student and student-material interactions				
19	for encouraging active participation of learners in the class activities.				
20	to assist me in planning and carrying out research on my learners				

The questionnare above was developed by Ogunleye, Y. (2014).

Appendix F. Pearson Correlation Matrix and Varimax Rotation via Factor Analysis

F-1. Pearson correlation matrix for pre-test

F-1.1. Teachers' attitudes towards use of research evidence (n=46)

	PreS1	PreS2	PreS3	PreS4	PreS5	PreS6	PreS7	PreS8	PreS9	PreS10	PreS11	PreS12	PreS13	PreS14	PreS15
PreS1	1.000														
PreS2	.254	1.000													
PreS3	.146	.172	1.000												
PreS4	-.065	.217	.634	1.000											
PreS5	.231	.282	.429	.503	1.000										
PreS6	.091	.026	.323	.137	.090	1.000									
PreS7	-.014	.136	-.092	.047	.233	.107	1.000								
PreS8	-.014	.118	.608	.606	.561	.442	.237	1.000							
PreS9	.013	.031	.177	.216	-.060	.042	.000	.254	1.000						
PreS10	.068	-.189	.249	.018	.056	.050	.085	.235	.344	1.000					
PreS11	.105	-.301	.185	-.080	.080	.142	.023	.184	.239	.801	1.000				
PreS12	.132	-.098	.371	.299	.278	.149	.199	.243	.245	.220	.349	1.000			
PreS13	.014	.086	.398	.397	.454	.081	.069	.322	.169	.052	.084	.562	1.000		
PreS14	.215	-.099	.220	.239	.152	.213	-.045	.123	.128	.337	.508	.507	.272	1.000	
PreS15	-.048	-.135	.291	.362	.237	.043	.036	.346	.377	.414	.499	.611	.489	.444	1.000

Note: correlation higher than 0.69, correlation between 0.30 and 0.70, correlation lower than 0.30

F 1.2. Teachers' use of research (n=46)

	Pre Q1	Pre Q2	Pre Q3	Pre Q4	Pre Q5	Pre Q6	Pre Q7	Pre Q8	Pre Q9	PreQ 10	PreQ 11	PreQ 12	PreQ 13	PreQ 14	PreQ 15	PreQ 16	PreQ 17	PreQ 18
PreQ 1	1.000																	
PreQ 2	.782	1.000																
PreQ 3	.709	.797	1.000															
PreQ 4	.727	.725	.744	1.000														
PreQ 5	.715	.724	.730	.742	1.000													
PreQ 6	.576	.724	.709	.658	.626	1.000												
PreQ 7	.562	.631	.634	.544	.678	.740	1.000											
PreQ 8	.728	.703	.782	.654	.807	.724	.728	1.000										
PreQ 9	.455	.497	.655	.525	.632	.598	.625	.638	1.000									
PreQ 10	.541	.516	.632	.586	.646	.526	.546	.699	.842	1.000								
PreQ 11	.496	.608	.707	.588	.769	.667	.603	.727	.775	.711	1.000							
PreQ 12	.550	.585	.624	.577	.786	.645	.626	.750	.748	.754	.790	1.000						
PreQ 13	.522	.425	.593	.722	.599	.600	.556	.618	.701	.669	.620	.567	1.000					
PreQ 14	.540	.585	.594	.653	.741	.653	.791	.713	.577	.621	.630	.705	.590	1.000				
PreQ 15	.598	.711	.714	.681	.710	.743	.720	.718	.720	.686	.721	.606	.709	.681	1.000			
PreQ 16	.619	.641	.697	.580	.756	.673	.686	.871	.770	.783	.765	.773	.576	.698	.775	1.000		
PreQ 17	.666	.688	.693	.609	.723	.611	.661	.826	.674	.746	.797	.689	.608	.665	.697	.789	1.000	
PreQ 18	.513	.566	.644	.575	.610	.652	.662	.721	.607	.624	.668	.555	.530	.541	.642	.748	.737	1.000

Note: correlation higher than 0.69, correlation between 0.30 and 0.70, correlation lower than 0.30

