



Archived by Flinders University

This is the peer reviewed version of the following article:  
Lendrum, A., & Askill-Williams, H. (2019). Types of  
knowledge teachers use when solving educational  
problems. In *Problem Solving for Teaching and Learning*  
(pp. 140–156). Routledge. [https://  
doi.org/10.4324/9780429400902-11](https://doi.org/10.4324/9780429400902-11)

which has been published in final form at  
<https://doi.org/10.4324/9780429400902-11>

Reproduced in accordance with the publisher's article  
sharing policy

Copyright © 2019 Routledge

**AUTHOR VERSION OF CHAPTER 11 SUBMITTED TO  
Problem solving for teaching and learning: A festschrift for  
Emeritus Professor Mike Lawson**

**Types of Knowledge Teachers Use When Solving Educational  
Problems: A Case Study of the Implementation of the Promoting  
Alternative Thinking Strategies (PATHS) Program**

Ann Lendrum *<https://orcid.org/0000-0002-4469-4804>*

Helen Askill-Williams *<https://orcid.org/0000-0002-1071-5216>*

# **Types of Knowledge Teachers Use When Solving Educational Problems: A Case Study of the Implementation of the Promoting Alternative Thinking Strategies (PATHS) Program**

## **Abstract**

Many schools are introducing programs for promoting students' social and emotional learning (SEL). However, evaluations often report that intended outcomes have not been achieved, attributing this to teachers' poor adherence (fidelity) to a program's goals, structures, and processes. We propose an alternative view of teachers' involvement in curricula delivery. We position teachers as critical and reflective practitioners who use their professional knowledge and experience to solve educational problems, adapting methods of program delivery, differentiation, and contextual fit as one of their problem-solving processes.

In this chapter, we report our investigation of interview data from 106 teachers involved in implementing Promoting Alternative THinking Strategies (PATHS), a SEL program, in 23 primary schools in Greater Manchester, England. We used Shulman's (1986, 1987) categories of teachers' knowledge to explore the types of professional knowledge that underpinned teachers' problem solving and subsequent adaptations to the prescribed curriculum. Our analysis revealed that teachers frequently drew upon identifiable components of professional knowledge, particularly pedagogical content knowledge and knowledge of learners and their characteristics, to solve educational problems during their delivery of PATHS.

## **Introduction**

A decline in the positive mental health and wellbeing of children and young people, particularly in developed countries, has been identified in recent decades (Bor, Dean, Najman, & Hayatbakhsh, 2014; Collishaw, 2015; Green, McGinnity, Meltzer, Ford, & Goodman, 2005). Schools are encouraged to address this decline by implementing interventions to promote positive mental health for all pupils (Greenberg, Domitrovich, Weissberg, & Durlak, 2017; Humphrey, 2013).

Many programs have entered the education market to support teachers' delivery of SEL education. Examples include Second Step (<http://www.secondstep.org>) and Promoting Alternative THinking Strategies (PATHS) (<http://www.pathseducation.com>), which have been evaluated and demonstrated to be effective in the United States (Crean & Johnson, 2013; Low, Cook, Smolkowski, & Buntain-Ricklefs, 2015). Similar approaches have also been developed in Australia, including KidsMatter: Primary schools (DoH, n.d.-a), MindMatters: Secondary schools (DoH, n.d.-b), and ResponseAbility (DoH, n.d.-c) for universities and teacher educators. In November 2018, these long-running Australian initiatives were superseded by an integrated birth to age 18 National Education Initiative (beyondblue, 2018). In England, Social and Emotional Aspects of Learning (SEAL) was introduced for primary schools in 2005 (DfES, 2005) and by 2010 approximately 90 per cent of primary schools were using it (Humphrey, Lendrum, & Wigelsworth, 2010). SEAL was introduced for secondary schools in 2007 (DfES, 2007).

Despite schools' investments in selecting and adopting evidence-based programs, program

implementation is not always effective or sustained. For example, the number of schools delivering SEAL has dropped considerably in recent years and the UK Government archived the program in 2011 following mixed evaluation findings. Similarly, Askell-Williams (2017) reported that a follow-up survey of 100 trial schools in the highly-resourced KidsMatter: Primary schools initiative revealed that one in five schools reported they were no longer delivering the initiative with fidelity only one year after its introduction (see also Devaney, O'Brien, Resnik, & Weissberg, 2006; Scheirer, 2005; Wigelsworth, Humphrey, & Lendrum, 2012a, b). Similarly, Elias, Zins, Graczyk, and Weissberg (2003) reported that implementation of an evidence-based social-emotional curriculum was sustained in only six of 14 start-up sites five years after its introduction.

Reported outcomes of many interventions are based on efficacy trials, which are typically conducted under highly controlled, optimal conditions (Dusenbury, Brannigan, Falco, & Hansen, 2003) so that an intervention's effectiveness and internal validity may be clearly demonstrated. Schools and teachers who later adopt the intervention rarely have access to the technical expertise and resources that were available to researchers and program designers (Greenberg, Domitrovich, Graczyk, & Zins, 2005). Thus, they are unable to implement programs with the developers' expected levels of fidelity, resulting in implementation variability (Durlak & DuPre, 2008) that has been frequently identified as a key moderator in achieving effective outcomes (e.g. Durlak, 2016).

