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978-0-521-19725-0 - Handbook of Implementation Science for Psychology in Education

Edited by Barbara Kelly and Daniel F. Perkins

Excerpt

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## Part I

# WHAT IS IMPLEMENTATION SCIENCE?



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## CHAPTER 1

# Implementation Science for Psychology in Education

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## What Is Implementation Science?

How to implement interventions effectively in educational contexts is the theme of this book. Essentially, the book aims to provide a resource for those involved in designing and delivering intervention in educational contexts. A range of applied and academic scientists, psychologists, educators, organisational consultants and practitioners from various domains explore the gap between the design and development of evidence-based programmes or interventions and the design and methodology required to ensure their successful transfer and application in real-world contexts. The book explores the topic of *implementation science*, a new area of scientific, academic and practitioner interest focussed on exploring and explaining what makes interventions work in real-world contexts.

Paradoxically, this new science has arisen mainly from the study of failure. Psychological interventions, or indeed any interventions involving people and resources in natural contexts, have notoriously unpredictable outcomes. This has been the case

for some considerable time, but implementation science is a remarkably new development. The scientific themes combining to create implementation science have materialised from a range of sources cutting across disciplines and practice contexts. The first academic journal dealing exclusively with this area appeared only as recently as 2006. The journal aimed to pull together the very disparate fields of epistemology, research protocols, practitioner methodology and experience that combine to create the implementation science focus and knowledge base. Before this, a wide-ranging evidence and interest base had begun to develop in pockets where failure to implement effectively was identified as underlying failure of interventions. A scientific focus on implementation provides the coherent perspective and accessibility urgently required by all applied scientists and practitioners, presenting evidence and direction for creating and supporting real-world change.

The application of psychology is well recognised, and it is influential in a wide range of contexts. Psychological programmes and interventions are applied globally in

educational, health, organisational and therapeutic contexts with the overarching objective of enhancing human well-being and potential. In education, psychological theory and empirical research have informed and continue to inform and develop many aspects of teaching and learning. For example, understanding and developing effectiveness in teaching style, literacy acquisition, behaviour management, social and emotional education, curricular design, school ethos and staff development and training are key areas derived directly from psychological theory and research.

In contrast, however, the effectiveness in general of applied psychological theory and intervention has proved very difficult to demonstrate with consistency, particularly in real-world contexts. Certainly, traditional, empirical approaches to design, measurement and evaluation of the effects of applied psychology have created a considerable range of what are rightly called 'evidence-based' programmes. However, problems have arisen in the transfer of these to real-world contexts that lack experimental control. These problems are mainly due to a scientific failure to anticipate and take into account factors and processes underlying variability and unpredictability in effectiveness. Variability effects arise from a range of sources but are related mainly to characteristics and attributes of practitioners who are asked to implement programmes and to surrounding contextual issues. Practitioners' understanding of the theory underlying the programme, their knowledge of how it should be implemented and why, their beliefs about the programme's potential to bring about change and the impact of external constraints such as time and resources have a profound effects on results.

Exploration of the nature of barriers to effectiveness and their impact on the delivery of effective evidence-based programmes in the real world is the major focus of implementation science. Implementation science is the study of the processes and methods involved in the systematic transfer and uptake of evidence-based practices into routine, everyday practice. Its central

aims are to support the understanding of relevant, contextual processes and improve the quality and effectiveness of what is delivered as psychological intervention in applied contexts.

### Scientific Paradigms and the Concept of Evidence Base

An important contemporary objective for practitioners is to make use of evidence-based practice. Evidence-based practice is practice that is based on robust research evidence of efficacy and effectiveness. Research on effectiveness is particularly salient where investment by government and other stakeholders is substantial and outcomes are intended to reflect and mobilise progressive policy. Directives to use evidence-based intervention have extended to education policies in the United States, where funding has been allocated specifically for schools to adopt proven, comprehensive reform models (American Psychological Association Presidential Task Force on Evidence-Based Practice, 2006; Slavin, 2002). In the United Kingdom, the demand for evidence-based intervention and practice is less explicit at the policy level but is expected of educational, psychology and other practitioners and is embedded in the leading concept of accountability (Friedman, 2005).

