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STUDY PROTOCOL

REVISED Addressing implementation considerations when developing universal interventions for speech, language and communication needs in the ordinary classroom: a protocol for a scoping review [version 3; peer review: 2 approved]

Aoife Gallagher [ID][1], Carol-Anne Murphy[1], Johanna Fitzgerald [ID][2], James Law[3+]

[1]Health Implementation Science and Technology Research Cluster, Health Research Institute, School of Allied Health, University of Limerick, Limerick, Ireland
[2]Department of Educational Psychology, Inclusive & Special Education, Mary Immaculate College, Limerick, Ireland
[3]School of Education, Communication and Language Sciences, Newcastle University, Newcastle upon Tyne, Newcastle upon Tyne, NE1 7RU, UK

[+] Deceased author

Abstract

Background: Understanding the factors that influence the implementation of health interventions in the context of education is essential to improving outcomes for children and young people with speech, language and communication needs (SLCN). Yet implementation considerations have not been adequately addressed when developing interventions for this context. The aim of this paper is to present a protocol for a scoping review of existing implementation frameworks that might guide SLCN intervention research in schools.
Methods: In accordance with scoping review guidelines, the proposed study will be conducted in phases: (1) identifying potentially relevant studies, (2) screening and selection of studies, (3) charting and extracting data from identified frameworks, (4) collating, summarising and reporting the results and (5) consulting with stakeholders. Two reviewers will conduct the screening and the data extraction phases independently. Identified frameworks will be collated, and described, and constructs from the frameworks will be categorised using domains from the Consolidated Framework for Implementation Research. A draft implementation science model will be proposed based on the findings of the scoping review.
Conclusions: The findings of this review will provide guidance for researchers to begin to address implementation considerations when

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	Invited Reviewers	
	1	**2**
version 3 (revision) 31 Jan 2022		✓ report
version 2 (revision) 15 Nov 2021	✓ report	? report
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1. **Michael Donnelly**, Queen's University Belfast, Belfast, UK

2. **Trina D Spencer** [ID], University of South Florida, Tampa, USA

Any reports and responses or comments on the article can be found at the end of the article.

developing and facilitating the uptake of universal interventions for SLCN in the ordinary classroom, and ultimately can contribute towards improving outcomes for this vulnerable childhood population.

Keywords

Implementation Science, inclusive education, disability, speech, language and communication needs

Corresponding author: Aoife Gallagher (aoife.gallagher@ul.ie)

> **REVISED** **Amendments from Version 2**
>
> We have further aligned the text to reflect that phase 1 of our study has already been conducted in preparation for publication of the protocol. We have reduced the number of ACRONYMs and ensured consistency of the use of these throughout the study. We have added a sentence from methods into the introduction re the constructs we are planning to investigate.
>
> **Any further responses from the reviewers can be found at the end of the article**

Introduction

According to school census data, children and young people with speech, language and communication needs (SLCN) represent a sizeable proportion of the school-aged population (Lindsay & Strand, 2016; Norbury *et al.*, 2016a), and are a vulnerable group in terms of poor social and emotional, and educational outcomes (Conti-Ramsden & Durkin, 2012; Conti-Ramsden *et al.*, 2018). Children and young people with SLCN can struggle to understand and/or to use grammar, to learn new vocabulary and linguistic concepts and/or to use language for higher order tasks such as making inferences and/or predictions and problem-solving (Norbury *et al.*, 2016a) as well as co-occurring difficulties with written language (Alloway *et al.*, 2017; Archibald *et al.*, 2013). As teaching and learning in the classroom is essentially language-based, children with SLCN can be particularly disadvantaged in accessing the curriculum (Dockrell & Lindsay, 1998; Dockrell *et al.*, 2017). For some children with SLCN, these barriers to learning can have a negative impact into adulthood, with reported difficulties gaining skilled employment, mental health (Botting *et al.*, 2016) and living independently (Botting *et al.*, 2016). Prior to school entry, speech and language difficulties are considered a 'health' need and are managed by speech and language therapists, employed by health services.

Once of school age, the majority children and young people with SLCN in Ireland, as in many other high-income countries, attend ordinary (mainstream) schools (Cosgrove *et al.*, 2014; Gallagher *et al.*, 2020). (Black-Hawkins *et al.*, 2016; Day & Prunty, 2015; Nilholm, 2020). Where a child's SLCN act as a barrier to their learning and participation in the classroom, they are referred to as 'special educational needs' (SEN). In the Irish context, a special educational need is defined as '… a restriction in the capacity of the person to participate in and benefit from education on account of an enduring physical, sensory, mental health or learning disability, or any other condition which results in a person learning differently from a person without that condition' (EPSEN Act 2004, p 6). The educational landscape for children and young people with SEN in Ireland has witnessed radical and rapid transformation since the early 1990s, in line with many countries internationally (Department of Education and Skills, 2015), with a shift in focus towards creating more socially-responsive inclusive school environments (Rose *et al.*, 2015). Essential to this policy goal is the effective integration of 'health' interventions in schools (IASLT, 2017; Rix *et al.*, 2013a).

For schools to address the needs of children and young people with SLCN, three distinct tiers of intervention exist; interventions delivered at a universal level (support for all); interventions delivered at a targeted level (support for some); and interventions delivered at a specialist level (support for few) (Rix *et al.*, 2013b). Speech and language therapists provide interventions at all three levels. This tiered approach to the delivery of support in school is underpinned by public health principles (Ehren & Nelson, 2005; Greenwood *et al.*, 2017) including the need for: early and accurate identification of needs, more equitable access to appropriate support (Law *et al.*, 2013) and more efficient and cost-effective allocation of specialist resources (Ebbels *et al.*, 2019; Lindsay *et al.*, 2012).

