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Teacher–researcher partnership in the translation and implementing of PALS (Peer-Assisted Learning Strategies): An international perspective

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Peer-Assisted Learning Strategies (PALS) is a class-wide structured supplementary paired reading programme to support learners with their reading (Fuchs et al., 1997). What remains at the core of implementing PALS in any given location is the co-creation with teachers to ensure PALS fits with that educational context. This paper discusses the involvement of teachers as co-creators in the process of adapting PALS in England, United Arab Emirates (UAE), Taiwan and Iceland. The aim is to demonstrate the importance of careful adaptation when implementing a programme adopted from another country. Each adaption used a different methodological approach to co-creation. For example, in England, field notes, informal conversations and interviews were utilised for co-creation. In Iceland, preschool and elementary teachers were instrumental in translating and adapting the PALS materials to the Icelandic context. From each adaption, the teachers supported the development of a literacy programme that was suitable for classroom use. In England, teachers' involvement resulted in the removal of the motivational point system. For the UAE context, PALS began in

English to support second language learning, but the instructional routines were a good ‘fit’ for the school culture and were developed in Arabic. For the Taiwan context, PALS provided an empirical basis for a model of differentiated instruction to enhance the reading literacy of Chinese-speaking elementary students. In Iceland, teachers trained other teachers in PALS as a research-based and efficient approach to meeting diverse learning needs of students, especially those with Icelandic as an additional language. Careful adaptation, piloting and the involvement of key stakeholders is important for the successful implementation of a reading programme.

Keywords: co-creation, Intervention design, Peer-Assisted Learning Strategies , Reading Comprehension

Highlights

What is already known about this topic

- Peer-Assisted Learning Strategies (PALS) for reading is an effective evidence-based supplementary whole-class paired reading programme to support children’s reading skills.
- PALS follows principles of explicit and systematic instruction that are consistent with the science of reading.
- PALS is a culturally responsive practice that teaches children to take turns reading and listening, whilst providing each other with supportive and corrective feedback.

What this paper adds

- Acknowledges that programmes need to be carefully adapted for each new context to ensure they are suitable.
- Describes cross-cultural approaches to co-creation with educators in the design and implementation of a reading programme.
- Describes approaches to expanding access to a successful reading programme by implementing PALS in a variety of languages and cultures, which may promote literacy skills for emerging bilinguals.

Implications for theory, policy or practice

- Programmes will not always directly translate from one context to another; changes might be needed and thus consultation with educators in educational settings are important.
- Understanding the theoretical underpinnings of reading programmes can add to success but to be used in practice need to ensure it fits within the educational context without diluting the core elements.
- Effects of peer-mediated learning conducted in a structured and systematic way show promise to be robust across languages and cultures.

The purpose of this paper is to strengthen the case for teacher–research partnerships for intervention design and implementation. Peer-Assisted Learning Strategies (PALS) provides a case study example of how, when completed successfully, these partnerships can result in a feasible accessible intervention. PALS was developed by Doug and Lynn Fuchs in collaboration with educators to accommodate the variation in students' reading levels in their classrooms in the United States (Fuchs et al., 1997, 2000; Fuchs, Fuchs, Al Otaiba, et al., 2001). PALS is now an international programme that researchers and educators have adapted to different education systems whilst maintaining the programme fidelity. In this paper, we outline the adaptation of PALS in four contexts using different methodological approaches to engage educators in the adaptation process of PALS.

Peer-Assisted Learning Strategies for reading was modelled after an approach called Class-wide Peer Tutoring (CWPT), which was developed by Delquadri et al. (1986) as part of the Juniper Gardens Children's Project at the University of Kansas. CWPT involves pairing all students within a classroom to maximise time that students are engaged in active learning with opportunities for feedback, immediate error correction and content mastery. Extensive empirical research supported this approach in reading, spelling and mathematics at the elementary and secondary levels (see McMaster & Fuchs, 2016, for a review). Doug and Lynn Fuchs and colleagues (e.g., Fuchs et al., 1997) sought to capitalise on these features to develop a structured reading programme that would benefit a wide range of learners in general education classrooms. They first developed PALS-Reading for Grades 2–6, which includes several core features that have since been incorporated into additional PALS programmes (e.g., Kindergarten and First Grade PALS): (a) all students in the class are paired, such that a stronger reader is paired with a weaker reader; (b) students learn to use specific prompts, correction procedures and feedback to support their partners; (c) PALS incorporates frequent verbal interactions between students to increase opportunities to respond; (d) roles are reciprocal, so that both students in a pair have the opportunity to be both the tutor and tutee; and (e) students learn to implement a set of structured activities designed to support their reading. After several weeks of training led by the classroom teachers, students then implement these activities independently with their partners.