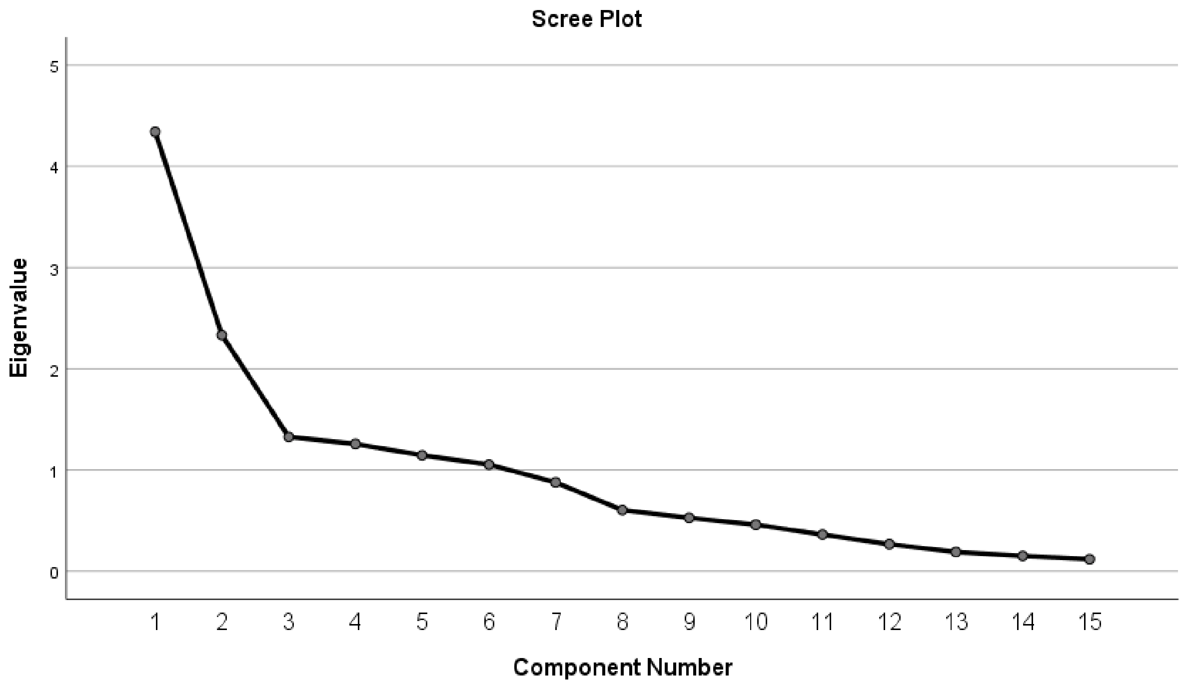
F-2. Varimax rotation via factor analysis

F-2.1-Varimax rotation via factor analysis for the attitudes scale

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,651
Bartlett's Test of Sphericity	Approx. Chi-Square	277,841
	df	105
	Sig.	,000

Communalities		
	Initial	Extraction
PreS1	1,000	,826
PreS2	1,000	,706
PreS3	1,000	,765
PreS4	1,000	,765
PreS5	1,000	,659
PreS6	1,000	,725
PreS7	1,000	,908
PreS8	1,000	,851
PreS9	1,000	,674
PreS10	1,000	,818
PreS11	1,000	,860
PreS12	1,000	,753
PreS13	1,000	,707
PreS14	1,000	,677
PreS15	1,000	,758
Extraction Method: Principal Component Analysis.		

Total Variance Explained									
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4,341	28,939	28,939	4,341	28,939	28,939	2,851	19,008	19,008
2	2,332	15,546	44,485	2,332	15,546	44,485	2,448	16,322	35,330
3	1,327	8,844	53,329	1,327	8,844	53,329	2,391	15,938	51,268
4	1,257	8,377	61,706	1,257	8,377	61,706	1,371	9,141	60,409
5	1,145	7,630	69,337	1,145	7,630	69,337	1,229	8,193	68,601
6	1,052	7,017	76,353	1,052	7,017	76,353	1,163	7,752	76,353
7	,877	5,846	82,200						
8	,603	4,018	86,218						
9	,526	3,509	89,727						
10	,458	3,053	92,780						
11	,361	2,407	95,187						
12	,265	1,766	96,953						
13	,189	1,259	98,212						
14	,150	,997	99,209						
15	,119	,791	100,000						
Extraction Method: Principal Component Analysis.									



Rotated Component Matrix[a]						
	Component					
	1	2	3	4	5	6
PreS8	,826		,207		,259	,222
PreS4	,815	,289				
PreS3	,776	,221	,146	,152	-,196	,176
PreS5	,531	,356	-,116	,339	,343	
PreS12	,150	,821	,200		,118	
PreS13	,372	,731	-,108			-,133
PreS15	,252	,665	,439	-,173		-,171
PreS14		,625	,361	,194	-,185	,291
PreS10			,895			
PreS11		,292	,850			,213
PreS9	,338		,563			-,482
PreS1			,115	,882		,126
PreS2	,351	-,183	-,240	,615	,181	-,285
PreS7					,949	
PreS6	,379		,123			,749
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.						
a. Rotation converged in 13 iterations.						