Considerable emphasis is placed on the provision of effective universal interventions in the classroom for children and young people with special educational needs in policy in Ireland (Department of Education and Skills, 2017; National Council for Special Education, 2019). Universal interventions are defined as techniques or strategies that can be integrated into the teaching and learning of the classroom for the benefit of all students including the child with SEN (Edyburn, 2010). In the field of speech and language therapy, intervention research has focused primarily on establishing the efficacy of therapy techniques for school-aged children with SLCN to be delivered at targeted and/or specialist levels (Ebbels *et al.*, 2017; Walker *et al.*, 2020) with less of a focus on the development of interventions at a universal level (Dobinson & Dockrell, 2021; Dockrell & Howell 2015; Ebbels *et al.*, 2017; Law *et al.*, 2012).

Universal level interventions to support SLCN which have been piloted in the classroom setting have paid limited, if any, attention to the contextual factors which may facilitate or hinder their implementation (Douglas & Burshnic, 2019; Roberts *et al.*, 2020). Despite the fact that multiple and complex barriers to the uptake of evidence-based research into routine teaching practice have been reported for some time in the education literature (Cook & Odom, 2013; Domitrovich *et al.*, 2008; Fixsen *et al.*, 2013), there is little to guide researchers when developing and/or implementing universal interventions for SLCN in the ordinary classroom.

According to Eccles & Mittman (2006), implementation science can facilitate the study of methods to support the systematic uptake of evidence into routine practice and by doing so can improve the quality and effectiveness of healthcare across contexts. Evaluation of the implementation of interventions is only one focus of implementation science. Certain characteristics related to the intervention itself have also been shown to influence uptake of research into practice. Considering factors such as practitioners views of the trialability, adaptability and complexity of an intervention at the pilot stage when designing new interventions can ensure interventions are acceptable and sustainable (Bauer & Kirchner, 2020). Therefore implementation science has a role in guiding the design of new interventions in addition to facilitating uptake of interventions where efficacy has already been established.

According to the findings of a recent systematic review of the implementation science literature (Nilsen & Bernhardsson, 2019), a large number of conceptual frameworks have been developed and tested within the field of implementation science research in the context of healthcare settings over the last twenty years. A conceptual framework can be defined as "a structure, overview, outline, system or plan consisting of various descriptive categories, e.g. concepts, constructs or variables, and the relations between them that are presumed to account for a phenomenon" (Nilsen, 2015, p2). The use of conceptual frameworks in implementation research to guide data collection and analysis is important for several reasons. The use of such frameworks can mitigate against conceptual confusion across studies, and can help create a consistent vocabulary for domains and constructs (Nilsen, 2015). Facilitating the synthesis of findings across studies is essential to building the evidence base for what, how, and when implementation strategies work in the context of schools. (Bauer & Kirchner, 2020; Geng *et al*., 2017).

Although implementation science has been employed for some time in clinical, health and community settings, its application within the educational domain is still relatively new and there are many areas for further research within this discipline (Lyon *et al*., 2018; Moir, 2018). An increasing number of studies have focussed on the implementation of school wide initiatives in the education literature particularly with regards to emotional behavioural needs (Durlak, 2016; Durlak & Wells, 1997; Oberle *et al.*, 2016). In the field of speech and language therapy, researchers have outlined the potential benefits of implementation science in addressing research to practice gaps (Campbell & Douglas, 2017; Douglas & Burshnic, 2019; Olswang & Prelock, 2015). However, there are no conceptual frameworks that we know of which have been developed specifically for use in research with regards to the development and/or implementation of universal interventions for children and young people with SLCN in the classroom (Olswang & Prelock, 2015). Without such research tools, we are limited in our capacity to build up a body of knowledge to facilitate the successful uptake of research into practice in this context.

In this study we will scope the literature in order to document the use of implementation science frameworks in the development and/or implementation of universal interventions for children identified as having SEN in the ordinary classroom in general schools. As per Nilsen's schema of implementation science theories, models, and frameworks (2015), we are interested in the use of determinant frameworks i.e. those conceptual frameworks used to understand and/or explain what influences implementation outcomes. To guide the analysis we will use the domains of the Consolidated Framework for Implementation Research (CFIR) (Damschroder *et al*. (2009). The CFIR is a meta-theoretical framework developed to create a consistent vocabulary for domains and constructs in implementation science research. The CFIR has been used widely in implementation science studies across a range of health service research contexts previously, providing a set of constructs upon which theories hypothesising specific mechanisms of change and interactions can be developed and tested

empirically. As we are scoping the use of determinant frameworks, the constructs we will report on are descriptive categories or factors believed or found to influence implementation outcomes (Nilsen, 2015). Based on the study findings, we will propose a draft model of implementation science constructs which can act as a starting point for researchers to address implementation considerations when developing and/or implementing universal interventions for SLCN in school. This set of constructs will allow us to begin to build an evidence-base in implementation science in this context. Building an evidence base with regards to the determinants of successful implementation in the classroom for children and young people with SLCN gives us the potential to develop more acceptable and sustainable universal interventions, and ultimately to improve the participation and achievement of children and young people with these needs in school.