The structured activities included in PALS vary based on the grade-level focus of each programme. PALS for Grades 2–6 and High School both include Partner Reading, Retell, Paragraph Shrinking and Prediction Relay. In Partner Reading, students take turns reading instructional-level text with fluency. In Retell, students retell what they learned in sequence. In Paragraph Shrinking, students summarise the main idea of each paragraph they read. In Prediction Relay, students predict what will happen next in the story. These are all core skills identified as important for successful reading comprehension (e.g., Jenkins et al., 1987; Jitendra et al., 2000; Mathes & Fuchs, 1993; Palinscar & Brown, 1984). Kindergarten and First Grade PALS include 'What Sound?' (students identify common letter sounds), 'What Word?' (students identify high-frequency words by sight), decoding words using letter–sound correspondences, and reading sentences and stories to build fluency. Again, each of these skills has extensive empirical support for developing beginning reading skills (e.g., Foorman et al., 2016). Each programme is designed to be implemented three to four times per week for 20 to 35 minutes per session, across 16–20 weeks (depending on the grade level).

Extensive robust research spanning over 30 years has demonstrated the effectiveness of PALS to improve the reading attainment of students (see McMaster & Fuchs, 2016, for a review). This research includes investigations conducted by the original developers of PALS, as well as independent investigators who extended PALS to different populations of learners (e.g., Bemboom & McMaster, 2013; Calhoun, 2005; Mastropieri et al., 2001).

Central to the development and implementation of PALS is co-creation with educators. In the initial development of PALS, educators were research partners; for example, the training manuals were written in consultation with teachers (Fuchs & Fuchs, 2005; Fuchs, Fuchs, Thompson, et al., 2001). Furthermore, K-PALS was the result of kindergarten teachers asking the PALS developers to develop a kindergarten version of PALS after seeing the benefits of first grade and Grades 2–6 PALS (Fuchs, Fuchs, Al Otaiba, et al., 2001). Collaborating with educators resulted in an intervention that was feasible in a classroom setting (McMaster et al., 2007).

Intervention programmes cannot be assumed to translate from one school, one area or country successfully without consideration of the local sociocultural and policy landscape (Klingner et al., 2013). Within a school, there is likely to be diversity in delivery due to varying factors that may affect the implementation and effectiveness of an intervention. At the classroom level, factors might include teaching styles, teachers' engagement with research evidence and characteristics of individual pupils. At the school level, factors such as location of the school and resources available will influence the feasibility and acceptability of the intervention within the classroom. Only by understanding these barriers and facilitators of implementation can we understand how to support users to implement an intervention with high fidelity (see Moir, 2018, for further review of factors that influence implementation in education). Thus, whether designing an intervention or planning to implement an intervention already developed in a new setting, co-creation with intended users is vital to increasing the likelihood of successful implementation. Further, when adaptations are made, additional research is then needed to assess whether these adaptations impact the effectiveness of an intervention.

Peer-Assisted Learning Strategies is now an international supplementary reading programme; however, it cannot be assumed that the US version translates to the educational context of any given country. In this paper, we present an international account of the adaptation of the US version of PALS in four contexts: England, United Arab Emirates (UAE), Taiwan and Iceland. In each context, we outline the methodological approaches used and adaptations made due to cultural settings and other insights provided by the educators in each context. Presenting an international perspective highlights different approaches to involve educators to reach the same aim to adapt a pre-existing programme whilst balancing the contextual considerations and programme fidelity.