### **Implementation variability: Fidelity and adaptation**

Implementation variability is frequently attributed to poor adherence (fidelity) to a program's prescribed procedures (Durlak & DuPre, 2008); therefore, any adaptations to the prescribed procedures are seen as implementation failure and detrimental to program effectiveness (e.g. Bellg et al., 2004; Bradshaw, Debnam, Koth, & Leaf, 2009; Carroll et al., 2007; Century, Rudnick, & Freeman, 2010; Hansen et al., 2013; Lee et al., 2008; Melde, Esbensen, & Tusinski, 2006; Weare & Nind, 2011). However, Carvalho et al. (2013) proposed that adaptation is a natural element of implementing evidence-based interventions, and research has demonstrated that adaptations of school-based interventions are inevitable (Hansen et al., 2013; Ringwalt et al., 2003). For example, Hansen et al.'s examination of 306 video recordings of teachers delivering *All Stars*, a middle school drug prevention program, found that all teachers made adaptations. Similarly, Miller-Day et al. (2013) examined lesson adaptations made by 31 teachers who implemented the *keepin' it REAL* drug prevention curriculum in 7th grade classrooms. Although teachers reported making adaptations in only 68 per cent of lessons, independent researchers reported adaptations in more than 97 per cent of the observed lessons.

It should not be assumed that adaptations inevitably represent implementation failure even though they contribute to implementation variability. Whilst some level of adherence is undoubtedly required, successful outcomes may be achieved with levels of around 60 per cent fidelity (Durlak & DuPre, 2008). This suggests that some variability may be acceptable without detriment to achieving intended outcomes. Indeed, adaptations may improve sustainability and effectiveness (Berman & McLaughlin, 1976; O'Donnell, 2008) by enhancing goodness-of-fit between the program, its implementers and recipients (Greenberg et al., 2005). Of course, this does not necessarily mean that all adaptations are beneficial. The quality of an adaptation is critical (Humphrey, Barlow, & Lendrum, 2017; Humphrey et al., 2016).

## Understanding adaptations

If adaptations are inevitable (Hansen et al., 2013), then it is important to understand why they are made. This information may support program developers in providing more flexible frameworks for implementation that detail where fidelity is crucial, as well as where teachers may make beneficial adaptations. Implementation evaluations have previously identified key factors that contribute to adaptations, including an implementer's enthusiasm and perception of the need for the intervention; an understanding of the key concepts and the skills to teach them (Durlak & DuPre, 2008). Adaptations can be reactive or proactive (Hansen et al., 2013). In Moore et al.'s (2013) study of ten programs, lack of time, limited resources and difficulty retaining participants were listed as the most common reasons for reactive adaptations, whilst changes to the procedures, dosage, and content were the most frequently cited types of modifications. Proactive adaptations to pre-empt challenges, such as modifications to improve alignment with students' known needs, have also been observed (Moore et al., 2013). Hansen et al. reported pro-active adaptations that reflected teachers' modifications to suit their pedagogical styles and teaching goals, as well as students' learning needs. These types of adaptations, informed by teachers' professional education and experience, as well as their abilities to solve educational problems, may not only be desirable (Jennings & Frank, 2015; McIntosh, Horner, & Sugai, 2009) but are also, perhaps, predictable. As Fenstermacher (1978, 1986 cited in Shulman, 1987, p. 13) argued:

The goal of teacher education is not to indoctrinate or train teachers to behave in prescribed ways, but to educate teachers to reason soundly about their teaching as well as to perform skilfully.

Accordingly, teachers can be perceived as critical reviewers of programs. Their program adaptations may not arise from resistance or misunderstandings, but are informed by their professional knowledge and approaches to solving pedagogical problems (Borko & Putnam, 1996; Grossman, 1995; Mishra & Koehler, 2006; Munby, Russell, & Martin, 2001; Shulman, 1986, 1987). Teachers are educated from the beginning of their service preparation to be informed curricula interpreters and deliverers; they are expected to thoughtfully select and adapt curricula resources to their contexts and pupils (DoE, 2011). Teachers are expected to identify problems with curriculum design and delivery, and to solve those problems in ways that suit their specific contexts. It seems at odds with current best practices in pre-service and in-service teacher education to expect otherwise, for example, by demanding fidelity rather than allowing professional interpretation when delivering a wellbeing promotion program (Darling-Hammond, 2006; Feiman-Nemser, 2001; Fenstermacher & Richardson, 2005; Jennings & Frank, 2015). Teachers' problem solving that leads to adaptations to curricula can be conceived as teachers' critical reflective and reflexive practice, which is informed by their professional knowledge and experience. In this chapter, we explore this proposition by using Shulman's (1986, 1987) categories of teachers' knowledge as a framework for examining the types of knowledge that underpinned teachers' adaptations to a SEL intervention.

Shulman (1986, 1987) argued for teaching reform that recognised teachers as agents of comprehension and reasoning, transformation and reflection. He argued that these generative actions go beyond classroom behaviour management and extend to the "management of ideas within classroom discourse" (Shulman, 1987, p. 1). Shulman's seminal work, along with modifications by subsequent authors (e.g. Borko & Putnam, 1996; Depaepe, Verschaffel & Kelchtermans, 2013; Grossman, 1995; Mishra & Koehler, 2006; Munby et al., 2001), suggests that a better understanding of teachers' knowledge can be gained by considering a taxonomy of knowledge types. Shulman's (1986, p. 6) original categories of teachers'

knowledge are:

- content knowledge
- curriculum knowledge (materials and programs)
- general pedagogical knowledge (broad principles and strategies that transcend subject matter, such as behaviour management)
- pedagogical content knowledge (an amalgam of content and pedagogy – unique to each teacher’s strengths and preferences)
- knowledge of learners and their characteristics (students’ strengths, preferences, and needs)
- knowledge of educational contexts (group dynamics, school governance, characteristics of communities) and
- knowledge of educational ends, purposes, values, philosophy, history.