The objectives of the review are to:
1. To document the use of implementation science frameworks in the development and/or implementation of universal interventions in the ordinary classroom for children and young people identified as having SEN in the published peer-reviewed literature

2. To describe the implementation science frameworks and constructs used including psychometric properties as well as the theoretical underpinnings of the frameworks where stated

3. To propose constructs that may be applicable to the development and/or the implementation of universal interventions for children and young people with SLCN

The study aims to address the following research questions:
1. What implementation science frameworks have been used in the development and/or implementation of universal interventions in ordinary classrooms for children and young people with special education needs?

2. What specific constructs have been identified in the research literature as important when researching the development and/or implementation of universal interventions in this context?

3. What constructs might be applied to research aimed at developing and/or implementing universal interventions for SLCN needs in this context?

Methods
A scoping review will be undertaken. Like systematic reviews, scoping reviews use a systematic approach to searching, screening, and reporting of the literature but differ in that the method is used to: examine the extent, range, and nature of a particular research activity, to summarize/map research findings, and/or to identify concepts which may be transferable to other research contexts. A scoping review is therefore the most suited method to address the research questions of the study.

This review is planned to be carried out in distinct phases as described by Levac *et al. (2010)*. Phase one, the development of the research question, has already been completed in order to meet the requirements of the publication of the protocol. Decisions that guided the development of the research questions are described below. The remaining phases to be completed include: (1) identifying potentially relevant studies, (2) screening and selecting papers, (3) charting and extracting data from included papers, (4) collating, summarising and reporting the results and (5) consulting with stakeholders. As suggested, more extensive content analysis may be required, depending on the nature of the papers included in the review (Levac *et al.,* 2010).

1. Developing the research question

In developing our research questions we were guided by the need to have a well-defined research question which includes a clearly-defined phenomenon of interest, a well-defined population and a description of the context when conducting a scoping review given the potentially large body of papers which may be analysed (Colquhoun *et al.,* 2014). We identified the *phenomenon of interest* as the use of *implementation science frameworks*. We defined implementation science research as "the scientific study of methods to promote the systematic uptake of research findings and other evidence-based practices into routine practice" (Eccles & Mittman, 2006, p1). We defined a framework as per Nilsen's definition i.e. "a structure, overview, outline, system or plan consisting of various descriptive categories, e.g. concepts, constructs or variables, and the relations between them that are presumed to account for a phenomenon" (Nilsen, 2015, p2). As we are scoping the use of determinant frameworks, the constructs we will report on are descriptive categories or factors believed or found to influence implementation outcomes (Nilsen, 2015).

In relation to the *population of interest*, we broadened the scope of the review beyond children and young people with SLCN to include children and young people with a range of SEN. We did so for two reasons. Firstly, we know that the field of implementation science is relatively under-developed in the field of speech and language therapy and therefore unlikely to yield many papers. Secondly, provided the studies are focused on implementation of universal interventions in the context of the ordinary classroom, we hold that these studies can bring transferable contextual insights to implementation of interventions related to SLCN. We also avoid using narrow inclusion and exclusion criteria based on a particular diagnostic category when specifying our *populations of interest*. Therefore, studies will include children and young people with any of the following: (i) communication and interaction needs, (ii) cognition and learning needs, (iii) social, emotional and mental health difficulties needs, and (iv) sensory and/or physical needs. We will include intervention studies which aim to improve any of the areas of need stated above provided they are universal level and related to the general classroom.

As most children and young people with SEN are educated in general schools the context of interest in the study was the ordinary classroom. Given the differences in education systems internationally, we are aware that it will be important to pay careful attention to selecting search terms and to extracting as much detail as possible about the setting in which the studies were conducted in order to contextualise our findings.

2. Identifying potentially relevant studies

Search strategy and terms. A preliminary search string was developed based on an adapted Phenomenon - Situation (P-S) framework (Jakubec & Astle, 2017). See Table 1 for details. Once the search string is finalised and the searches are conducted, the search results will be reported using the PRISMA extension for Scoping Reviews (PRISMA-ScR) tool (Tricco *et al.,* 2018), the most up-to-date guidance on conducting scoping reviews. Search terms will be adapted to the basic search particulars (eg., wildcards (*) and truncations, capacity for complex searches) of each electronic database. Electronic searches will be supplemented with snowballing techniques such as by seeking recommended articles from well-cited implementation science researchers across health and education. Any articles retrieved via manual searches will be incorporated into the PRISMA-ScR flowchart. A manual search of reference lists will be undertaken as well as a manual search of Implementation Science research group websites known to the research group. Any papers retrieved manually will be added to the papers from the electronic searches on Rayyan for Title and Abstract screening (see study screening and selection section).

Following preliminary assessment of electronic databases for their relevance and coverage of the topic literature, five electronic databases have been identified to be included in the search:

- ERIC

ERIC (Education Resources Information Center) is a database of indexed and full-text education literature and resources.

- EMBASE

Embase is a medical database produced by Elsevier which includes journals related to healthcare policy and management.

- AMED

Allied and Complementary Medicine Database (AMED) is a database designed for therapists amongst other healthcare practitioners and includes articles on allied therapies and related subjects.

- PubMed

PubMed is a database which supports the search and retrieval of biomedical and life sciences literature.

- PsycARTICLES

PsycARTICLE is a database of social and behavioral sciences published literature.

3. Study screening and selection

To ensure compatibility with the standards expected of a scoping review for peer-reviewed publication, explicit inclusion/exclusion criteria will be applied.

Table 1. Search String Developed for CINAHL in EBSCO.