Evidence-based intervention is developed by rigorous, systematic scientific procedures. To be sure that a programme or intervention can be described as evidence-based, procedures commonly may involve the use of randomised, controlled trials (RCTs) at some point in the evolution of the intervention. RCT is an experimental design that involves the random allocation of participants either to an experimental group, which receives some form of treatment or intervention, or to a control group, which receives no such treatment or intervention (Robson, 2002). The RCT procedure is designed to ensure that there is an equal probability of the assignment of participants to the different conditions and to minimise bias by ensuring that there is

comparability across groups. In this way, the impact of a programme or intervention can be measured by comparing the two groups before and after the intervention is applied. This type of research is considered to be essential in establishing the effectiveness of interventions, and therefore, it can be seen to underpin *directly* the development of effective, replicable programmes and practices that schools are encouraged to adopt. However, despite conviction that evidence-based intervention represents the 'gold standard' in practice contexts, ongoing attempts to assess the impact of any interventions applied in schools and in other contexts has highlighted substantial obstacles and challenges, not least of which are related to the complex processes of implementation. The traditional scientific approach, as Slavin (2002) points out, has largely been responsible for the transformation of society, guiding developments in medicine, technology and agriculture. However, he suggests that education has somehow avoided the classical scientific paradigm, and he points to the continuing haphazard adoption in schools of programmes and packages that are not scientifically verified. The situation remains similar in the United Kingdom. The realisation of contemporary aims and ideals in education does seem to rest to a large extent on psychological and social research, but educational policy and practice have not been so radically influenced and systematically transformed by scientific methodology and findings per se. The reasons for this are complex and related to the nature of the hitherto covert processes involved in enabling, demonstrating and measuring effectiveness. Evidence presented throughout this book indicates that although the traditional scientific approach is still accepted as critical to prove effectiveness, it is in fact highly unlikely to demonstrate statistically significant intervention effects from programme evaluation in uncontrolled and unprepared social contexts. However, while this information has been available for some time, it has not informed the development of methodologies more suited to the task (Boruch et al., 1975, 1978).

## Identifying Barriers to Effectiveness

The processes operating in or around social contexts such as the classroom are elusive, intricate and unpredictable. It is these processes that have proved resistant to the rigours of the classical scientific paradigm, requiring a distinctive but complementary type of scientific methodology to measure and, in many instances, offset their influence. It is these processes that prevent or potentially support the transfer of scientifically developed, evidence-based approaches to real-world contexts, and they explain why it has not been possible to predict with accuracy how well a programme or approach will fare across a variety of real, as opposed to controlled, situations. The scientific approach to promoting change in human relational contexts has to take into account social, perceptual, attitudinal and value-based characteristics as well as existing frameworks for action, such as ethics, resources and policy directives. All these may support or hinder the intervention and change processes. It is clear now that these dimensions operate to a distinctive set of rules and that they are *additional* to those identified in classically controlled experimental paradigms. They require a distinctive systematic and scientific approach to understand and manage their effects.

It is a compelling fact that although psychological interventions may reflect rigorous standards of theory, development, design and methodology at the initial stages, and although they justifiably acquire the label 'evidence-based', variation across contexts is the norm. This has undoubtedly undermined confidence in the utility of psychology for educational or indeed any contexts. However, a greater degree of predictability is emerging steadily via the implementation perspective, illuminating processes and characteristics previously hidden but nevertheless critical in the gap between theory and practice. New design and methodology are providing a distinctive set of approaches involving innovative protocols and perspectives in scientific understanding and practice. Much of this relates to

what is described as *implementation quality* and involves a network of integrated processes affecting staff training and selection, incorporation of interventions into school operations, organisational capacity and resourcing, principal and management support and readiness for change and progress embedded in specific practitioner values and attitudes. Implementation science can now provide frameworks for the preparation, execution, evaluation and sustainability of interventions in schools, organisations and communities. This information is proving to be decisive not only in supporting and sustaining the impact and effectiveness of programmes and interventions but also in influencing how they are conceived, designed and resourced.

### The Emergence of Evidence-Based Implementation

The key question for implementation scientists has been: What is it about real-world contexts that makes measurable effectiveness so difficult to achieve? Although this particular question has taken a long time to emerge, it is central to the development of the concept of evidence-based practice in applied social contexts. Critically, the concept of evidence-based now has two elements, and the idea of an evidence base is not solely related to the nature of the evidence supporting a particular programme but applies *equally* to the way a programme is implemented in the field.