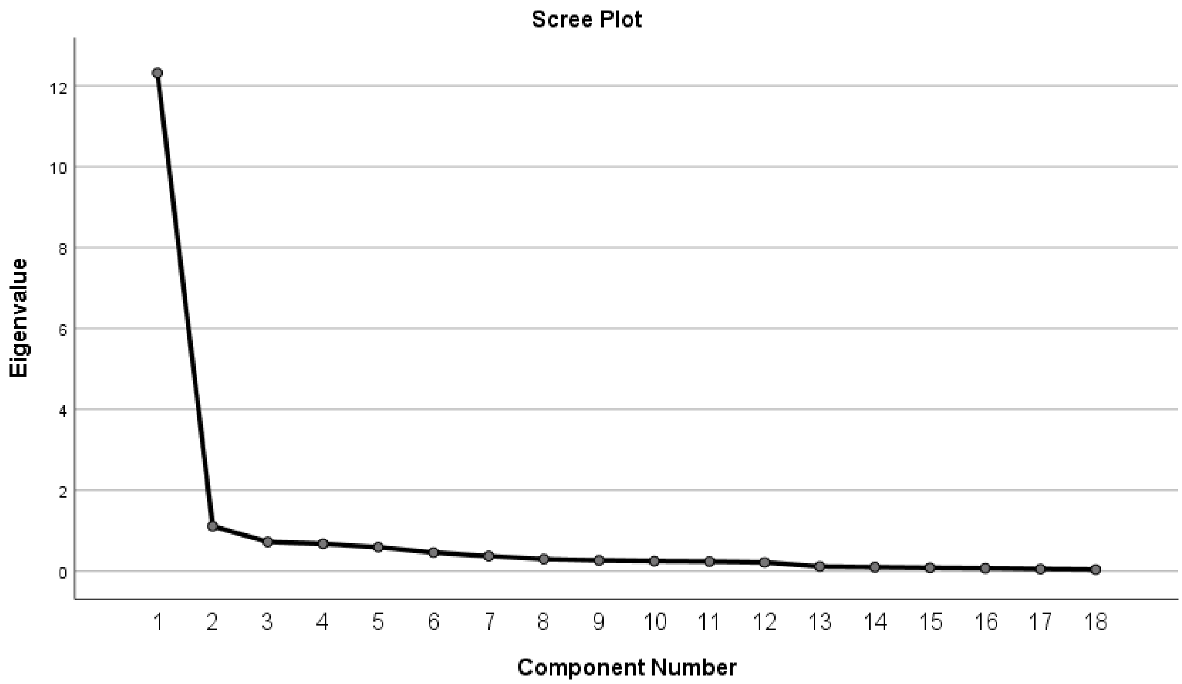
F-2.2 Varimax rotation via factor analysis for the use of research

KMO and Bartlett's Test	
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	,899

Bartlett's Test of Sphericity	Approx. Chi-Square	873,007
	df	153
	Sig.	,000

Communalities		
	Initial	Extraction
PreQ1	1,000	,775
PreQ2	1,000	,848
PreQ3	1,000	,774
PreQ4	1,000	,737
PreQ5	1,000	,776
PreQ6	1,000	,689
PreQ7	1,000	,652
PreQ8	1,000	,819
PreQ9	1,000	,846
PreQ10	1,000	,804
PreQ11	1,000	,787
PreQ12	1,000	,745
PreQ13	1,000	,587
PreQ14	1,000	,649
PreQ15	1,000	,745
PreQ16	1,000	,825
PreQ17	1,000	,758
PreQ18	1,000	,613
Extraction Method: Principal Component Analysis.		

Total Variance Explained									
	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	12,315	68,414	68,414	12,315	68,414	68,414	7,126	39,590	39,590
2	1,114	6,188	74,602	1,114	6,188	74,602	6,302	35,013	74,602
3	,723	4,018	78,620						
4	,678	3,768	82,388						
5	,593	3,295	85,683						
6	,461	2,563	88,246						
7	,372	2,067	90,314						
8	,300	1,669	91,983						
9	,268	1,489	93,472						
10	,250	1,389	94,861						
11	,239	1,328	96,189						
12	,217	1,203	97,392						
13	,115	,638	98,030						
14	,100	,555	98,585						
15	,085	,473	99,059						
16	,073	,408	99,467						
17	,054	,299	99,766						
18	,042	,234	100,000						
Extraction Method: Principal Component Analysis.									



Rotated Component Matrix[a]

	Component	
	1	2
PreQ9	,890	,231
PreQ10	,851	,283
PreQ11	,792	,399
PreQ16	,775	,474
PreQ12	,768	,394
PreQ17	,685	,537
PreQ13	,656	,396
PreQ15	,633	,587
PreQ18	,620	,478
PreQ14	,590	,549
PreQ2	,276	,879
PreQ1	,250	,844
PreQ4	,366	,776
PreQ3	,472	,742
PreQ6	,488	,672
PreQ5	,571	,671
PreQ8	,625	,655
PreQ7	,557	,585