1	implementation N1 framework* OR implementation N1 model* OR "research utili?ation" N1 model* OR "research utili?ation" N1 framework* OR "knowledge translation" N1 framework* OR "knowledge translation" N1 model* OR "knowledge-to-action framework" OR "K2A framework" OR "KTA framework" OR "Quality Implementation Framework" OR "QIF" OR "promoting action on research implementation in health services" OR "PARIHS" OR "i-PARIHS" OR "active implementation framework" OR "AIF" OR "consolidated framework for implementation research" OR "CFIR" OR "theoretical domains framework" OR "TDF" OR "reach, effectiveness, adoption, implementation, and maintenance" OR "RE-AIM" OR "PRECEDE-PROCEED" OR "Understanding-User-Context Framework" OR "Stetler Model" OR "ACE star model of knowledge transformation" OR "Iowa model" OR "Ottawa Model" OR "Exploration Preparation Implementation Sustainment framework" OR "EPIS" OR "interactive systems framework" OR "integrated systems framework" OR ISF OR "Practical Robust Implementation and Sustainability Model" OR "PRISM" OR "stages of implementation framework" OR "stages of implementation completion" OR "implementation components model" OR "getting to outcomes" OR GTO OR "program implementation" OR (MH "Implementation Science") OR (MH "Program Implementation")
2	school* OR educati* OR class* OR "classroom-based" OR "school-based" OR (elementary OR grade OR middle OR primary OR secondary OR high) N3 (school* OR student* OR child* OR pupil*) OR kindergarten OR K-12 OR school-age OR "mainstreaming education" OR "mainstream* special education" OR "mainstreaming" OR "mainstream school" OR "regular class*" OR "mainstream class*" OR "mainstream education system" OR "inclusi* education" OR "integrati* education" OR (MH "Schools") OR (MH "Education") NOT "special school*" NOT "special class*" NOT "special unit*" NOT "language class*" NOT preschool*
3	"special need*" OR special OR "additional need*" OR "complex need*" OR disabilit* OR disabled OR impairment OR impaired OR "learning disabilit*" OR "learning disorder*" OR "LD" OR "learning impairment" OR "non-verbal learning disabilit*" OR "developmental academic disabilit*" OR "academic disorder*" OR "intellectual disabilit*" OR "ID" OR "developmental disease*" OR "developmental* disabilit*" OR "DD" OR "developmental disorder*" OR "child developmental disorders" OR "cognitive impairment*" OR "cogniti* disorder*" OR "mental retardation" OR "mentally retarded" OR "mental handicap" OR "mentally handicapped" OR "mental deficiency" OR "mental disorder" OR handicap* OR "communicati* disorder*" OR "communicate* impair*" OR "communicati* dysfunction*" OR "SLCN" OR "speech language communication need*" OR apraxia OR dyslexia OR dyspraxia OR "developmental language disorder*" OR "DLD" OR "specific language impairment*" OR "SLI" OR "language development* disorder" OR "language disorder*" OR "language disabilit*" OR "emotional needs" OR "emotional disorder*" OR "social disabilit*" OR "autist*" OR ASD OR "autistic disorder" OR "autism spectrum disorder*" OR "pervasive developmental disorder" OR PDD OR "PDD-NOS" OR "reading disabilit*" OR "reading disorder*" OR "reading failure" OR "reading retardation" OR "retarded readers" OR dyslexia OR alexia OR "literacy need*" OR apraxia OR "developmental apraxia" OR "childhood apraxia of speech" OR CAS OR "childhood verbal apraxia" OR "developmental apraxia of speech" OR "developmental articulatory apraxia" OR "developmental verbal dyspraxia" OR DVD OR "dyspraxia of speech" OR "speech apraxia" OR "nonverbal learning disabilit*" OR "neurologic* disorder*" OR "congenital Impair*" OR "physical disabilit*" OR "motor dysfunction" OR "fine motor dysfunction" OR "cerebral palsy" OR "spina bifida" OR "down syndrome" OR "attention deficit disorder" OR ADD OR "attention deficit/hyperactivity disorder" OR ADHD OR "developmental coordination disorder*" OR DCD OR "developmental dyspraxia" OR "motor coordination disorder" OR "coordination disorder" OR "clumsy child*syndrome" OR "movement disorder" OR "motor skills disorder*" OR "muscular dystrop*" OR "congenital disorder*" OR "sensory system disorder*" OR "sensory disintegrative disorder" OR "sensory defensiveness" OR "sensory processing disorder" OR "anxiety" OR "global developmental delay" OR "cleft lip" OR "cleft palate" OR "cleft lip and palate" OR "orofacial cleft" OR (MH "Intellectual Disability") OR (MH "Developmental Disabilities") OR (MH "Dyslexia") OR (MH "Students, Disabled") OR (MH "Learning Disorders") OR (MH "Disabled") OR "at-risk"
4	1 AND 2 AND 3

The following studies will be included:
- Empirical studies published in peer-reviewed journals

- Primary implementation science research with qualitative, mixed methods and/or quantitative design

- Related to universal interventions in schools

- Related to interventions aimed at improving (i) communication and interaction needs, (ii) cognition and learning needs, (iii) social, emotional and mental health difficulties, and/or (iv) sensory and/or physical needs

- Related to the ordinary classroom setting

- Papers published/available in English

The following literature will be excluded:
- Policy briefs, books, book chapters, editorials, commentaries and published or unpublished reports from governments and other agencies

- Related to pre-school/kindergarten years (< 5 years) or third level education (<18 years+)

- No explicit implementation science conceptual framework constructs are referenced in the collection and/or analysis of the data

- Related to special education settings/ special classrooms[1]

- Not related to children and young people identified as having difficulties in one of the following: (i) communication and interaction, (ii) cognition and learning, (iii) social, emotional and mental health difficulties, and (iv) sensory and/or physical needs.