England Adaption of Grade 2–6 PALS

The key differences between England compared with the United States are geographical, sociocultural and political, each of which impact the educational environment. There are also subtle differences in language (British English compared with American English), but these are minimal compared with the other contexts described later.

Initial work with PALS in England was a result of teachers identifying an issue at a school-research partnership event. Teachers mentioned students were not confident to give corrective feedback and were passive during paired reading activities. Furthermore,

teachers were looking for approaches to support students' comprehension skills, with evidence suggesting that students in England were underperforming in comprehension skills such as retrieval and inferencing (Progress in International Reading Literacy Study [PIRLS], 2017). Grade 2–6 PALS was selected as the approach to pilot within this teacher–researcher partnership. The teachers involved in the partnership were self-selecting with an interest in trialling a different approach to paired reading.

The aim of the pilot was to understand whether PALS was suitable for the English education system. An implementation and process evaluation was incorporated in the evaluation design of a randomised control trial with nine schools in England (five intervention schools), with Year 5 pupils in the West Midlands (aged 9–10 years old; Vardy et al., 2021 – in prep). Eight teachers (one male and seven females) delivered PALS for approximately 20 weeks to their Year 5 classes. During the implementation process, the teachers were encouraged to keep a log to inform any changes needed to adapt PALS prior to wider implementation; three returned their logs. Alongside the logs, the teachers were interviewed at the end of the programme. Working with the teachers enabled us to understand the feasibility and acceptability of the US Grade 2–6 PALS version.

Summarising the teacher voice, the teachers found the peer element to be '*good, children pushed themselves with reading*'. The students worked well to support each other, which is why some schools removed the motivational point system as the students '*did not like them ... and stopped the enjoyment*', it became competitive with students adding on extra points. All schools noted that PALS had '*opened up more books to read*', with students selecting more challenging texts and as a result students' fluency improved from the teacher perspective.

Informal chats during the programme delivery and field notes, along with the interviews, explored the barriers teachers faced during implementation, highlighting what changes could improve PALS for English schools and what those changes could look like. As a result, the following changes were made to develop PALS-UK, which did not adapt the core elements of PALS as they fitted well within each setting but rather were minor changes to the programme: (1) modernisation and Anglicisation of the manual and training materials (Fuchs et al., 2021); (2) guidance on alignment to national curriculum; (3) support for book selection; and (4) changes to implementation of the motivational system.

Literacy education in England is quite prescriptive, and educators were keen to understand how PALS aligns to the national curriculum. Several factors make schools accountable for deviation from the national curriculum in England, for example, regular inspections by The Office for Standards in Education, Children's Services and Skills (a non-ministerial department of the government) and annual publication of school-level performance on national tests. Of particular relevance for PALS, at the end of primary school (age 10–11 years), pupils in England sit statutory standardised assessment tests in reading, maths, and spelling, punctuation and grammar. From working with teachers and senior leadership, it became clear that a key driver in the decision to implement and continue using PALS was an understanding of whether PALS addressed areas of the national curriculum and the likelihood of impact on national tests.

The National Curriculum for Year 5 and 6 (9–11 years old) states that students need to understand what they have read by predicting what might happen next and summarising the main ideas (Department for Education [DfE], 2013). This aligns very neatly to the component skills of reading comprehension that PALS focuses on training. One teacher noted that through using PALS they were able to meet school objectives of students improving in summarising and retelling skills. Therefore, we did not need to change PALS to allay

concerns about national curriculum alignment but needed to recommend ways to collate the evidence required.

An outcome for all the schools was the increased enjoyment of reading from using PALS. The teachers showed concern about book selection and felt that this could be a barrier to feasibility, particularly in under-resourced schools. Some suggested that PALS would be easier to implement if schools were provided with a resource list of reading material for each target year group. Prior research in the United States also shows that it is important that the reading material is interesting and at the right level for the students (Fuchs et al., 2000). For a subsequent large-scale Education Endowment Foundation (EEF) funded evaluation of PALS, teachers were provided with books to facilitate delivery of the intervention, as well as substantial training before and during delivery of the intervention (summarised in Dimova & Sutherland, 2019).