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

F-3 Varimax rotation component Values and comments

F-3.1 Teachers' attitudes towards the adoption of evidence-based practice

		Varimax Rotation Component Values by Component						
Component / the number of items	Item	1	2	3	4	5	6	My comments
1 /4	PreS8: I would try a new intervention/method even if it were very different from what I am used to doing	,826		,207		,259	,222	These items are about openness and being willingness. They look related and can be under this component. Although PreS3 and PreS5 also work under the other components, they are more related to this component.
	PreS4: I like to use new types of interventions/methods to help my students.	,815	,289					
	PreS3: I am willing to use new and different types of interventions/methods developed by researchers.	,776	,221	,146	,152	-,196	,176	
	PreS5: I am willing to try new types of interventions/methods even if I have to follow a teaching/training manual.	,531	,356	-,116	,339	,343		
2 /4	PreS12: It was required by your school (head teacher, principal etc.)?	,150	,821	,200		,118		PreS12 and PreS13 are about the requirements (c omponent 2). But PreS14 and PreS15 look a bit different. They might be under component 3 as they are related to appealing.
	PreS13: It was required by your law?	,372	,731	-,108			-,133	
	PreS14: It was being used by colleagues who were happy with it?		,625	,361	,194	-,185	,291	
	PreS15: You felt you had enough training to use it correctly?	,252	,665	,439	-,173		-,171	
3 /3	PreS10: It was intuitively appealing?			,895				These can be under this component 3. PreS9 work better here. As I said above, PreS14 and PreS15 can be under this component.
	PreS11: It "made sense" to you?		,292	,850			,213	
	PreS9: Evidence said it worked?	,338		,563			-,482	
4 /2	PreS1: Research-based interventions/methods are not useful in practice.			,115	,882		,126	PreS1 and PreS2 are negative items like PreS7 and PreS6 (below) that has been reverse scored. PreS1 and PreS2 look related. This component focuses on the value of research evidence and experience in practice for teachers.
	PreS2: Experience is more important than using manualized interventions/methods.	,351	-,183	-,240	,615	,181	-,285	
5 /1	PreS7: I would not use					,949		When I read this, it

	manualized interventions/methods.							looks related to PreS1 and PreS2 at first, but teachers can consider this differently. Also, this doesn't work under other components according to the scores. If I add this to the component four, it can be misleading. And one item is not enough to create a component.
6 /1	PreS6: I know better than academic researchers how to care for my students.	,379		,123			,749	This can be related to the component 4 but it did not work well for 4 according the scores. If it stays here, there will be another one item component.

Conclusion
Most of the items may work under their components. There are a few items that need to be moved from their components to the others, but this is not sufficiently supported by the varimax rotation matrix. There are also two components that have only one item. Overall, it might not be convincing to have such components for the analysis. Item-based analysis might be better instead of having an overall score for all items or these components. However, these items may be classified into two components while presenting results even if I analyse the date item by item. The first eight questions are related to general attitudes towards research evidence. The other seven questions are about the influences that might affect teachers' adoption of a new intervention.

F-3.2 Teachers' attitudes towards the adoption of evidence-based practice

		Varimax Rotation Component Values by Component		
Component / the number of items	Item	1	2	My comments
1 / 10	PreQ9: to become knowledgeable on recent theories of child development	,890	,231	I have found difficult to divide these items into different components. These two components by varimax rotation matrix do not make sense to me. There is also no clear distinction according to the scores.
	PreQ10: for theories behind various new teaching strategies	,851	,283	
	PreQ11: to improve my content knowledge of school subjects	,792	,399	
	PreQ16: for further verification of research findings	,775	,474	
	PreQ12: for the acquisition of more pedagogical knowledge	,768	,394	
	PreQ17: to increase the level of classroom interaction i.e. teacher-student, student-student and student-material interactions	,685	,537	
	PreQ13: for more effective classroom management techniques	,656	,396	
	PreQ15: to acquire knowledge and	,633	,587	

	skills in using modern questioning techniques in class			
	PreQ18: to assist me in planning and carrying out research involving my learners	,620	,478	
	PreQ14: for skills at motivating and reinforcing my learners in learning	,590	,549	
2 / 8	PreQ2: to help in improving my learners' progress	,276	,879	
	PreQ1: to get acquainted with effective teaching strategies	,250	,844	
	PreQ4: on how to improve my learners' interest in schooling	,366	,776	
	PreQ3: for innovations in school curricula	,472	,742	
	PreQ6: in order to prepare my lessons well	,488	,672	
	PreQ5: to source better evaluation techniques for day-to-day activities	,571	,671	
	PreQ8: for effective use of instructional materials	,625	,655	
	PreQ7: to help me in effective delivery of instruction	,557	,585	

Conclusion

Some items work for both two components. But compared to attitudes, these items look more related (almost underlying one component). Considering the scores, however, it might be better to analyse the data item by item.