Jennings and Frank (2015) hypothesised that Shulman’s (1986, 1987) categories of teachers’ knowledge could provide a useful framework for considering the interface between teachers’ professional knowledge and their adoption and adaptation of externally-designed SEL programs. In this chapter, we build on Jennings and Frank’s hypothesis by operationalising Shulman’s categories of teachers’ knowledge into a framework for examining teachers’ adaptations to the prescribed delivery of the universal SEL program PATHS in English schools. Investigating the types of knowledge that underpin teachers’ adaptations, we aim to contribute to a better understanding of how programs may be designed to achieve optimal fidelity whilst simultaneously enabling teachers to use their professional knowledge and experience to solve educational problems. This type of research falls into what Spoth, Randall, and Shin (2008) described as “Type 2 translation research” in their Translation Science to Population Impact Framework. Type 2 translation research is concerned with close investigation of the systemic processes and structures that enable programs to be embedded, sustained, and scaled-up, whereas Type 1 translation research is concerned with investigating program efficiency and effectiveness. Spoth et al. (2008) argued that there is very little reported Type 2 research because it typically requires investigations of program aspects that are outside typical evaluation criteria (such as short-term effectiveness and fidelity).

## **The Promoting Alternative THinking Strategies (PATHS) program**

PATHS ([www.pathseducation.co.uk/](http://www.pathseducation.co.uk/)) is a universal, curriculum-based SEL intervention that aims to promote self-control, emotional understanding, positive self-esteem, relationships, and interpersonal problem-solving skills among children aged 4–11. The structured, explicitly taught curriculum is designed to be delivered approximately twice weekly by class teachers, supplemented by generalisation activities and techniques that support the application and reinforcement of new skills throughout the school day. Materials for parents, which aim to extend learning to the home environment, are also provided. The curriculum includes lessons on topics such as identifying and labelling feelings, controlling impulses, and understanding others’ perspectives.

The original US PATHS materials used in the current study were ‘Anglicised’ by Barnardo’s, the children’s charity that owns the UK licence to distribute the program. Anglicisation consisted primarily of surface level changes to support cultural transferability, including modified vocabulary, photographs, and names. It did not substantively change the PATHS structure or delivery model.

## Method

Semi-structured interviews were conducted with teachers involved in a two-year trial of the PATHS curriculum (for details of the outcome evaluation of the UK PATHS trial see Humphrey et al., 2015). The interviews explored key aspects of implementation, including fidelity, dosage, quality, participant responsiveness, program reach, and adaptations (Durlak & DuPre, 2008). Context-specific factors affecting implementation were also explored. The earliest interviews focussed on schools' existing foundations for PATHS, perceptions of need (and benefit), and early installation of the curriculum. As implementation progressed, the interview focus shifted to full implementation, including factors affecting delivery of PATHS. Perceptions of impact and sustainability were explored in interviews toward the end of the trial. Teachers were asked about program adaptations at all stages of PATHS implementation.

## Participants

Participating schools were representative of norms in England in respect of size, attendance, attainment, ethnicity, and the proportion of children identified as having special educational needs. However, there were moderately higher than national average proportions of children eligible for free school meals and who spoke English as an additional language. Table 11.1 summarises participants' details. A total of 106 teachers from 104 classrooms were interviewed. Classes contained an average of 25 students. Teachers averaged 8 years of classroom experience, were predominantly female (81%), and were educated to postgraduate level (51%). Thirty-four per cent reported having 2–5 years of experience implementing other SEL programs prior to adopting PATHS.

<INSERT TABLE 11.1 HERE>

## Data analysis

We used NVivo in a first round of coding to analyse interview data thematically at a semantic level following the six-stage procedure outlined by Braun and Clarke (2006). A hybrid approach was taken to improve rigour and credibility, allowing emergent and unanticipated themes to be identified alongside a priori themes that were informed by implementation theory and research, and the PATHS resources. Negative and disconfirming examples were coded alongside those supporting a given theme to achieve a complete and more nuanced understanding of the processes underpinning PATHS implementation.

In our second round of coding, we focussed on teachers' statements that had originally (in round 1) been coded as 'adaptations', 'perceptions of impact', 'teacher self-efficacy', and 'teacher attitudes to SEL'. We used a framework based upon Shulman's (1986, 1987) categories of teachers' knowledge to identify and code the types of knowledge that underpinned teachers' decisions to make adaptations to PATHS materials, processes, and structures (see Table 11.2). All transcripts were coded by the second author and reviewed by the first author. There were very few discrepancies, all of which were resolved by discussion.

<INSERT TABLE 11.2 HERE>

## Results

The most noticeable product of the two rounds of coding was the large volume of comments from teachers about adaptations they had made to the PATHS program, thus confirming that program adaptation was a salient feature of teachers' program implementation. Eighty-one per cent of respondents mentioned proactive adaptations to the PATHS program, 65 per cent mentioned intentionally reactive adaptations, 10 per cent mentioned unintentionally reactive adaptations, and only two per cent referred specifically to not adapting a program component. In the following discussion, we present the coding categories and representative selections of teachers' comments.