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[1] In the Irish Educational System 'special classes' are those which involve a small number of children and young people with a particular diagnosis, with significant differences in terms of staff/ratio compared with an ordinary classroom.

Once the electronic and manual searches are conducted, citation abstracts for all items will be exported into EndNote (x9). Rayyan (2016) -a web and mobile app for systematic reviews will be used to independently screen the papers. After removing duplicates, the remaining items will be screened for inclusion, initially on the basis of title and abstract. Where inclusion or exclusion cannot be determined on the basis of title and abstract, the paper will be included for full-text screening.

Two researchers (ALG and CAM) will screen an initial sample of randomly selected papers independently for inclusion. As suggested by (Levac *et al.*, 2010), inclusion/exclusion criteria may be refined at this point if necessary. Any differences in screening decision-making will be discussed. If needed, independent screening will be continued until decisions are consistent. Full-text screening will then be undertaken between the researchers for all papers where it was not possible to determine inclusion or exclusions on the basis of title and abstract. Following the full-text screening, studies recommended for exclusion will be reviewed by an additional researcher (JF) to ensure consistency in the application of exclusion criteria. A final list of all included papers will be agreed amongst the research team.

4. Data extraction
Two researchers, (ALG and CAM) will simultaneously extract data into Excel (2019) for five randomly selected papers in order to assure consistency in data extraction (ALG and CAM). Following this check for quality assurance, which will be repeated until agreement is reached, we will divide the remaining included studies for data extraction. Data to be extracted will include:

- Background information related to the study (author(s), date, study objectives, research question, intervention details, country).

- Population(s)/ Special Educational Need of interest.

- Name and description of implementation science framework.

- Description/definitions and psychometric properties of the constructs used in the study.

- Theoretical underpinnings of the research and/or framework if referenced.

- Any constructs identified as important to inform implementation research when developing universal interventions in ordinary classrooms.

As discussed by Levac *et al.* (2010), this process may need to be iterative meaning that new categories may need to be developed based on the findings of the extraction phase.

As the purpose of this scoping review is to describe and synthesise the current research, papers will not be excluded based on quality criteria. However, part of the extraction process will include an assessment of the methodological and reporting quality of the studies using the 'Mixed Methods Appraisal Tool' (MMAT) (Pace *et al.*, 2012; Pluye *et al.,* 2009) and the 'Standards for Reporting Implementation Studies (StaRI) Statement' (Pinnock *et al.,* 2017). This appraisal step has been included as an aim of the study is to make recommendations for future research. Quality appraisal details will be extracted when presenting the details of the included papers as will any reported psychometric properties related to specific IS constructs. These properties may relate to reliability (internal consistency and test-retest); validity (construct and criterion); broad application (validated in different settings and cultures); and sensitivity to change (responsiveness) (Rabin *et al.*, 2012).

5. Collating, summarising and reporting results
The analysis will be conducted by ALG and CAM in consultation with the review team. Descriptive statistics, if relevant, will be used to summarise the general characteristics of included studies. As we are mapping the current literature, we will not exclude on the basis of quality score. However, we will contextualise the findings in relation to these scores, discussing the findings of the analysis and when making any recommendations for research. When making recommendations regarding the use of specific IS constructs, we will contextualise these also in relation to the psychometric properties described above. Where there is insufficient evidence regarding the psychometric properties of any constructs this will also be made explicit in the analysis, discussion and in recommendations for future research. Where papers fail the preliminary methodological questions on the MMAT, findings from these studies will not be included in the recommendations for research.

We will then conduct a qualitative content analysis to map the extracted implementation science constructs. Our analysis will be carried out deductively, guided by five implementation science domains developed by Damschroder *et al.* (2009). These domains have been widely used in implementation science research across a range of health service research contexts previously. The domains relate to *intervention characteristics, inner setting*, *outer setting*, *and implementation process*. These domains will be operationalised as per definitions set out by Damschroder *et al.* (2009); *intervention characteristics* will include any constructs related to the features of the intervention that are stated to have influenced implementation, *inner setting* will include organisational factors which have been reported to influence implementation, *outer setting* will include elements related to the broader context or environment that are stated to have influenced implementation such as policy, *characteristics of individuals* involved in the implementation which impacted the success of the implementation and the implementation process includes any identified strategies or tactics reported to have influenced implementation.

6. Expert consultation
A summary of study aims and findings will be shared with a sample of researchers in the field of implementation science as well as practitioners who support speech and language needs in school (teachers, educational psychologists and speech and language therapists). Researchers in the field of implementation science will be identified via known research networks and by reviewing relevant journals. Practitioners will be

identified via professional networks. Feedback from these stakeholders will be used to shape the final interpretation and presentation of the study findings. Findings of the scoping review will be disseminated by publication and at relevant conferences internationally.

Discussion

Children and young people with speech, language and communication needs (SLCN) represent a sizeable proportion of the school-aged population (Lindsay & Strand, 2016; Norbury *et al.*, 2016b). Such needs can have a negative impact on an individual's educational outcomes and potentially longer term in terms of employability and difficulties with mental health (Conti-Ramsden & Durkin, 2012; Conti-Ramsden *et al.*, 2018).