Appendix G. Ethical Approval

From: **Ethics** no-reply@sharepointonline.com
Subject: Ethical Approval: EDU-2019-11-15T12:09:53-xhcb98
Date: 5 December 2019 at 17:38
To: ERKAN, CANER caner.erkan@durham.ac.uk
Cc: ED-ETHICS E.D. ed.ethics@durham.ac.uk, GORARD, STEPHEN A.C. s.a.c.gorard@durham.ac.uk

E

Please do not reply to this email.

Dear Caner erkan,

The following project has received ethical approval:

Project Title: *An investigation of how research evidence can be best disseminated to teachers.;*
Start Date: *01 January 2020*;
End Date: *01 October 2021;*
Reference: *EDU-2019-11-15T12:09:53-xhcb98*
Date of ethical approval: *05 December 2019*.

Please be aware that if you make any significant changes to the design, duration or delivery of your project, you should contact your department ethics representative for advice, as further consideration and approval may then be required.

If you have any queries regarding this approval or need anything further, please contact ed.ethics@durham.ac.uk

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If you have any queries relating to the ethical review process, please contact your supervisor (where applicable) or departmental ethics representative in the first instance. If you have any queries relating to the online system, please contact research.policy@durham.ac.uk.

Appendix H. Data extraction and quality appraisal

H-1. Data extraction table

Study: Author (s), date, title	Design	Sample, population and location	Data collection instrument/s	Missing data	Intervention (approach)	Outcome measures	Results	Notes (e.g. other threats)	Rating
Lord et al. (2017a) Literacy octopus dissemination trial: Evaluation report and executive summary	RCT	12,500 primary schools, randomised into five groups of 2,500, (Four trial arms and one control group arm.) 466,799 pupils England	NPD data for KS2 English scores	Pupil-level missing data accounted for 6% of the total: 28,604 pupils of the 466,799 pupils	Disseminating evidence-based materials and research summaries to teachers (Research summaries- passive dissemination)	KS2 attainment scores in English -End-user	KS2 attainment scores in English : Null/negative		4 🔒
Lord et al. (2017b) Evidence-based literacy support: The" Literacy Octopus" trial. Evaluation report and executive summary	RCT	823 schools; 60 were allocated to each of the nine intervention arms and 283 to the control group. 32,613 pupils and 2,041 teachers England	NPD data for KS2 English scores Pre-post surveys for teachers' attitudes toward academic research and their use of research evidence	Pupil-level missing data accounted for 6% Attrition in terms of school-completion of surveys between baseline and endpoint was at 44%. A total of 335 teachers completed surveys at both time-points.	Four passive trial arms (disseminating evidence-based materials and research summaries to teachers) Five active trial arms (passive dissemination plus active dissemination such as inviting participants to one twilight Continuing Professional Development (CPD) session. (Research summaries- passive	KS2 attainment scores in English -End-user Teachers' attitudes toward academic research and their use of research evidence -Attitudes -Behaviour	KS2 reading outcomes: Null/negative Teachers' attitudes towards research evidence: Null/negative Teachers' use of research evidence: Null/negative	While the pupil level missing data was minimal, the teacher level missing data was considerably higher. Therefore, the study was rated twice considering outcome measures. Overall, this study was considered an example of passive dissemination. Although some of the trials used active approaches, they were like follow up support	End-user 4 🔒 Attitudes and behaviour 2 🔒

					dissemination)			(light) after the passive dissemination.	
Wiggins et al. (2019) The Rise Project: Evidence informed school improvement	RCT	40 secondary schools (20 treatment and 20 control) Cohort A pupils= 7,468, Cohort B pupils= 7,633	NPD data for national test examination scores	The reported attrition rates for cohorts and subjects were from 9 to 13%.	An evidence-informed school improvement model involving a senior teacher from each school whose responsibility to improve and support the use of research evidence in the school. The research leads were supported with a series of training and follow-up support such as CPD sessions, follow-up meetings, evidence-based resources etc. Also, workshops were held for headteachers and subject leads (Active multi-component)	Pupils' mathematics and English attainment scores -End-user	Pupils' mathematics and English attainment scores: Unclear/mixed		3
Rose et al. (2017) Research Learning Communities: Evaluation report and executive summary	RCT	119 schools (60 treatment, 59 control) 5462 pupils and 1709 teachers England	Pupils' reading outcomes at KS2 (NPD records) Pre-post surveys for teachers' attitudes	Pupil level attrition is approximately 9% . Overall, data was missing for the teacher survey : round two= 11	The intervention used Research Learning Communities (RLC) and involved four RLC workshops held by researchers and two Evidence Champion teachers from each school to take part in these	KS2 reading outcomes -end-user Teachers' attitudes toward academic research and	KS2 reading outcomes: Null/negative Teachers' attitudes towards research evidence: Unclear/mixed	While the pupil level missing data was minimal, the teacher level missing data was considerably higher. Therefore, the study was rated twice considering outcome measures.	End-user 3 Attitudes and behaviour 2