A core element of the PALS US version is the motivational framework, where students' award points during each activity to encourage students to complete the PALS activities accurately (Fuchs et al., 1999). However, teachers mentioned early in the 20-week delivery that the point system had the opposite effect, as it demotivated students by increasing competition between pairs removing the focus away from helping their partner. As a result, the PALS motivational points system was removed from two schools before the end of the 20 weeks and has been removed from the English version of PALS following teacher and student feedback. Instead, teachers are encouraged to use their own motivational approaches to engage students, when necessary, for example, offering a class merit point scheme as rewards at their own discretion for pairs who had worked well together. Additionally, the points system is not the only motivational aspect of PALS; the peer-assisted nature of the activities and positive coaching environment are can also be motivating.

The researchers and teachers worked collaboratively to ensure PALS became suitable for England. Their knowledge of curriculum requirements and student behaviour during PALS provided an insight that would not have otherwise been considered. Minor adaptations to PALS were made for the English context, and those changes have ensured that PALS is suitable for teachers implementing PALS.

The Taiwan Adaptation of Grade 2–6 PALS

Taiwan is a country located in East Asia. The majority of the population speaks Mandarin, and Traditional Chinese is used as the writing system. Chinese characters do not constitute an alphabet or a compact syllabary. Rather, the writing system is roughly logossyllabic. In other words, the basic graphic unit in Chinese is a character. Approximately 80% of Chinese characters are compound characters that are constructed by several stroke patterns, also known as radicals (Chung et al., 2008). Therefore, many students struggle with achieving Chinese reading proficiency due to the heavy reliance of visual processing skills (Liu et al., 2015). Additionally, most Chinese language arts teachers in Taiwan are trained in Chinese classics, such as word and sentence-level skills, rather than reading strategies. The average instructional time located in teaching reading is far less compared with the international average (Ko, 2018). Therefore, the need for structured reading instruction in Taiwan is apparent.

The translation of PALS was undertaken using a co-creation process, with a group of in-service elementary teachers with English language expertise working with the fourth author (Kung) to ensure the materials were suitable for the Taiwan context but also kept the

core elements of PALS. One adaption that was made with the Chinese version of PALS was that an additional activity, ‘presenting time’ followed the Grades 2–6 activity paragraph shrinking, instead of moving straight to the activity prediction relay. In this activity, PALS teachers pick two to three pairs and have them read aloud their 20-word paragraph summary from the paragraph shrinking activity. The presentation activity was intended to enhance the participating students’ joint attention, as well as to allow them to receive more feedback during the activity process. The adaption was made through discussions among participating teachers and the principal researcher as we all thought a ‘gathering time’ was needed in between the student-centred activities. Additionally, to fit PALS within the school timetable, some teachers implemented longer sessions but at a reduced frequency.

A total of 118 fourth-grade students from four classes in two elementary schools located in northern Taiwan participated in a pilot study (Kung & Teo, 2022 – under review). The average age of the participating students was 10.7 years old. The four classes were randomly assigned to PALS and control groups, and this resulted in 58 PALS students and 60 control students. For 15 weeks (including the first week of PALS training), the PALS classes received PALS reading instructions twice a week for 40 minutes, whereas the control classes followed conventional teacher-led reading instructions with the same reading materials. To explore the effects of the Chinese PALS instruction, pre-test and post-test differences in reading abilities, particularly at the word level (oral reading fluency) and passage level (reading comprehension) of the two groups of participants, were measured (Kung & Teo, 2022 – under review). The experimental group significantly outperformed the control group in oral reading fluency (partial $\eta^2 = .11$) and the reading comprehension measure (partial $\eta^2 = .07$). The difference was greater for oral reading fluency. Furthermore, a clear pattern of differences was observed in the effects of PALS instruction for students of different ability levels. In the subgroup analysis, lower-achieving students in the pairs benefited more from PALS instruction in terms of oral reading fluency ($d = 0.84$) and reading comprehension ($d = 1.31$) than their higher-achieving peers did ($d = 0.46$ and 0.91 , respectively). The results indicated that the PALS instruction can benefit the reading literacy of Chinese-speaking elementary students in Taiwan.