Interventions for children and young people with SLCN in school are delivered using a phased approach; at a universal level, then a targeted level and a specialist level depending on the child's response to intervention. Intervention research in SLCN has focused mainly on establishing the efficacy of interventions aimed at a targeted or specialist level, with insufficient consideration given to the development and/or implementation of interventions to support SLCN, delivered at a universal level, in the ordinary classroom. Understanding the factors which can facilitate and/or act as a barrier to the implementation of universal interventions is essential if we are to improve outcomes for this population.

We will conduct a scoping review of the implementations science literature to map and synthesise the use of implementation science frameworks in developing and/or implementing universal interventions in school. The review aims to document implementation science research related to any category of special education needs provided that the context under investigation is the ordinary classroom. By synthesising the use of existing implementation science frameworks in relation to interventions in the ordinary classroom for children and young people with special education needs more broadly, we aim to propose a draft model of implementation science constructs which can act as a starting point for researchers to begin address implementation considerations when developing and implementing universal interventions for children and young people with SLCN. By doing so we have the potential to support the successful uptake of interventions for this population in school where efficacy has already been established, as well as to guide acceptable and sustainable intervention development in this context going forward.

Strengths and limitations of the proposed study

This scoping review protocol is the first to focus on implementation considerations in the development of universal interventions for SLCN in the ordinary classroom. We will use the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews tool, and the most current guidance on conducting scoping reviews, in order to ensure a systematic approach to searching, screening and reporting. This study will search journals from across the fields of education and health in order to maximise the comprehensiveness of the review. This scoping review may miss studies published outside of journals (e.g. theses, book chapters, unpublished reports and other grey literature).

Study status

The search strategy is being finalised currently for this scoping review.

Data availability

No data are associated with this article.

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Open Peer Review

Current Peer Review Status: ✓ ✓

Version 3

Reviewer Report 02 February 2022

✓   **Trina D Spencer** [ID]

Department of Child and Family Studies, University of South Florida, Tampa, Florida, USA

I approve this article, however, I have some very small edits that should be attended to.

The abstract is much clearer and accurately reflects the Method featured in the review. There is an extra space after the 2) screening...

First paragraph of intro: "as well as co-occurring difficulties with written language." should be, "as well as **experience** co-occurring difficulties with written language." Grammatically consistent with the subject of the sentence.

The intro is much clearer and the critical terms have been defined. Nice work.

"...such as practitioners views..." the word practitioners needs an apostrophe to show possession: "practitioner**s'** views"

Thank you for covering CFIR and why you believe this review is necessary. I also like the purpose of a scoping review and how it aligns with the current research questions. The intro is very well written.

I believe the heading Methods should be Method. The phases are nicely described and it is clear what has already been completed and what you will do during the review.

This is very long and excessively complex sentence. Please consider revising it. "In developing our research questions we were guided by the need to have a well-defined research question which includes a clearly-defined phenomenon of interest, a well-defined population and a description of the context when conducting a scoping review given the potentially large body of papers which may be analysed (Colquhoun *et al.*, 2014).

I suggest rewriting this sentence, "...screening will be continued until decisions are consistent." to be "...screening will continue until decisions are consistent."

The precision of the phases is very well done. The process the authors will engage in to complete this review are very clear and understandable. I enjoyed reading this version very much. I appreciate the specification and where there will likely be refinement. Thank you for your efforts to improve this protocol. It will make a great contribution and I look forward to your findings, as it will help me in my work too.

I express my condolences for the passing of James Law. That is a great loss for you as his colleagues and for the field. My deepest sympathies. May you always remember the lessons he taught you.

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Multi-tiered oral language interventions; implementation research; evidence-based practice.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

- -

Version 2

Reviewer Report 26 November 2021

https://doi.org/10.21956/hrbopenres.14667.r30844

✔️ **Michael Donnelly**
Centre for Public Health, Queen's University Belfast, Belfast, UK

The revised version reads well to me. Good luck with your review.

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Public health and health care research

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Reviewer Report 16 November 2021

https://doi.org/10.21956/hrbopenres.14667.r30843

❓ **Trina D Spencer** 🆔

Department of Child and Family Studies, University of South Florida, Tampa, Florida, USA

Although the authors have reconciled many of the previous problems, there are additional problems that should be taken care of. In particular, the use of acronyms/abbreviations is horribly inconsistent. Please choose one way to do it and keep them consistent throughout. The second is how to understand the first phase of the scoping review when the report includes research questions. See comments below.

ABSTRACT
It is not clear what the letters SLCN abbreviate.

(1) identification of the research question...does this refer to the research questions addressed in the various studies reviewed or the research question of the proposed scoping review?
In the Methods of the Abstract, the phases are not consistent. For example, (3) what are you doing with the study screening and selection? There is no verb in this phase.

"stages" or "phases" These should be consistent throughout.

INTRODUCTION
Here the abbreviation SLCN is specified correctly.

I think you need : instead of ; in the following sentence "including the need for; early and accurate identification..."

There is inconsistent use of acronyms, capitalization, and the full words (e.g., Implementation Science vs. IS and implementation science).

2. Objective has the word "including" twice. Please rewrite the sentence to avoid that.

It is still not clear what "constructs" the authors are thinking about. The intro doesn't offer more information. It is very vague.

METHODS
The last line of the first paragraph uses "This" but the previous sentence is talking about differences. What does "this" refer to?

Just as in the Abstract, the six phases are not listed well. (1) Developing the research question - What are we talking about? You have three research questions in your introduction so why would the first phase be for you to develop your research question? What is going to happen in phase (3)? There is no verb, unless "study" is the verb and it is very vague.