			toward academic research and their use of research evidence	schools round three= 40 schools. The number of teachers completed the survey: baseline:1709 round two: 966 round three: 699	workshops with some of their peers from other schools. (Active single component)	their use of research evidence -attitudes -behaviour	Teachers’ use of research evidence: Positive		
See et al. (2016) Teachers’ use of research evidence in practice: a pilot study of feedback to enhance learning	Quasi-experiment	9 treatment schools were compared with five local, 49 other state-funded and all state-funded primary schools in England 1677 pupils in Years 2–6 (intervention). 2187 Year 6 pupils in the 49 comparator schools, and 1177 pupils in Years 2–6 in the 5 local schools England	National test scores	The “attrition rate” was not clearly reported by authors. But it was regarded minimal as the data comes from the national test scores, also considering the number of pupils shown in tables presenting the results.	Using a journal article regarding enhanced feedback, a series of cascading training events for all staff, conducting three action research cycles (Collaborative)	Pupils’ academic attainment (reading, writing and maths) -End-user	Pupils’ academic attainment: Null/negative	NA	2
Purper (2015) Study of early childhood teachers' use of federally	RCT	96 teachers (48 treatment, 48 control) USA	Pre-post surveys	Complete or minimal missing data	Teachers were given professional development (PD) training and information regarding	Teachers’ self-reported use of research evidence-	Teachers’ attitudes towards research evidence:	NA	2

funded websites that disseminate information about evidence-based practices					five websites disseminating research evidence. (Active single component)	based practices -Attitudes -Behaviour	Positive Teachers' use of research evidence: Null/negative		
Nelson-Walker et al. (2013) Teachers' engagement with research: What do we know? A research briefing	RCT	16 schools, 42 teachers (23 treatment, 19 control)	Observation	The reported attrition was 11%	PD and follow-up coaching (Active multi-component)	Teachers' instructional behaviours -Behaviour	The intervention improved teachers' instructional behaviours	NA	2
Ely et al. (2014) Improving instruction of future teachers: A multimedia approach that supports implementation of evidence-based vocabulary practices	Experimental	49 participants: a multimedia-based intervention, which pairs video with a Content Acquisition Podcast (i.e., video plus CAP) (24) and reading (25) USA	Observation with checklists	Complete or minimal missing data	A multimedia-based intervention, which pairs video with a Content Acquisition Podcast (i.e., video plus CAP) (Technology)	Teachers' use of evidence-based practices -Behaviour	CAP plus video made more improvements in teachers' use of evidence-based practices compared with simply reading.	NA	2
Ely et al. (2018) Classroom simulation to prepare teachers to use evidence-based comprehension practices	Experimental	22 participants, randomly assigned to teach in a simulation or observe peers teach in a simulation USA	Pre-post tests and survey	Complete or minimal missing data	The study involved a classroom simulation developed through a virtual mixed-reality application. (Technology)	Teachers' knowledge and perceptions about evidence-based practices -Knowledge/	The study found that pre-service teachers improved their knowledge about the evidence-based strategies.	NA	2

						Attitudes			
Clarke et al. (2011) The impact of a comprehensive Tier I core kindergarten program on the achievement of students at risk in mathematics	RCT	64 classrooms with more than 1,300 students USA	Pre-post test	The overall attrition was around 10%.	Early Learning in Mathematics (ELM) curriculum, in which research evidence-based strategies are embedded (Embedded)	The achievement of students at risk in mathematics -End-user	Students at risk made considerable progress in mathematics compared with those in the control group	NA	2
Doabler et al. (2014) Examining teachers' use of evidence-based practices during core mathematics instruction	RCT	129 classrooms (68 intervention and 61 control) 130 teachers USA	Observation	Complete or minimal missing data	Early Learning in Mathematics (ELM) curriculum, in which research evidence-based strategies are embedded (Embedded)	Teachers' use of explicit mathematics instruction in core educational settings -Behaviour	The treatment teachers' use of evidence-based practices were better than those in the control group	NA	2
Griggs et al. (2016) Ashford teaching alliance research champion: evaluation report and executive summary	One group pretest-posttest	106 teachers for the analysis from 5 schools (four secondary and one primary) England	Pre-post survey	The overall response rate for the survey was 63% at baseline (190 of an eligible 304 respondents) and 56% for the outcomes survey (106 of 190 eligible respondents)	A research champion delivered a programme having 4 components: audits of schools' research interests; research symposia; twilight forums; and research brokerage (Active multi-component)	Teachers' use of, and attitudes towards, academic research to support pupils' progress -Attitudes -Behaviour	There was no convincing evidence of a beneficial impact on teachers' use of, and attitudes towards, academic research to support pupils' progress	NA	1
Speight et al.	One group	10 primary	Pre-post	The overall	Continuing	Teachers'	The	NA	1