The study provides an initial empirical basis for a model of differentiated instruction through PALS for enhancing the reading literacy of Chinese-speaking elementary students. The results provide a reference for the development of effective and feasible teaching strategies for reading to be implemented with Chinese-speaking elementary students with diverse learning abilities.

United Arab Emirates Adaption of K-PALS

The UAE is located in the Arabian Peninsula and the official language is Arabic, but English is widely spoken. Although there are many spoken Arabic dialects in the world, most native Emiratis speak a dialect known as Gulf Arabic. The school system in the UAE includes public schools as well as private schools. Public schools are free for Emirati citizens and Modern Standard Arabic is the primary language for instruction; English is also taught. The UAE Ministry of Education (MOE) establishes standards and curricula at the federal level, but there are also other education authorities within individual Emirates. Despite the UAE’s rapid development and prosperity, improving literacy outcomes remains a high priority. Data from the PIRLS revealed that on average within the UAE (across public and

private schools), fourth graders' reading performance remains relatively low, although it has increased from 439 in 2011 to 468 in 2016 (with an international scale centre point of 500 and a standard deviation of 100). However, within public schools that followed the MOE reading curricula, the mean reading scaled scores in Arabic reading were lower by more than a half a standard deviation than the overall averages for all types of school in the nation (372 in 2011 and 400 in 2016).

The adaptation of K-PALS to support beginning reading in the Arabic language was initiated by teachers as research partners within one UAE public school. This school was an innovative model school that provided bilingual instruction in Arabic and English. The school had adopted PALS to support English language reading instruction, which was provided by native English speakers. During a visit to support English PALS implementation, primary grade Arabic teachers expressed their interest in designing an Arabic version of K-PALS reading approach with instructional routines that would be consistent across English and Arabic as they were very concerned that many students could not read proficiently in their native Arabic language. The teachers expressed concerns that the Arabic reading curriculum they used followed a whole word approach, and students needed more direct and explicit instruction for letter–sound correspondence, particularly for beginning reading stages.

These Arabic teachers also described several issues that generally make learning to read in Arabic challenging (for more information, see, e.g., Al Ghanem & Kearns, 2015). First, spoken Arabic dialects are different from the written version, known as Modern Standard Arabic (e.g., Abu–Rabia, 2002; Saiegh-Haddad, 2005). Second, the written version of Arabic orthography includes vowel marks to represent long and short vowels, but these markings (called *harakat*) add complexity to visual processing (e.g., Mohamed et al., 2011). Third, consonants and vowels are represented differently depending on whether the letter occurs at the beginning, middle or end of a word. Fourth, the Arabic language relies heavily on root words and morphology, so understanding the sentence context and grammar are important for reading comprehension (e.g., Farghaly & Shaalan, 2009; Saiegh-Haddad & Taha, 2017). Therefore, the PALS translation needed to be mindful of these issues identified by teachers and supported by evidence.

Four primary grade Arabic teachers helped develop an initial version of a beginning reading Arabic PALS. The teachers first requirement for PALS was that the scope and sequence began with instruction in letters and sounds and would build to roots and morphemes. In developing beta lesson plans (paper and pencil), the teachers collaborated with researchers to identify a series of books for their classroom libraries that (1) reinforced the alphabetic principle and initial phonics and (2) included brief stories that would be decodable after students learned to blend and segment simple words. Following the initial versions and considering the teachers' concerns, an initial set of 24 lessons, and translation of the English K-PALS procedures and teacher training into Arabic occurred. These lessons and the teacher training materials were provided to the teachers.

In the next phase, teachers began an initial try-out of these 24 PALS lessons in their classrooms to explore the feasibility of Arabic PALS. During observations and interviews about feasibility, teachers provided useful feedback for revision and further development of the PALS materials. A couple of interesting innovations emerged. All teachers used an overhead and digital whiteboard so that students could easily see and participate in the teacher-led introduction. In one second grade classroom, the teacher developed a follow-up routine in which students wrote and spelt each of the letters and words they learned each day on individual whiteboards. Students were able to give each other feedback using the PALS 'check it' procedures.