If you are going to use the acronyms, use them throughout.

They are sometimes abbreviated SLCN and sometimes written out. What are CYPs? The authors' use of acronyms are so inconsistent.

The mismatch between what the Method says and what the authors have already done (e.g., established research questions) is very difficult to reconcile.

There are so many acronym problems.

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Multi-tiered oral language interventions; implementation research; evidence-based practice.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Author Response 04 Dec 2021

Aoife Gallagher, University of Limerick, Limerick, Ireland

In V3, we have amended the document following on from some further comments from Reviewer 2.
Our responses to each comment are set out below.
Specifically:

ABSTRACT
(1) It is not clear what the letters SLCN abbreviate.
Amended.

(2) identification of the research question...does this refer to the research questions addressed in the various studies reviewed or the research question of the proposed scoping review?

The word 'proposed' has been added for clarity. The five remaining phases to be completed are now described.

(3) In the Methods of the Abstract, the phases are not consistent. For example, (3) what are you doing with the study screening and selection? There is no verb in this phase.

Amended.

"stages" or "phases" These should be consistent throughout.

Now consistently referred to as Phases.

INTRODUCTION
(4) I think you need : instead of ; in the following sentence "including the need for; early and accurate identification..."

Amended.

(5) There is inconsistent use of acronyms, capitalization, and the full words (e.g., Implementation Science vs. IS and implementation science).

We have reduced the use of acronyms to SLCN (speech, language and communication needs) and SEN (special educational needs) only. We use implementation science throughout in the place of IS.

(6) Objective has the word "including" twice. Please rewrite the sentence to avoid that.

Amended.

(7) It is still not clear what "constructs" the authors are thinking about. The intro doesn't offer more information. It is very vague.

We had detailed that we are interested to map determinant frameworks and their associated constructs in the methods section. Second paragraph, last sentence:

"As we are scoping the use of determinant frameworks, the constructs we will report on are descriptive categories or factors believed or found to influence implementation outcomes (Nilsen, 2015)"

 We have added this same sentence to the introduction.

(8) METHODS
The last line of the first paragraph uses "This" but the previous sentence is talking about differences. What does "this" refer to?

Amended.

(9) Just as in the Abstract, the six phases are not listed well. (1) Developing the research question - What are we talking about? You have three research questions in your introduction so why would the first phase be for you to develop your research question? What is going to happen in phase (3)? There is no verb, unless "study" is the verb and it is very vague.

In order for the protocol to be publishable RQs and a sample search string needed to be developed. We have described the first phase as completed and the remaining phases to be completed.

(10) If you are going to use the acronyms, use them throughout. They are sometimes

> abbreviated SLCN and sometimes written out. What are CYPs? The authors' use of acronyms are so inconsistent.
>
> Addressed see point 5.
>
> (11) The mismatch between what the Method says and what the authors have already done (e.g., established research questions) is very difficult to reconcile.
>
> Addressed see point 9.
>
> (12) There are so many acronym problems.
> Addressed see points 5.
>
> Thank you for taking the time to review this version of our paper.
>
> ***Competing Interests:*** No competing interests were disclosed.

Version 1

Reviewer Report 14 September 2021

https://doi.org/10.21956/hrbopenres.14412.r30043

✗ **Trina D Spencer** (iD)

Department of Child and Family Studies, University of South Florida, Tampa, Florida, USA

This is a study protocol for a scoping review on implementation science frameworks as they are applied to studies of speech, language, and communication interventions in mainstream classrooms. Generally, I am in favor of this protocol, but there are a number of unsettling aspects. I offer the following recommendations for the authors to consider.

1. The introduction needs a stronger rationale for why the researchers are interested in IS frameworks. The definition and utility of frameworks should be in the intro. It is not clear why they are choosing to look at frameworks as opposed to implementation studies generally. What if specific researchers do not specify a framework? And really, is it the framework that is important or is the research that is conducted? What does it mean and what does it look like to "apply a framework"? How is this different or better than just conducting the study? Likewise, the term "constructs" is so general and unspecified, yet they are critical in the research questions. Specification of the CFIR domains can help if they are introduced earlier. In other words, state you are using a specific framework in your study and give a rationale for its selection.

2. I am concerned about the introduction and discussion focusing on children with SLCNs but then the actual method is to include all children with disabilities. Alignment is needed and this is a pretty big thing. You can't do one thing and draw conclusions about another thing.

3. I recommend avoiding informal language (e.g., "map" as a verb) and other non-specific and non-descriptive language.

4. It appears in the exclusion criteria that they are excluding any study with children ages 5-18 years old. Please review that content for accuracy.

5. CFIR is mentioned specifically in the abstract, but then only referenced without naming it in the protocol.

6. As a reader, I am not convinced that knowing what frameworks other researchers chose (if they stated it) is going to help future researchers. Be explicit about this.

7. Please read and edit carefully.

Is the rationale for, and objectives of, the study clearly described?

Partly

Is the study design appropriate for the research question?

Partly

Are sufficient details of the methods provided to allow replication by others?

Partly

Are the datasets clearly presented in a useable and accessible format?

Not applicable

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Multi-tiered oral language interventions; implementation research; evidence-based practice.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to state that I do not consider it to be of an acceptable scientific standard, for reasons outlined above.