(2016) Rochdale research into practice: evaluation report and executive summary	pretest-posttest	schools (124 teachers for the analysis) England	Survey	response rate for the survey was 95% at baseline (169 of an eligible 177 respondents) and 73% for the outcomes survey (124 of an eligible 169 respondents)	Professional Development (CPD) and direct consultant support about some research evidence-based strategies such as metacognition and self-regulated learning (Active multi-component)	attitudes toward academic research and their use of research evidence -Attitudes -Behaviour	intervention led to some positive changes in teachers' attitudes towards research evidence, but there was no convincing evidence of a beneficial impact on teachers' use of research evidence		
Kretlow et al. (2012) Using in-service and coaching to increase teachers' accurate use of research-based strategies	Multiple baseline design	One school (three teachers) North Carolina/USA	Observer used the audio-recording of the sessions and three phases were evaluated, (a) baseline (no PD), (b) post-in-service, and (c) post-coaching	Complete or minimal missing data	-PD/in-service -PD/in-service and coaching (Active multi-component)	Teachers' accurate implementation of group instructional units (three research-based strategies during math instruction) -Behaviour	The intervention promoted increased accuracy with three research-based strategies	NA	1 🔒
Sawyer (2015) The effects of coaching novice special education teachers to engage in evidence based	Multiple baseline design	Four teachers USA	Checklist	Complete or minimal missing data	Coaching and then creating self-determined EBP action plans (empirically supported treatments) (Collaborative)	Teachers' implementation of evidence-based self-designed plans in practice	Teachers were successfully implemented evidence-based self-designed plans in practice	NA	1 🔒

practice as a problem-solving process						-Behaviour			
Ogunleye (2014) Impact of Collaborative Intervention Programme on pre-primary and primary school teachers' awareness, acquisition and utilisation of educational research findings in Oyo State, Nigeria	One-group pretest - postest	60 teachers of pre- primary (30) and primary (30) schools Nigeria	Pre-post survey	Complete or minimal missing data	Collaborative programme consisting of micro-teaching, focus groups and seminar, allowing sharing knowledge and ideas (Collaborative)	Teachers' awareness, acquisition and utilisation of educational research findings -Attitudes -Behaviour	The study found positive changes in teachers' use of and attitudes to research evidence.	NA	1
Vaughn (2004) The role of mentoring in promoting use of research-based practices in reading.	Pre-post evaluation	2 schools, 12 teachers (six mentors, six participants)	Pre-post interviews, teacher implementation logs, and observations using checklists	Complete or minimal missing data	Mentoring (Active single component)	Teachers' use of research evidence-based reading strategies -Behaviour	The study found a positive impact on teachers' use of research evidence.	NA	1
Briand-Lamarche et al. (2016) Evaluation of the processes and outcomes of implementing a competency model to foster research knowledge	Multiple case study	7 schools, 24 participants Canada	Tracking sheets and three series of interviews	The "attrition rate" was not clearly reported by authors. Missing data was not clear to calculate the "attrition", but there were clearly missing cases	The intervention was based on various components, some of which are: sharing materials and giving training to participants (Research summaries)	Teachers' attitudes toward academic research and their use of research evidence -Attitudes -Behaviour	Teachers' attitudes towards research evidence: Positive Teachers' use of research evidence: Unclear/mixed	NA	1

utilization in education				at different stages of the interviews.					
Mady (2013) Reducing the gap between educational research and second language teachers' knowledge	Pre-post evaluation	38 teachers (pre-survey) 21 (post survey) 18 (both) Canada	Pre-post survey	38 teachers (pre-survey) 21 (post survey) 18 (both)	Teachers were given six research articles, including supporting guides and allowed to discuss on online forum (Technology)	Teachers' knowledge (conceptual of research use) -Knowledge (attitudes)	The study found that teachers improved their knowledge after the intervention.	NA	1
Abbott et al. (2002) Phonemic awareness in kindergarten and first grade	Pre-post evaluation	Kindergarten intervention :6 pupils First-grade intervention: 11 pupils Expanded first-grade intervention:12 pupils	Pre-post test	The "attrition rate" was not clearly reported by authors. The study reported minimal missing cases at different stages.	Teachers participated in the process and generated useful materials based on phonemic awareness. They were also given training and follow-up support (Collaborative)	Pupil's literacy skills -End-user	Pupils improved their literacy skills after the intervention	NA	1
Maheady et al. (2004) Preparing preservice teachers to implement class wide peer tutoring.	Pre-post evaluation	10 teachers 207 students USA	-Pre-post tests -Observation	Complete or minimal missing data	Participants were given training and supported with workshop plus in class assistance regarding a research evidence-based program	Students' weekly spelling test performance -End-user Teachers' accurate use	Teachers used the evidence-based program accurately, and students made progress in their test results.	NA	1