### *Content knowledge*

Shulman (1986) defined content knowledge as what is known by a teacher about a specific subject. We did not find evidence that teachers sought to adapt the 'content knowledge' components of the PATHS materials. Threaded through participants' accounts about their pedagogical adaptations was the sense that the teachers were happy with the fundamental ideas contained in the PATHS materials. Interestingly, this appeared to be linked with the teachers' belief that their own knowledge of SEL was sufficient; that the content of PATHS was "nothing new" (School 13, Y6 teacher). Some teachers had received SEL-specific training in preparation for delivering SEAL, whilst a few, mostly newly-qualified teachers, had received some input during their pre-service education. Others relied on broader knowledge, including PSHE concepts and religious education, or likened SEL to life skills and "common sense" (School 1, Y3 teacher). This suggests some familiarity with the broader concepts of SEL and why teachers felt comfortable about teaching PATHS. Teachers who initially felt they did not have sufficient content knowledge indicated that they were reassured by the PATHS training and coaching support, and the clearly-detailed content in the PATHS resources:

*When you get all these objectives to teach it's quite difficult, so PATHS makes it easy for you to understand. (School 17, Y5 teacher)*

### *Curriculum knowledge*

Shulman (1987) defined curriculum knowledge as an awareness and understanding of the range of materials and programs available for teaching a specific subject. Some teachers had "met similar kinds of strategies through SEAL" (School 10, Y6 teacher), whilst others relied on a more general understanding of SEL as a range of broad competencies and used knowledge from a variety of approaches, including behaviour management, anti-bullying interventions and circle time, to interpret and adapt the PATHS resources.

Almost 100 per cent of respondents referred to generalising concepts to other areas of the curriculum. For example, teachers appeared to use the lesson as "basic starting points that you can then use, the way you can the best" (School 14, Y6 teacher). This included approaching the PATHS curriculum from the perspective of a particular topic, using the relevant lessons to supplement or enhance an existing approach:

*We had anti-bullying week ... we wanted to fit in loads about anger during that week and about feeling relaxed ... so we looked at the story of the selfish giant. (School 41, Y4 teacher)*

## *General pedagogical knowledge*

The term general pedagogical knowledge refers to teachers' broader knowledge of strategies to organise and manage teaching in classrooms (Shulman, 1986, 1987). This was frequently evident in respondents' approaches to curriculum organisation, particularly time-management. For example, more than 75 per cent of teachers mentioned lack of preparation time and lack of time in the mandated curriculum to deliver PATHS. All respondents referred to needing to match the time required to deliver one or more of the PATHS modules with the available lesson times. The limitations of available time were seen as a major barrier to the full implementation of PATHS and resulted in almost all teachers making adaptations to its prescribed structure. A range of strategies was used, including dividing a lesson into two shorter sessions, omitting parts of a lesson to reduce the duration, or combining two or more lessons to reduce the frequency of delivery. Some teachers reported skipping lessons due to competing priorities, with "so many pressures to do so much" (School 17, Y6 teacher) and:

*I would have to see what my class is like at the end... I have got so many things that I am trying to work on, I have got so many interventions, I have got children behind on so many things, I would rather use that half an hour in an academic way. (School 30, Y3 teacher)*

Teachers' adaptations due to time restrictions were also informed by pupils' needs and engagement with the lessons:

*If it goes over I'll just carry on you know, as long as they're able to stay focused. I have had to do it once or twice before where I've only done half the session because they just weren't quite in the right frame of mind. (School 38, Y3 teacher)*

## *Pedagogical content knowledge*

Shulman (1987, p. 8) described pedagogical content knowledge as teachers' "own special form of professional understanding". This category combines pedagogical knowledge with knowledge of subject content. Participants evaluated the PATHS resources and how these might best be delivered to optimise pupils' engagement and understanding. Teachers commented that they:

*look at the material and make that sort of professional decision...how much ... to follow and which bits to leave out. (School 10, Y4 teacher)*

Typically, teachers felt that these solutions to pedagogical problems were informed by their experience, knowledge of the content, and pupils' needs, for example, "This year I've done a lot more adapting, I know what would work and how could I adapt [the materials]" (School 1, Y5 teacher).

Teachers also adapted the resources to "suit...actual teaching ability" (School 14, Y6 teacher) or their preferred pedagogical approach. These adaptations included converting hard copies for use with electronic media such as interactive whiteboards.

Adaptations to improve delivery were generally designed to improve pupil engagement or maintain concentration. These included personalising the lesson scripts and adding activities such as group discussions or role play "to try spice it up a little bit just so there's a bit more action" (School 2, Y5 teacher). As one teacher stated, adaptations were to make lessons "more interesting... that's what any teacher would do" (School 24, Y6 teacher).

Teachers made adaptations to improve the scope and application of the PATHS concepts, including using materials in different ways to those prescribed, for example, using lesson plans as the basis for assemblies, changing the sequence of lessons, or repeating lessons to emphasise the relevance of concepts:

*It seemed relevant to them to go back to that lesson ... because it was relevant to a new incident that had happened [at the school].* (School 5, Y4 teacher)

### *Knowledge of learners and their characteristics*

This theme explored the ways in which teachers' knowledge of their pupils' characteristics as learners underpinned adaptations to the PATHS resources and delivery. The focus was on problem solving to achieve a match between the materials and specific pupils, that is, individualising the PATHS curriculum rather than broader adaptations as found in the general pedagogical knowledge category above.

More than 80 per cent of teachers reported that they "adapted [PATHS] to how that class particularly are" (School 14, Y6 teacher). Adaptations were typically proactive, that is, made prior to delivery. These included changes to vocabulary, the type of activities, or lesson content. For example, some teachers might "spend a little bit extra time doing...something that'll work really well with my class" (School 25, Y4 teacher), or:

*join some lessons together a little bit. It was kind of below what that class were at, it was a little bit slow moving for them.* (School 2, Y4 teacher)

Pupils' responses to the material triggered teachers' reflexive problem solving during lessons:

*I would gauge it on their engagement ... keep [the discussion] as long as they're engaged.* (School 13, Y5 teacher)

### *Knowledge of educational contexts*

There was evidence that some teachers adapted PATHS based on their knowledge of their pupils' broader contexts and experiences. This included adaptations to the content of stories in the PATHS lessons "to make it more appropriate for the setting we are in" (School 39, Y5 teacher). For example, PATHS stories about holidays and spending disposable income were not relevant to many of the children in Greater Manchester, so teachers modified those aspects of the narratives. The most frequent adaptation was the decision not to use the send-home activities. This may just be an artefact of our sample because many of the schools were in areas of high immigration or deprivation, where "a lot of [parents] don't speak English" (School 39, Y3 teacher) or "their literacy skills aren't as good... it would be a bit daunting to have so much" (School 38, Y3 teacher).