Teachers did identify a few challenges for implementation. Although PALS was designed for delivery 3 days per week, they were only able to implement it twice a week. Other teachers suggested adaptations to the beta version of the scope and sequence (e.g., adding short vowels with the vowel marking earlier so students could begin blending to read words). The teachers also suggested adding an image of a child whose mouth would indicate the appropriate pronunciation or position for vowels. Another suggestion was to substitute more common words to represent one or two of the introductory images for initial sounds. Only one teacher elected to use the PALS motivational framework and used points to reinforce positive partnership behaviour or fidelity; the others did not.

The PALS for Arabic Beginning Reading continues to be developed. The US research team has created a total of 80 lessons to date with a revised expanded scope and sequence and an updated professional training (Al Otaiba et al., 2018). Next steps will be to conduct additional field tests with other research partners in Palestine and with Arab immigrant students within the United States.

The Icelandic Adaption of K-PALS

Iceland is one of the Nordic countries, located in the North Atlantic Sea. The Icelandic language is considered orthographically transparent reflecting that the writing relates directly to the sounds of language (Seymour, 2005). This orthographic transparency should promote decoding and make it relatively easy for children in Iceland to learn to read. However, many children struggle with achieving reading proficiency. For example, in recent decades, around one-third of 8-year-old students have been reported to read below their comprehension level at the end of second grade (Björgvinsson et al., 2015).

Nearly all children in Iceland attend government-subsidised preschools from an early age. Around 95% of children aged 5 years attend preschool 8 hours a day (Statistics Iceland, 2021). The traditional pedagogy is play-based learning, and the emphasis of play is reflected in preschools being referred to as 'playschools' in Iceland. No public or standard performance aims have been set across preschools, and very little emphasis is on explicit instruction in beginning reading skills. Similar emphasis can be observed in most elementary schools. Teachers in Iceland predominantly adhere to a constructivist approach to teaching (TALIS, OECD, 2009). Thus, even though phonics can be considered the traditional approach to teaching reading in Iceland, it is rarely applied in a very systematic and explicit manner.

Teacher training in PALS started in 2009 as part of a publicly funded project that aimed to implement evidence-based structured practices to support the learning of students with Icelandic as an additional language in inclusive education settings (SÍSL, 2021). Studies have indicated that teachers in Iceland generally felt insecure and ill-equipped to teach students with additional support needs (Óskarsdóttir, 2014). PALS was selected for implementation in Iceland based on research findings showing positive effects on academic skills of a diverse student group in the United States. Icelandic versions of PALS were created through a collaborative effort, involving teachers and the implementation project leader, but also university faculty and administrators at the school and municipality levels (SÍSL, 2021).

Given that play-based learning has been the major approach to promoting early literacy in Icelandic preschools, it was important to explore how preschool staff perceived the use of a structured programme such as K-PALS to teach fundamental reading skills to their

oldest students (5- to 6-year-olds). In a qualitative study (Petursdottir & Guðjónsdóttir, 2015), five public preschools in the capital region of Iceland were contacted, and every staff member with experience of K-PALS offered to share their views with an interviewer with no prior connections to the preschools or K-PALS. Participants, 12 teachers and 1 paraprofessional, had on average more than 2 years of experience applying K-PALS and were currently teaching roughly 100 children aged 5 to 6 years, with around 1 in 10 learning Icelandic as a second language. Semi-structured interviews revealed that participants conducted K-PALS activities with high fidelity to the manual, albeit changing wording slightly to maintain children's attention.

A few teachers described initial difficulties implementing K-PALS, such as fitting it into the weekly schedule, learning to follow the manual and engaging students in the activities. Two teachers were initially against implementing K-PALS because it seemed complicated and too structured for use in preschools. However, these same teachers described how their attitude towards K-PALS became gradually more positive upon seeing children enjoying K-PALS lessons and acquiring fundamental reading skills. Despite predictions to the contrary, nearly all the children reportedly enjoyed K-PALS. All participants described significant improvements, not only in beginning reading skills but also children's self-esteem, social skills and interactions. This was even reported to be the case with children identified at-risk for reading difficulties, although a few were said to need more individualised support.