> Author Response 28 Oct 2021
>
> **Aoife Gallagher**, University of Limerick, Limerick, Ireland
>
> Response to Reviewer 2
>
> Thank you so much for taking the time to provide us with constructive comments to

improve our study.
Our responses to your most helpful comments are written under each, in italics.

a. The introduction needs a stronger rationale for why the researchers are interested in IS frameworks.

Now included.

b. The definition and utility of frameworks should be in the intro. It is not clear why they are choosing to look at frameworks as opposed to implementation studies generally. What if specific researchers do not specify a framework?

Amended.

c. What does it mean and what does it look like to "apply a framework"? How is this different or better than just conducting the study? Likewise, the term "constructs" is so general and unspecified, yet they are critical in the research questions.

Definitions have been added in relation to both points.

d. Specification of the CFIR domains can help if they are introduced earlier. In other words, state you are using a specific framework in your study and give a rationale for its selection.

Now included in the protocol introduction

e. I am concerned about the introduction and discussion focusing on children with SLCNs but then the actual method is to include all children with disabilities. Alignment is needed and this is a pretty big thing. You can't do one thing and draw conclusions about another thing.

We have added a justification for this in the methods and discussion. The premise of the study is based on the idea that we can learn from other Implementation Science work in schools as a starting point for considering such issues when working with children with SLCN.

f. I recommend avoiding informal language (e.g., "map" as a verb) and other non-specific and non-descriptive language.

We have changed some of the language accordingly.

g. It appears in the exclusion criteria that they are excluding any study with children ages 5-18 years old. Please review that content for accuracy.

Corrected.

h. CFIR is mentioned specifically in the abstract, but then only referenced without naming it

in the protocol.

Corrected.

i. As a reader, I am not convinced that knowing what frameworks other researchers chose (if they stated it) is going to help future researchers. Be explicit about this.

We have justified this further in the introduction.

j. Please read and edit carefully.

Done.

We are grateful for your time and thank you for your comments. We believe these have improved the reporting quality of the study protocol.

Competing Interests: None.

Reviewer Report 06 September 2021

https://doi.org/10.21956/hrbopenres.14412.r29879

? **Michael Donnelly**

Centre for Public Health, Queen's University Belfast, Belfast, UK

The authors are proposing appropriately to use the well tried and tested Arskey and O'Malley scoping review methodology to collate studies that have used implementation frameworks in order guide the implementation of SLCN interventions in schools. The reporting of the review will follow the PRISMA guidance for scoping reviews. A further positive feature is the inclusion of stage 6 in the scoping review framework (omitted in many published scoping reviews).

There are references in the protocol to the development of interventions - there is need to clarify how intervention frameworks might be used to develop interventions (as well as guide the implementation in practice of existing evidence-based interventions).

Will the review exclude studies that investigate implementation of interventions but does not include an implementation science framework?

Most readers will be familiar with EMBASE and PUBMED. Consider adding a sentence about the content of each database and the rationale for its selection. Is PSYCHINFO included in PsychArticles? Are social science databases included?

How will websites be identified and how will data from websites be included in the review?

Explain how the results of the appraisal of the methodological quality of each study will be used in the analysis and synthesis of the implementation frameworks particularly studies that the checklist deem to be of low quality.

Has consideration been given to the use in the conduct of the scoping review to one or more of the checklists that focus on implementation studies?

Hope that these reflections are helpful.

Is the rationale for, and objectives of, the study clearly described?
Yes

Is the study design appropriate for the research question?
Yes

Are sufficient details of the methods provided to allow replication by others?
Yes

Are the datasets clearly presented in a useable and accessible format?
Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Public health and health care research

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

> Author Response 28 Oct 2021
> **Aoife Gallagher**, University of Limerick, Limerick, Ireland
>
> Response to Reviewer 1
> Thank you so much for taking the time to provide us with constructive comments to improve the quality of our study.
>
> Re 1. There are references in the protocol to the development of interventions - there is need to clarify how intervention frameworks might be used to develop interventions (as well as guide the implementation in practice of existing evidence-based interventions).
> Response: We have added text in the introduction to clarify how intervention frameworks might be used to develop interventions
>
> Re 2. Will the review exclude studies that investigate implementation of interventions but

does not include an implementation science framework?
Response: Yes we will exclude studies without explicit reference to an IS framework. This has been clarified and rationale is given in the amended text.

Re 3. Most readers will be familiar with EMBASE and PUBMED. Consider adding a sentence about the content of each database and the rationale for its selection.
Response: These sentences have been added and tracked.

Re 4. Is PSYCHINFO included in PsychArticles?
That is our understanding, yes.

Re 5. Are social science databases included?
Yes – see tracked sentences related to the database descriptions.

Re 6. How will websites be identified and how will data from websites be included in the review?
Response: Further text has been added to clarify this point.

Re 7. Explain how the results of the appraisal of the methodological quality of each study will be used in the analysis and synthesis of the implementation frameworks particularly studies that the checklist deem to be of low quality.

Response: We have added text to make clear how we will trace the quality of the studies in the analysis and synthesis.

Re 8.Has consideration been given to the use in the conduct of the scoping review to one or more of the checklists that focus on implementation studies?

Response: We were not completely sure whether the checklist referred to here relates to the appraisal of included studies. Having looked at the 'Standards for Reporting Implementation Studies (StaRI) Statement' (Pinnock et al 2017), however, we can see the benefit of including an appraisal of the reporting quality of the IS papers included in the analysis in addition to the methodological quality (planned to be assessed by the MMAT). We have therefore included reference to this checklist in the protocol. We would welcome further guidance from the reviewer on this point as needed.

Competing Interests: None.