### *Knowledge of educational ends, purposes, and values, and their philosophical and historical grounds*

The perception of our participating teachers was that the goal of PATHS to improve students' SEL competencies was worthwhile. Almost 100 per cent of respondents referred to the complementarity between PATHS and their school ethos, which is perhaps not surprising because all schools had volunteered to participate in the study.

## *Interacting types of knowledge*

Teachers' statements were frequently relevant to more than one knowledge category, indicating that when the teachers solved educational problems they considered multiple factors. For example, adaptations due to the limited time available for delivery were informed by knowledge about students' individual needs and engagement with the lessons, together with knowledge about the broader school curriculum.

## **Discussion and implications**

Shulman's (1986, 1987) categories of teachers' professional knowledge enabled thematic analysis of the types of professional knowledge that underpinned teachers' problem-solving decisions during their delivery of the PATHS curriculum. Two categories emerged as the most salient: 1) pedagogical content knowledge; and 2) knowledge of learners and their characteristics. In the first, adaptations were informed by teachers' evaluation of the PATHS resources and how these may best be delivered to optimise pupils' engagement and understanding. In the second, teachers' adaptations were both proactive and reactive, based on pupils' capabilities and responsiveness. Thus, adaptations were intended to improve the fit between PATHS and the context in which it was delivered.

Interestingly, it was evident from the interview transcripts that teachers did not express the need to have additional professional development to enhance their SEL content knowledge. The reasons for this should be explored in future studies because this finding has potentially important implications for SEL in schools. For example, it may reflect the priority or status afforded to SEL, that is, teachers' beliefs that a general understanding of SEL would suffice, and/or that specialist content knowledge does not need to be acquired (as it would in traditional academic subjects). This is perhaps supported by teachers' reported reliance on rather broad perceptions of what SEL means, with familiar or existing practices within schools (such as circle-time) informing PATHS delivery. This suggests an implicit perception of SEL as a general 'approach' rather than a discrete subject with its own knowledge base, reflecting potentially limited perceptions around the social validity or importance of SEL in the school curriculum.

Our findings have several important implications. Firstly, we propose that Shulman's (1986, 1987) categories of knowledge provide a useful framework for facilitating an understanding and appreciation of the thinking processes underpinning teachers' approaches to solving educational problems. Importantly, teachers' decisions to adapt the PATHS materials were informed by more than one type of professional knowledge, for example, when combining general pedagogical knowledge and knowledge of students and their characteristics to improve pupil responsiveness to materials.

Secondly, programs designed to value teachers' knowledge, which accommodate contemporary best practices and principles of teaching and learning, and which allow teachers' responsiveness to contextual affordances and constraints, are more likely to be implemented in ways that achieve program goals. For example, programs that allow teachers to select the most appropriate pedagogical approaches for the presentation of core concepts are more likely to have their message received and interpreted by that teacher's students than programs that prescribe pedagogies that lack contextual authenticity. This is a specific issue when programs cross cultural boundaries.

Thirdly, programs have the potential to become more sustainable if, by design, they incorporate teachers' knowledge and expertise. When tension arises between a program's prescribed processes and a teachers' need to solve educational problems, a logical pathway out of that tension may be for teachers to abandon the program. The inability of programs and organisations to accommodate mutual adaptation has the potential to lead to poor long-term program sustainability.

Fourthly, recognising that adaptations will occur and incorporating space for adaptations in the program design (rather than ignoring them) could enable clarification about potentially inappropriate adaptations that deviate from, or undermine, program goals. Positioning teachers as equal partners in the design and delivery of new curricula may enable programs' critical elements to be specified in ways that support teachers' work but are not so prescriptive that their implementation success relies upon expecting teachers *not* to apply their professional knowledge and engage in problem solving to support teaching and learning. A reframing of a program's 'prescribed' approach to one of 'guidance', which combines clear specification of critical elements that must be implemented with fidelity with embedded opportunities for applying professional knowledge to support adaptations, may be more acceptable to teachers.

This leads to a final implication of our study; specifically, the need to conceptualise 'fidelity *with* adaptation' during program evaluations. The large number of adaptations identified in this study may imply that the fidelity of the PATHS program was compromised. That is possibly the case from a surface perspective because teachers changed delivery methods, scope and sequence, and materials. However, from a conceptual perspective, it may be possible to generate shared understandings about achieving fidelity to a program's core concepts without needing to maintain fidelity to a program's pedagogical features. This requires that a distinction be made during program evaluations between degrees of implementation fidelity and degrees to which teachers' knowledge is valued for its contribution to pedagogical problem solving.

## **Limitations**

Our sample included schools that had committed to undertake PATHS. Caution should be exercised when considering our findings in other contexts.