Some of the teachers wanted to make adjustments to K-PALS, such as using more pictures or games, and a few wanted to use it less often per week. Interviews with first grade teachers from nine public schools in different neighbourhoods of the greater capital region of Iceland, who had applied K-PALS in reading instruction for 1 to 7 years (over 3 years on average), reported similarly that some students grew tired of the repetition. This was easily addressed by skipping parts of lessons or those lessons where no new sounds were introduced. Nearly all teachers considered K-PALS to be beneficial for Icelandic language learners and students with learning disabilities. Overall teachers in the study (Fawcett, 2018) considered K-PALS valuable for meeting the diverse needs of students in inclusive settings but stressed the importance of selecting lessons based on student skill levels and maintaining their motivation.

In a quantitative outcome study of Icelandic K-PALS (Petursdottir & Ólafsdóttir, 2016), two groups of 5- to 6-year-olds ($n = 30$) in two preschools were instructed with K-PALS two to four times per week, for a total of 30–45 sessions. A comparison group ($n = 27$) in two matched preschools was instructed with other methods in supporting emerging literacy. In the K-PALS preschools, 35–40 minutes were spent on average per week on foundational reading skills, but 50–180 minutes in the comparison preschools. Pre-tests in October showed no difference between the groups, but in May the K-PALS group outperformed the comparison group in phonological awareness, letter knowledge, letter sound knowledge, letter sound fluency and word-decoding skills. Of the K-PALS group, 90% had acquired some decoding skills compared with 48% of the comparison group. Overall, the effect sizes of K-PALS on foundational reading skills were considered large (Petursdottir & Ólafsdóttir, 2016). These results indicate that the Icelandic version K-PALS can significantly improve important foundational reading skills of preschoolers in Iceland.

Peer-Assisted Learning Strategies has been well received in Iceland, as reflected in the large number of teachers attending training and the generally positive view expressed in qualitative interview studies. The implementation approach of having teachers take on

major roles in the process of translating and adapting materials to the Icelandic context and training of teachers has worked well. Initial effectiveness studies also indicate that incorporating K-PALS into preschool activities can be an efficient way to improve foundational reading skills. However, in Iceland, K-PALS is more often used in first grade than preschool (Daníelsdóttir, 2015); the effects of its use on first graders' beginning reading skills remain to be assessed as well as the effects of first grade PALS and PALS for second to sixth grade. Also, it remains to be explored to what extent teachers who have completed PALS training use the strategies in their teaching and whether they and their students are applying the strategies as intended.

Concluding Thoughts

In each case study, educators were involved using different mechanisms, within England and the UAE, teachers initiated the spark that led to the development of PALS in these contexts, whereas researchers in Iceland and Taiwan led the initial development of PALS. For each context, teachers provided practical on the ground knowledge of how PALS works within their setting. In the England context, teachers delivered the intervention and during the process kept a log and were interviewed at the end of the programme. This approach is a lighter touch model of co-creation in comparison with the approaches used in Taiwan, UAE and Iceland. In these contexts, teachers were heavily involved due to the need for translation of the materials in addition to feasibility.

In each context, the US motivational framework was mentioned resulting in the removal of the framework in England and the UAE. In Iceland and England, the educational system played a role in the acceptability of PALS by teachers; it was important to examine the teacher's perspectives of PALS to align PALS to the play-based model of Iceland and the more prescriptive approach of England. Despite these different educational approaches, PALS was well received with minor changes needed to align with the curriculum to increase the acceptability with educators. In Taiwan, in collaboration with the teachers, an additional activity was added to support student learning.