Researchers have always realised that what transpires in the field, especially in intervention research, does not reflect perfectly the conditions of scientifically controlled intervention trials. However, the powerful and decisive effects of contextual variables have been minimised to a large extent in research reports and in most cases completely overlooked in scientific explanations of variability. In a key paper illustrating this fundamental oversight, Dane & Schneider (1998) investigated the extent to which programme integrity – that is, the degree to which programmes were

implemented as planned – was verified in studies of prevention programmes published between 1980 and 1994. Although a fair amount had been written by that stage about implementation processes and obstacles to programme integrity, the processes and variables involved were still not part of *scientific routine* in programme design, implementation and outcome evaluation. The authors selected articles for review in which an intervention focussed on the primary or early secondary prevention of behavioural, social and/or academic maladjustment in children. In total, 231 studies were examined in detail. Only 39 of 102 outcome studies specified features for the documentation of programme integrity. Of these, only 13 considered variations in integrity in analysing the *effectiveness* of the programme.

Dane & Schneider (1998) highlighted the importance of programme integrity in the context of preventative interventions. Some contemporary literature pointed out that interventions were often implemented in contexts presenting a range of identifiable *obstacles* to implementation and integrity. At that point, known obstacles mainly involved the feelings, values and attitudes of the programme recipients about the programme, the involvement of paraprofessionals in implementing programmes and limitations in resources to support programme delivery. Rohrbach and colleagues (1993) highlighted the fact that paraprofessionals might tend to feel uncomfortable or unfamiliar with the material they were being asked to deliver and, because of this, might prove less effective in delivering a programme exactly as it had been designed. Lack of appreciation of the impact of aspects of programmes also might result in spontaneous decisions by recipients to change the design or often, because of perennial resource problems, to cut or shorten an intervention. In addition, in schools, for example, where a large number of preventative interventions were taking place, a poor programme-context fit in terms of how much users saw the programme as useful and practical was found to have an impact on the integrity of the implementation and therefore on its measured impact and success.

A number of early studies involving attention to aspects of implementation indicate that as control over the implementation of interventions is relinquished by researchers, inconsistencies and distortions arise in delivery and therefore affect outcome. These tendencies emerge even in *effectiveness trials*, which involve testing interventions in naturalistic conditions using only the resources likely to be available in real-world contexts and thereby predicting and allowing compensation for the impact of less than optimal implementation (Rohrbach et al., 1993). Dane & Schneider's (1998) meta-analysis demonstrated that lowered adherence to programme or intervention protocol was significantly associated with poorer outcome. They found mixed evidence of dosage effects – effects related to how much of the programme recipients actually received. Crucially, they concluded that the omission of integrity data, particularly measures of adherence, would potentially compromise the internal validity of outcome studies.

The failure to consider programme implementation has had wide-ranging effects on the quality and usefulness of the scientific process of developing reliable evidence-based applied psychology. Knowledge about programme integrity enhances interpretation of effects. Significant programme effects can be hidden by inconsistencies in implementation. If programme integrity is not verified, evaluations may *under-represent* the potential of an intervention, putting programmes at risk of discontinuation that, in fact, are valuable and effective if implemented as designed (Felner et al., 1991).

### Future Directions

Issues of control and measurement of contextual issues and implementation quality may be edging to the forefront for some social scientists and practitioners, but they are still considered optional in design, implementation and evaluation. For example, a number of relatively recent reviews explored whether depression can be prevented in children and adolescents. These

included Durlak & Wells (1997), Gillham et al. (2007), and Merry et al. (2006). All argued that the evidence for prevention was inconclusive and highlighted the failure to evaluate programme integrity as a possible source of variation.

Implementation scientists can now offer model programmes that combine classical scientific paradigms with frameworks for implementation. For example, from the clinical perspective, Chambless & Hollon (1998) recommend rigorous experimental methods for treatment outcome research involving randomised assignment to condition, use of control groups, provision of a manual for delivery to allow faithful replication of the programme, consistent training for those delivering interventions and checks for programme adherence using a range of reliable and valid outcome measures. Spence & Short (2007) also suggest that programmes need a clear theoretical and conceptual basis and should be comprehensive, employ a variety of teaching methods, implement sufficient dosage and be based on the development of positive relationships. However, in recent evaluations of school-based interventions aimed at promoting social and emotional learning and skills and following implementation frameworks, Spence & Short (2007) noted ongoing and considerable variability in programme effectiveness. Greenberg et al. (2001) also noted additional factors within the child, family and school context likely to affect outcomes. Gillham et al. (2007) underline the complexity of developing an implementation science in finding that in their depression-prevention intervention, outcomes differed by school with *no identifiable variables* linked to different outcomes. They suggest that despite awareness of implementation effects and processes, subtle and complex school differences were affecting delivery and outcome of the programme.

It seems that implementation science has only begun to uncover the complexity of implementation and will continue to draw on eclectic perspectives, mixed models and wide-ranging evidence to create working models of reality and change.