## **Conclusions**

It is evident from the research literature and our study that teachers are problem solvers when it comes to matching curricula to the needs of their students and themselves. Teachers' adaptations to curricula are to be expected (Greenberg et al., 2005; Hansen et al., 2013; Ringwalt et al., 2003). In the study reported in this chapter, teachers' problem solutions were grounded in recognisable domains of professional expertise, such as the knowledge categories explicated by Shulman (1986, 1987). Unsurprisingly, it has long been argued (Dusenbury et al., 2003) that co-operation between program developers and implementers is required to resolve possible tensions between their respective needs for fidelity and adaptability. The present study's contribution is to explain teachers' adaptations from the perspective of the types of knowledge that generated those adaptations. The implication is that rather than lamenting loss of program fidelity due to adaptations, program developers would benefit from explicitly recognising that teachers *will* invoke their professional knowledge and critical interpretations to solve educational problems. Often, those problem

solutions will involve adaptations to curricula materials and delivery. Knowledge-based solutions to problems, such as lack of individual and contextual fit, are welcome.

Accordingly, program designers and evaluators could usefully reconsider the meaning of implementation fidelity and how fidelity may interact with teachers' knowledge. Designs that make space for teachers' professional judgements could lead to programs that can be implemented, with fidelity, to achieve broad program concepts and goals; accommodate contemporary best practices and principles of teaching and learning; be responsive to students' individual learning needs; and constructively engage with contextual affordances and constraints. It is anticipated that such improvements will, in turn, contribute to longer-term program sustainability.

## Funding

The primary study on which this data analysis was based was supported by the Education Endowment Foundation and the National Institute for Health Research (Grant ref 10/3006/01).

## Ethics

All procedures performed in the study involving human participants were in accordance with the ethical standards of the University of Manchester Research Ethics Committee (Project approval reference 11470), and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

## Consent

All participants provided informed and voluntary consent for their involvement in the study. All interview data were de-identified using alpha-numerical codes. Participant and site names are not identified in this publication.

## References

- Askell-Williams, H. (2017). Perspectives from teachers and school leaders about long-term sustainability: A challenge for mental health promotion initiatives in educational settings. In C. Cefai & P. Cooper (Eds.), *Mental health promotion in schools: Cross cultural narratives and perspectives* (pp. 141-156). Rotterdam, Netherlands: Sense [https://dx.doi.org/10.1007/978-94-6351-053-0\\_9](https://dx.doi.org/10.1007/978-94-6351-053-0_9)
- Bellg, A. J., Borrelli, B., Resnick, B., Hecht, J., Minicucci, D. S., Ory, M., . . . Czajkowski, S. (2004). Enhancing treatment fidelity in health behavior change studies: Best practices and recommendations from the NIH Behavior Change Consortium. *Health Psychology, 23*, 443-451. <http://dx.doi.org/10.1037/0278-6133.23.5.443>
- Berman, P., & McLaughlin, M. W. (1976). Implementation of educational innovation. *The Educational Forum, 40*(3), 345-370. <https://dx.doi.org/10.1080/00131727609336469>
- beyondblue. (2018). The beyondblue National Education Initiative. Retrieved from <https://www.beyondblue.org.au/about-us/about-our-work/childhood-and-education-program/the-beyondblue-national-education-initiative>
- Bor, W., Dean, A. J., Najman, J., & Hayatbakhsh, R. (2014). Are child and adolescent mental health problems increasing in the 21st century? A systematic review. *Australian and*

- New Zealand Journal of Psychiatry*, 48, 606-616.
- Borko, H., & Putnam, R. T. (1996). Learning to teach. In D. C. Berliner & R. C. Calfee (Eds.), *Handbook of educational psychology* (pp. 673-708). New York: Macmillan.
- Bradshaw, C. P., Debnam, W. K., Koth, C. W., & Leaf, P. (2009). Preliminary validation of the implementation phases inventory for assessing fidelity of Schoolwide Behavior Supports. *Journal of Positive Behavior Intervention*, 11, 145-160.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3, 77-101. <https://dx.doi.org/10.1191/1478088706qp063oa>
- Carroll, C., Patterson, M., Wood, S., Booth, A., Rick, J., & Balain, S. (2007). A conceptual framework for implementation fidelity. *Implementation Science*, 2, 40. <https://dx.doi.org/10.1186/1748-5908-2-40>
- Carvalho, M. L., Honeycutt, S., Escoffery, C., Glanz, K., Sabbs, D., & Kegler, M. C. (2013). Balancing fidelity and adaptation: Implementing evidence-based chronic disease prevention programs. *Journal of Public Health Management and Practice*, 19(4), 348-356. <https://dx.doi.org/10.1097/PHH.0b013e31826d80eb>
- Century, J., Rudnick, M., & Freeman, C. (2010). A framework for measuring fidelity of implementation: A foundation for shared language and accumulation of knowledge. *American Journal of Evaluation*, 31, 199-218. <https://dx.doi.org/10.1177/1098214010366173>
- Collishaw, S. (2015). Annual research review: Secular trends in child and adolescent mental health. *Journal of Child Psychology and Psychiatry*, 56, 370-393. <https://dx.doi.org/10.1111/jcpp.12372>
- Crean, H. F., & Johnson, D. B. (2013). Promoting Alternative Thinking Strategies (PATHS) and elementary school aged children's aggression: Results from a cluster randomized trial. *American Journal of Community Psychology*, 52, 56-72. <https://dx.doi.org/10.1007/s10464-013-9576-4>
- Darling-Hammond, L. M. (2006). Constructing 21st-century teacher education. *Journal of Teacher Education*, 57, 300-314. <https://dx.doi.org/10.1177/0022487105285962>
- Depaepe, F., Verschaffel, L., & Kelchtermans, G. (2013). Pedagogical content knowledge: A systematic review of the way in which the concept has pervaded mathematics educational research. *Teaching and Teacher Education*, 34, 12-25. <https://dx.doi.org/10.1016/j.tate.2013.03.001>
- Devaney, E., O'Brien, M. U., Resnik, H., & Weissberg, R. P. (2006). *Sustainable schoolwide social and emotional learning (SEL)*. Chicago, ILL: University of Illinois.
- DfES. (2005). *Excellence and enjoyment. The social and emotional aspects of learning: Guidance*. London: Department for Education and Skills.
- DfES. (2007). *Social and emotional aspects of learning for secondary schools: Guidance booklet*. Nottingham: Department for Education and Skills.
- DoE. (2011). Teachers' standards: Guidance for school leaders, school staff and governing bodies. Retrieved from [www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/665520/Teachers\\_Standards.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/665520/Teachers_Standards.pdf)
- DoH. (n.d.-a). KidsMatter. Retrieved from <http://www.kidsmatter.edu.au/>
- DoH. (n.d.-b). MindMatters. Retrieved from <http://www.mindmatters.edu.au>
- DoH. (n.d.-c). Response Ability: Driving child and youth wellbeing. Retrieved from [http://www.responseability.org/client\\_images/777971.pdf](http://www.responseability.org/client_images/777971.pdf)
- Durlak, J. A. (2016). Programme implementation in social and emotional learning: Basic issues and research findings. *Cambridge Journal of Education*, 46, 333-345. <https://dx.doi.org/10.1080/0305764X.2016.1142504>
- Durlak, J. A., & DuPre, E. P. (2008). Implementation matters: A review of research on the