					(Active multi-component)	of evidence-based practices -Behaviour			
Learmond (2017) Evaluating the use of instructional coaching as a tool to improve teacher instructional strategies at a Title 1 middle school: An action research study	Action research	12 teachers and two instructional coaches USA	Observations, interviews and post-intervention checklists	Complete or minimal missing data. The "attrition rate" or "missing data" was not clearly reported by authors.	Instructional coaching model (Active single component)	Teachers' use of research-based instructional strategies -Behaviour	The intervention improved teachers' use of research evidence-based strategies	NA	1
Schnorr (2013) Effects of multilevel support on first-grade teachers' use of research-based strategies during beginning reading instruction	Multiple baseline	9 teachers USA	Observation	Complete or minimal missing data	Workshop and coaching (Active multi-component)	Teachers use of research based strategies on reading -Behaviour	The study improved teachers' accurate use of research evidence-based strategies	NA	1
Kutash et al. (2009) The use of evidence-based instructional strategies in special education settings in	Pre-post	15 teachers, 87 students USA	Pre-post test Checklist	Complete or minimal missing data	Teachers were allowed to engage with research evidence to develop evidence-based manuals. They were given training and supported with an instructional	Teachers' use of research evidence, students' academic achievement -Behaviour	The study yielded mixed results for both outcome measures (behaviour and end-user): Unclear/mixed	NA	1

secondary schools: Development, implementation and outcomes.					consultant during the intervention. (Collaborative)	-End-user			

H-2. Quality appraisal table

Study	Design	Scale	Dropout	Data quality	Other threats	Rating
Lord et al. (2017a)	4 🔒	4 🔒	4 🔒	4 🔒	4 🔒	4 🔒
Lord et al. (2017b) *end-user	4 🔒	4 🔒	4 🔒	4 🔒	4 🔒	4 🔒
Lord et al. (2017b) *attitudes and behaviour	4 🔒	3 🔒	2 🔒	2 🔒	2 🔒	2 🔒
Wiggins et al. (2019)	4 🔒	3 🔒	3 🔒	3 🔒	3 🔒	3 🔒
Rose et al. (2017) *end-user	4 🔒	4 🔒	3 🔒	3 🔒	3 🔒	3 🔒
Rose et al. (2017) *attitudes and behaviour	4 🔒	3 🔒	2 🔒	2 🔒	2 🔒	2 🔒
See et al. (2016)	3 🔒	2 🔒	2 🔒	2 🔒	2 🔒	2 🔒
Purper (2015)	4 🔒	2 🔒	2 🔒	2 🔒	2 🔒	2 🔒
Nelson-Walker et al. (2013)	4 🔒	2 🔒	2 🔒	2 🔒	2 🔒	2 🔒
Ely et al. (2014)	4 🔒	2 🔒	2 🔒	2 🔒	2 🔒	2 🔒
Ely et al. (2018)	4 🔒	2 🔒	2 🔒	2 🔒	2 🔒	2 🔒
Clarke et al. (2011)	4 🔒	2 🔒	2 🔒	2 🔒	2 🔒	2 🔒
Doabler et al. (2014)	4 🔒	2 🔒	2 🔒	2 🔒	2 🔒	2 🔒
Griggs et al. (2016)	1 🔒	1 🔒	1 🔒	1 🔒	1 🔒	1 🔒
Speight et al. 2016	1 🔒	1 🔒	1 🔒	1 🔒	1 🔒	1 🔒
Kretlow et al. (2012)	1 🔒	1 🔒	1 🔒	1 🔒	1 🔒	1 🔒
Sawyer (2015)	1 🔒	1 🔒	1 🔒	1 🔒	1 🔒	1 🔒
Ogunleye (2014)	1 🔒	1 🔒	1 🔒	1 🔒	1 🔒	1 🔒
Vaughn (2004)	1 🔒	1 🔒	1 🔒	1 🔒	1 🔒	1 🔒
Briand-Lamarche et al. (2016)	1 🔒	1 🔒	1 🔒	1 🔒	1 🔒	1 🔒
Mady (2013)	1 🔒	1 🔒	1 🔒	1 🔒	1 🔒	1 🔒
Abbott et al. (2002)	1 🔒	1 🔒	1 🔒	1 🔒	1 🔒	1 🔒
Maheady et al. (2004)	1 🔒	1 🔒	1 🔒	1 🔒	1 🔒	1 🔒
Learmond (2017)	1 🔒	1 🔒	1 🔒	1 🔒	1 🔒	1 🔒

Schnorr (2013)	1 🔒	1 🔒	1 🔒	1 🔒	1 🔒	1 🔒
Kutash et al. (2009)	1 🔒	1 🔒	1 🔒	1 🔒	1 🔒	1 🔒

*outcome measures