Reviews of current programmes may give an unbalanced account of awareness and practice in the implementation field. Currently, an awareness of implementation and contextual issues may mitigate against large-scale prevention or intervention programmes that require wide dissemination and are beyond the immediate control of highly trained implementation support staff. Implementation evidence suggests a role for the interventionist field specialist who is able to build purposeful and effective relationships with clients and stakeholders and to work systematically to clarify highly specific contextual needs in individual organisations. Implementation science may define need currently in relation to overall *readiness for evidence-based programmes* – adequate resourcing, skills and capacity for effective delivery and ongoing evaluation. How to most effectively bring about the positive transformation of processes affecting implementation and development of the practitioner skills and ecological characteristics required to support change represents the cutting edge of implementation science.

If effective implementation is the key to intervention effectiveness, then all practitioners involved directly and indirectly in education and related professions are pivotal to its success. School psychologists as well as teacher educators and teachers themselves, and indeed all those who contribute by delivering programmes or services, are able to support or hinder implementation processes. Likewise, policymakers, research funders, stakeholders and advisors need to become aware of the central role played by implementation in the success of investment in programmes.

### The Goals of This Book

Since the last millennium, the understanding and reporting of implementation effects have increased. Informed approaches for effective implementation draw on a substantial and growing evidence base about how best to support the application of psychology in education and elsewhere. However,

understanding of implementation processes is a separate, if related, discipline to the creation of evidence-based programmes per se. Slavin (2002) is undoubtedly correct in noting that schools do not currently select programmes because of their demonstrated evidence base. This issue has become very pressing. Knowledge is increasing about the evidential standards and effectiveness of programmes, and high-quality information is available about evidence base and how the selection of specific programmes should be made. The Collaborative for Academic, Social and Emotional Learning is a good example of initiative in this area and is a non-profit organisation that is advancing scientific methodology and evidence-based practice in social and emotional learning. The *Handbook of Implementation Science for Psychology in Education* offers an indispensable resource to all stakeholders in providing information about *how to* enhance impact from evidence-based programmes. This information is not yet disseminated as a discrete field of training or information for professionals in education, and this book makes unprecedented headway in clarifying concepts and setting out what information is available and how it can be used.

The boundaries of implementation science are currently drawn around the processes of implementing discrete programmes, but information on how to implement *any* aspect of teaching and learning comes under the same banner of promoting effectiveness. For this reason, this book contains chapters on work that is drawn from very different perspectives but which has been identified as supporting implementation of many different psychological and educational concerns. For example, there are chapters that explore frameworks for supporting implementation from a wide lens and in a range of contexts, and there are others that have a narrow focus, for example, on the elements of discourse or critical aspects of the teacher's role that have an impact on the quality of the learning experience and learning outcomes. By linking work from different and unrelated fields, this book highlights the intricate and potentially extensive role

of implementation science in supporting all educational outcomes. However, its influence extends from the classroom to the home and the community, as well as to decision making and policy forums dealing with the appropriate allocation of resources, successful prevention of difficulties and effective evaluation of needs and outcomes. The use of evidence-based programmes and evidence-based practice supported by implementation science can strengthen the effectiveness of both psychology and education. This integrated approach fosters a shared purpose and a common vision.

### The Plan of This Book

The chapters in this book are designed to reflect a wide and developing knowledge base about the influence of implementation effects and to allow an exploration of the implications for practice of an accumulation of useful and constructive findings. The chapters are organised into parts that focus on different areas of concern.

Part I begins with this chapter, and then, in Chapter 2, Karen Blase et al. discuss the role of implementation science in great depth and make a far-reaching, comprehensive contribution to promoting an understanding of implementation science. The authors draw on the work of the National Implementation Research Network and the Frank Porter Graham Child Development Institute, synthesising literature on implementation across a wide range of contexts. They outline a conceptual and practice-related framework of core implementation components related to key features of evidence-based practices and programmes.

Part II, 'Statistical Problems, Approaches and Solutions', covers epistemological, methodological and statistical issues that have a bearing on implementation science. This section is about exploring the potential and limitations of statistical methods in developing, applying and evaluating the impact of psychology in educational and related contexts. The aim is to describe methodologies and analytical approaches that fit

the demands of real-world effectiveness evaluation. Chapters tackle the epistemological, scientific and conceptual demands at the heart of evidence-based thinking and explore how new approaches may be developed, linking these with effective and useful scientific paradigms for real-world psychology. In Chapter 3, Tracey Bywater explores the complex methodology involved in ensuring that programme evaluations are rigorous and comprehensive. In Chapter 4, James Boyle considers the nature of experiments in real-world contexts, exploring how experimental paradigms can be incorporated into systematic *mixed-methods* approaches to contextual design and methodology. In Chapter 5, Carl J. Dunst and Carol M. Trivette explore information emerging via meta-analyses of the analysis of impact of implementation features in practice contexts. In Chapter 6, Judith Bennet provides an original and essential commentary that includes the rarely explored issue of the epistemology and its impact on interpretations of teaching practice, outcome assessment and evaluation.