- influence of implementation on program outcomes and the factors affecting implementation. *American Journal of Community Psychology*, 41, 327–350. <https://dx.doi.org/10.1007/s10464-008-9165-0>
- Dusenbury, L., Brannigan, R., Falco, M., & Hansen, W. B. (2003). A review of research on fidelity of implementation: Implications for drug abuse prevention in school settings. *Health Education Research: Theory and Practice*, 18, 237-256. <https://dx.doi.org/10.1093/her/18.2.237>
- Elias, M., Zins, J. E., Graczyk, P. A., & Weissberg, R. P. (2003). Implementation, sustainability, and scaling up of social-emotional and academic innovations in public schools. *School Psychology Review*, 32, 303-319.
- Feiman-Nemser, S. (2001). From preparation to practice: Designing a continuum to strengthen and sustain teaching. *Teachers College Record*, 103, 1013-1055. <https://dx.doi.org/10.1111/0161-4681.00141>
- Fenstermacher, G. D., & Richardson, V. (2005). On making determinations of quality in teaching. *Teachers College Record*, 107, 186-213. <https://dx.doi.org/10.1111/j.1467-9620.2005.00462.x>
- Green, H., McGinnity, A., Meltzer, H., Ford, T., & Goodman, R. (2005). *Mental health of children and young people in Great Britain*. London: Palgrave Macmillan.
- Greenberg, M. T., Domitrovich, C., Weissberg, R., & Durlak, J. (2017). Social and emotional learning as a public health approach to education. *The Future of Children*, 27, 13-32.
- Greenberg, M. T., Domitrovich, C. E., Graczyk, P. A., & Zins, J. E. (2005). *The study of implementation in school-based preventive interventions: Theory, research, and practice*. Rockville, MD: Center for Mental Health Services, Substance Abuse and Mental Health Services Administration.
- Grossman, P. L. (1995). Teachers' knowledge. In L. W. Anderson (Ed.), *International encyclopedia of teaching and teacher education* (2nd ed., pp. 20-24). Tarrytown, NY: Pergamon.
- Hansen, W. B., Pankratz, M. M., Dusenbury, L., Giles, S. M., Bishop, D. C., Albritton, J., . . . Strack, J. (2013). Styles of adaptation: The impact of frequency and valence of adaptation on preventing substance use. *Health Education*, 113, 345-363. <https://dx.doi.org/10.1108/09654281311329268>
- Humphrey, N. (2013). *Social and emotional learning: A critical appraisal*. London: Sage. <https://dx.doi.org/10.4135/9781446288603>
- Humphrey, N., Barlow, A., & Lendrum, A. (2017). Quality matters: Implementation moderates student outcomes in the PATHS curriculum. *Prevention Science*, 1,12. <https://dx.doi.org/10.1007/s11121-017-0802-4>
- Humphrey, N., Barlow, A., Wigelsworth, M., Lendrum, A., Pert, K., Joyce, C., . . . Turner, A. (2016). A cluster randomized controlled trial of the Promoting Alternative Thinking Strategies (PATHS) curriculum. *Journal of School Psychology*, 58, 73-89. <https://dx.doi.org/10.1016/j.jsp.2016.07.002>
- Humphrey, N., Hennessey, A., Wigelsworth, M., Lendrum, A., Pert, K., Joyce, C., . . . Turner, A. (2015). Promoting Alternative Thinking Strategies (PATHS): Evaluation report and executive summary. UK: Education Endowment Foundation.
- Humphrey, N., Lendrum, A., & Wigelsworth, M. (2010). Social and emotional aspects of learning (SEAL) programme in secondary schools: National evaluation. Retrieved from <http://www.education.gov.uk/publications//eOrderingDownload/DFE-RB049.pdf>
- Jennings, P. A., & Frank, J. L. (2015). Inservice preparation for educators. In J. A. Durlak, C. E. Domitrovich, R. P. Weissberg, & T. P. Gullotta (Eds.), *Handbook of social and emotional learning: Research and practice*. New York: Guilford Press.

