STUDY PROTOCOL

Addressing implementation considerations when developing universal interventions for speech, language and communication needs in the ordinary classroom: a protocol for a scoping review [version 2; peer review: 1 approved, 1 approved with reservations]

Aoife Gallagher¹, Carol-Anne Murphy¹, Johanna Fitzgerald², James Law³+

¹Health Implementation Science and Technology Research Cluster, Health Research Institute, School of Allied Health, University of Limerick, Limerick, Ireland
²Department of Educational Psychology, Inclusive & Special Education, Mary Immaculate College, Limerick, Ireland
³School 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 and language 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 study will be conducted in six phases: (1) identification of the research question, (2) identification of potentially relevant studies of Implementation Science frameworks, (3) study screening and selection, (4) charting and extracting data from identified frameworks, (5) collating, summarising and reporting the results and (6) consultation with stakeholders. Two reviewers will conduct the screening and extraction stages independently. Identified frameworks will be collated, and described, and constructs from the IS 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 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)

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Amendments from Version 1

We have actioned all of the changes recommended by the reviewers including; justifying the study more clearly, clarifying criteria for inclusion, and how we will manage poor quality studies. We have also highlighted more fully how intervention frameworks might be used to guide the development of interventions in addition to guiding the implementation of existing evidence-based interventions as suggested by reviewer 1.

Details of databases have been included for the reader. A justification is provided for scoping the literature as to our decision to include a broad population of needs in school, with a view to drawing learning across these studies to inform future implementation work for the narrower population of speech, language and communication needs. We have also contextualised the purpose of the study in relation to proposing a draft implementation science model.

We have one query in relation to a reviewer comment which we have included in the Response to Reviewers section.

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 (SLTs), employed by health services.

Once of school age, the majority of students 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 (IS) 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 IS. 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 IS 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 IS 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 IS 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 SLT, researchers have outlined the potential benefits of IS in addressing research to practice gaps (Campbell & Douglas, 2017; Douglas & Bursnice, 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 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 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 special educational needs 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. Based on the study findings, we will propose a draft model of IS 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 implementation considerations in the classroom for children with SLCN gives us the potential to develop more acceptable and sustainable universal interventions, and ultimately to improve the participation and achievement of children with these needs in school.

The objectives of this 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 special educational needs in the published peer-reviewed literature

2. To describe the IS frameworks and constructs used including psychometric properties and theoretical underpinnings 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 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 speech, language and communication 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. This method is therefore most suited to addressing the research questions of the study.

This review will be carried out in six phases as described by Levac et al. (2010). These phases include: (1) developing the research question, (2) identifying potentially relevant studies, (3) study screening and selection, (4) charting and extracting data from included papers, (5) collating, summarising and reporting the results and (6) consultation with stakeholders. As suggested by the researchers (Levac et al., 2010), more extensive content analysis may be required, depending on the nature of the papers included in the review.

1. Developing the research question

According to (Colquhoun et al., 2014), it is essential 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. Our review aims to synthesise frameworks used in empirical studies which explicitly aim to address implementation considerations when developing and/or implementing universal level interventions for children and young people identified as having special educational needs in ordinary classrooms.

In this study, the phenomenon of interest is the use of implementation science frameworks. We define 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 define 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 have broadened the scope of the review beyond children and young people with speech, language and communication needs to include children with a range of educational needs. We have done 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 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 CYPs with these needs are educated in general schools the context of interest in the study includes the general 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 study was conducted in order to contextualise our findings.

2. Identifying potentially relevant studies

Search strategy and terms. A search string will be developed based on an adapted Phenomenon - Situation (P-S) framework (Jakubec & Astle, 2017). See Table 1 for the preliminary search string. 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 IS 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**
- **Embase**
- **AMED**
- **PubMed**
- **PsycARTICLES**

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

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.
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
- Not related to children and young people identified as having difficulties in one of the following:

1 In the Irish Educational System ‘special classes’ are those which involve a small number of children with a particular diagnosis, with significant differences in terms of staff/ratio compared with an ordinary classroom.
(i) communication and interaction, (ii) cognition and learning, (iii) social, emotional and mental health difficulties, and (iv) sensory and/or physical needs.

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 IS 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) and the ‘Standards for Reporting Implementation Studies (StaRI) Statement’ (Pincock 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 IS constructs. Our analysis will be carried out deductively, guided by five IS domains developed by Danschroder 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 Danschroder 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 IS researchers and practitioners who support speech and language needs in school (teachers, educational psychologists and speech and language therapists who work in schools. Researchers will be identified via known research networks
and by reviewing relevant IS 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 (IS) literature to map and synthesise the use of IS frameworks in developing and/or implementing universal interventions in school. The review aims to document IS 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 IS 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 a draft model of IS 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 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 (PRISMA-ScR) 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.

**Acknowledgements**

It is with a deep sense of sadness that we share the death of Professor James Law, OBE one of the co-authors of our paper. James was a renowned researcher in the field of speech, language and communication disorders, specialising in the use of large population cohorts in this subject. He recently led the Cost Action European research network to improve children’s oral language abilities across Europe, as well as assisting the profession in considering ways to use telemedicine to deliver paediatric speech and language therapy services in response to the COVID-19 pandemic. James worked tirelessly to bring evidence-based approaches to children’s services across the UK, Europe, Australia, and beyond. Countless SLTs benefited from his time, knowledge, and passion. James will be known by all in the speech and language therapy community for his research interventions.

Ar dheis Dé go raibh a anam.

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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
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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.

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.
Reviewer Report 06 September 2021

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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.