Across all four contexts, these minor adaptations did not result in a change to the core elements of PALS. The highly structured nature of PALS and training were positively received by the teachers. The training element in PALS ensures high-quality interactions, with students more likely to correct errors made when reading aloud (Fuchs et al., 1999). Mentioned across all four case studies was time to implement PALS with competing demands on time, noting that when developing an intervention, developers need to consider how teachers will fit the content alongside the curriculum that needs to be delivered. Part of PALS success is that it is highly structured and includes a training package, which is a universal feature. Further work is still needed to explore what precisely supports implementation fidelity. It has previously been shown that implementation of PALS just using the manual does not ensure PALS is implemented with fidelity, supporting that teacher training is required (Vadasy et al., 1997), a point raised in the Icelandic context.

The effectiveness of PALS in the classroom relies on the partnership of teachers and researchers working collectively to design culturally appropriate adaptations and find solutions to implementation issues (Fuchs, Fuchs, Al Otaiba, et al., 2001; Fuchs, Fuchs, Thompson, et al., 2001). The aim of this paper was to demonstrate the importance of not just adopting a programme 'as is' from one country and implementing in another without careful adaptation to ensure that the programme remains feasible and relevant to the

teachers and students. Whenever exploring a programme from a different context, these teacher partnerships are vital.

There needs to be a mechanism for teachers to give feedback about their experiences to the developer of an intervention (Daniel & Lemons, 2018). For example, if a teacher selects an intervention using information from the EEF in the United Kingdom or the What Works Clearing House in the United States, there should be a mechanism through which information on how effective an intervention is when used in practice can be shared. For example, describing whether they were able to replicate as stated, or needed to amend to fit the school context, or if certain groups of students were unresponsive or any other information that would enhance an intervention. To make an analogy with medical research, Phase 4 trials are conducted post marketing of drugs and vaccines, to explore whether the intervention continues to work after the intervention has been rolled out to the public. These trials are also essential in education because they enable responsiveness to change in the environment. However, how often are teachers or those who work in the education sector able to provide feedback, or involved in the design and implementation of a programme?

Co-creation is a time commitment for teachers. In England, teachers were asked to keep an implementation log during the delivery; however, this was difficult to complete alongside competing demands. Therefore, when involving teachers, mechanisms that are fruitful but not burdensome need to be considered, such as interviews, which is a one-off interaction and used by three of the contexts presented in this paper. Informal conversations were also as important as data collected.

There are challenges to co-creation. It takes time to build partnerships with schools, to gain their trust, and it is a reciprocal process. From each case study, we learnt the importance of being flexible, acknowledging the workload of teachers. For each case study, whilst educators were engaged with the translation of PALS to their setting, the ownership of the project remained with the researchers. With co-creation projects, it is important to communicate clear expectations and provide guidance on intellectual contribution. In each setting, the teachers are acknowledged as a collective but not individually named when we discuss the adaptations (McMaster et al., 2014). This is a limitation of our approaches, if teachers do contribute a considerable amount of work, then this must be valued by being acknowledged. A recommendation from our work is to outline clearly what contribution teachers are to make, and how and whether they will be acknowledged. If we are to build these partnerships, then perhaps individual contributors should be named rather than described as a collective.

Some academics may see this approach as beyond the call of duty (Fuchs, Fuchs, Thompson, et al., 2001). However, we believe such an approach makes for feasible useful programmes for educators. In future, more time should be allocated to strengthen the involvement of educators and offer financial compensation for project involvement to support co-creation. If, as researchers, a focus is to support schools to support student learning, missing this vital chain in the development of an intervention or strategies means the end product may not be fit for use in the classroom. It does not matter how well an intervention works in a controlled experiment if no teacher wants to use it.

The aim of this paper was to highlight the processes of fine tuning an evidence-based reading intervention from four international perspectives. Each context demonstrates the key message of the paper, that to support the successful implementation of a reading intervention, teachers need to be part of the translation process. We hope to emphasise the need to consider the context and intervention to ensure they align; you cannot lift an intervention from one context and assume it will fit into the educational context and be successful.

Teachers and educational professionals' knowledge, experience and skills are a crucial part of the fine tuning of a reading intervention and should not be neglected in this process.

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Data Availability Statement

Data sharing is not applicable to this article as no new data were created or analysed in this study.

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