Part III, 'Preparing for Effective Implementation: Frameworks and Approaches', focuses on methods *enabling* effective change. In Chapter 7, I explore how the implementation science evidence base can be accessed to enhance and integrate school psychology service delivery and practice at a range of levels from the conceptual to routine application. Chapter 8, by Jeremy J. Mosen and Lisa Marks Woolfson, looks at the role of problem-solving frameworks in educational psychology training and practice in the United Kingdom, linking the epistemology of critical realism to conceptual issues and key features of psychology in schools. The authors reflect on the implications and usefulness of this approach for implementation science in practice. They suggest that this type of innovative, overarching framework helps to ensure that readiness for change, programme fidelity and evaluation issues are tackled collaboratively in schools as a matter of course. This approach involves teachers and other professionals in collaborative development, design and evaluation

of interventions. In Chapter 9, Gregory A. Aarons, Amy E. Green and Elizabeth Miller review the design and development of an instrument for assessing organisational readiness for change in practitioners, the Evidence-Based Practice Attitude Scale (EPAS). This instrument measures directly practitioner attitudes to accepting and implementing evidence-based change and is invaluable in highlighting where work *prior to* implementation may be required to enhance effectiveness.

Continuing the focus on enhancing organisational and practitioner effectiveness, Robert Illback in Chapter 10 offers a cutting-edge discussion and review of the elements of collaborative consultation processes, which are known to facilitate positive shifts in values, attitudes and practice in organisational contexts. Chapter 11, by Janet A. Welsh, looks afresh at pupil readiness for school context in relation to pressures for teacher accountability and implementation of successful teaching for student success.

Parts IV and V look in depth at the implementation of programmes and interventions with very specific goals and across very different contexts. Part IV, 'Successful Implementation of Specific Programmes and Interventions: Social, Emotional and Behavioural Change, Literacy Development and Leisure Education', looks at how implementation science can support directly a wide range of highly focused programmes and interventions in schools. These chapters are of great relevance for practitioners in particular who need detailed direction and support to develop high-quality implementation skills. In Chapter 12, Celene E. Domitrovich, Julia E. Moore, and Mark T. Greenberg review the practices and processes underlying maximum effectiveness in the implementation of social-emotional interventions for younger children. In Chapter 13, Keith Topping outlines a framework to support teachers and other school staff in improving the impact of school-based social competence programmes in general. In Chapter 14, Glen Dunlap, Phillip Strain and Lise Fox move beyond the school context and offer guidance on

implementing evidence-based strategies for managing seriously challenging behaviour in children with autism in the community. The authors review data and concepts related to the successful implementation of positive behaviour support, emphasising the precision of instructional delivery, dosage, ecological validity and importance of data-based decision making. In Chapter 15, Elizabeth Stormshack et al. outline the Ecofit Program, an evidence-based, integrated approach to parent intervention that is inspired by research indicating that successful interventions tackle multiple domains in reducing behavioural and academic problems. The project is implemented via school staff and resources and addresses misbehaviour in school via careful interventions tackling family interaction patterns.

Several chapters in this part deal specifically with the implementation of literacy programmes and the day-to-day effective teaching of literacy skills in schools. In Chapter 16, Robert Savage gives a comprehensive review of evidence-based reading interventions with a focus on the role and impact of implementation issues for the twenty-first century. The evidence base for *what works* is covered in detail, pursuing themes in research and evidence bases and exploring more technical issues in the teaching and learning dialogue. New perspectives are offered in quality implementation, methodology, scalability, sustainability and response to intervention. Chapter 17, by Colleen Reutebuch and Sharon Vaughan, also considers evidence-based literacy practices, but in relation to implementation, reading behaviour and the role of individual risk factors in compensatory literacy programmes for children who have English as an additional language. Part IV is completed by Chapter 18, in which Linda Caldwell explores the implementation of evidenced-based leisure education programmes.

In Part V, 'Improving the Implementation of Evidence-Based Programmes and Interventions via Staff Skills, Organizational Approaches and Policy Development', the intention is to shift the focus away from details of individual interventions and