- Lee, C., August, G. J., Realmuto, G. M., Horowitz, J. L., Bloomquist, M. L., & Klimes-Dougan, B. (2008). Fidelity at a distance: Assessing implementation fidelity of the early-risers prevention program in going-to-scale intervention trial. *Prevention Science, 9*, 215-229. <https://dx.doi.org/10.1007/s11121-008-0097-6>
- Low, S., Cook, C. R., Smolkowski, K., & Buntain-Ricklefs, J. (2015). Promoting social-emotional competence: An evaluation of the elementary version of Second Step. *Journal of School Psychology, 53*, 463-477. <https://dx.doi.org/10.1016/j.jsp.2015.09.002>
- McIntosh, K., Horner, R. H., & Sugai, G. (2009). Sustainability of systems-level evidence-based practices in schools: Current knowledge and future directions. In W. Sailor, G. Dunlap, G. Sugai, & R. Horner (Eds.), *Handbook of positive behavior support* (pp. 327-352). Boston, MA: Springer. [https://dx.doi.org/10.1007/978-0-387-09632-2\\_14](https://dx.doi.org/10.1007/978-0-387-09632-2_14)
- Melde, C., Esbensen, F.-A., & Tusinski, K. (2006). Addressing program fidelity using onsite observations and program provider descriptions of program delivery. *Evaluation Review, 30*, 714-740. <https://dx.doi.org/10.1177/0193841X06293412>
- Miller-Day, M., Pettigrew, J., Hecht, M. L., Shin, Y., Graham, J., & Krieger, J. (2013). How prevention curricula are taught under real-world conditions: Types of and reasons for teacher curriculum adaptations. *Health Education, 113*, 324-344. <https://dx.doi.org/10.1108/09654281311329259>
- Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record, 108*(6), 1017-1054. <https://dx.doi.org/ID Number: 12516>
- Moore, J. E., Bumbarger, B. K., & Cooper, B. R. (2013). Examining adaptations of evidence-based programs in natural contexts. *Journal of Primary Prevention, 34*, 147-161. <https://dx.doi.org/10.1007/s10935-013-0303-6>
- Munby, H., Russell, T., & Martin, A. K. (2001). *Teachers' knowledge and how it develops* (4th ed.). Washington, DC: American Educational Research Association.
- O'Donnell, C. L. (2008). Defining, conceptualizing, and measuring fidelity of implementation and its relationship to outcomes in K-12 curriculum intervention research. *Review of Educational Research, 78*, 33-84. <https://dx.doi.org/10.3102/0034654307313793>
- Ringwalt, C. L., Ennett, S., Johnson, R., Rohrbach, L. A., Simons-Rudolph, A., Vincus, A., & Thorne, J. (2003). Factors associated with fidelity to substance use prevention curriculum guides in the nation's middle schools. *Health Education & Behavior, 30*, 375-391. <https://dx.doi.org/10.1177/1090198103030003010>
- Scheirer, M. A. (2005). Is sustainability possible? A review and commentary on empirical studies of program sustainability. *American Journal of Evaluation, 26*, 320-347. <https://dx.doi.org/10.1177/1098214005278752>
- Shulman, L. S. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher, 15*, 4-14. <https://dx.doi.org/10.3102/0013189X015002004>
- Shulman, L. S. (1987). Knowledge and teaching: Foundations of a new reform. *Harvard Educational Review, 57*, 1-22. <https://dx.doi.org/10.17763/haer.57.1.j463w79r56455411>
- Spoth, R., Randall, G. K., & Shin, C. (2008). Increasing school success through partnership-based family competency training: Experimental study of long-term outcomes. *School Psychology Quarterly, 23*, 70-89. <https://dx.doi.org/10.1037/1045-3830.23.1.70>
- Weare, K., & Nind, M. (2011). Mental health promotion and problem prevention in schools: What does the evidence say? *Health Promotion International, 26* (SUPPL. 1), i29-i69. <https://dx.doi.org/10.1093/heapro/dar075>
- Wigelsworth, M., Humphrey, N., & Lendrum, A. (2012a). Evaluation of a school-wide preventive intervention for adolescents: The secondary social and emotional aspects

of learning (SEAL) programme. *School Mental Health*, July.

<https://dx.doi.org/10.1007/s12310-012-9085-x>

Wigelsworth, M., Humphrey, N., & Lendrum, A. (2012b). A national evaluation of the impact of the secondary social and emotional aspects of learning (SEAL) programme.

*Educational Psychology*, 32(2), 213-238.

<https://dx.doi.org/10.1080/01443410.2011.640308>

Table 11.1

<b>No. Teachers</b>	<b>Year group taught</b>	<b>Notes</b>
38	Yr 3 (ages 7–8)	37 teachers (two shared a class) and one teaching assistant from 22 of the 23 PATHS implementing schools
29	Yr 4 (ages 8–9)	29 of the 32 Year 4 teachers from all 23 PATHS implementing schools. Two teachers withdrew from interview, one teacher on sick leave
19	Yr 5 (ages 9–10)	19 of the 35 teachers from 19 of the 23 PATHS implementing schools. To reduce burden in the second year of the trial we focused on one teacher per school. Three classes were no longer implementing, and two teachers were on sick leave.
20	Yr 6 (ages 10–11)	20 of the 36 Year 6 teachers from 20 of the 23 PATHS implementing schools. To reduce data burden in second year we focused on one teacher per school. Two classes no longer implementing, and one teacher left school.

Table 11.2

<b>Organising theme</b>	<b>Sub-theme</b>
Content Knowledge	
Curriculum knowledge	
General pedagogical knowledge	Time management
	Learning strategies
	Scope and sequence
Pedagogical Content knowledge	Teacher creativity and generativity
	Adaptations to improve PATHS delivery
	Improve teaching materials and resources
Knowledge of learners and their characteristics	
Knowledge of educational contexts	General
	The specific setting
Knowledge of educational ends, purposes, values, philosophy, history	Evaluate achievement of intended outcomes/materials and resources