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Effects of a digitized phonics intervention in a Swedish context: intervention and booster outcomes for secondgrade students

Submission date 21/05/2026	**Recruitment status** No longer recruiting	[X] Prospectively registered [X] Protocol
Registration date 25/05/2026	**Overall study status** Ongoing	[_] Statistical analysis plan [_] Results
Last Edited 21/09/2026	**Condition category** Other	[_] Individual participant data [X] Record updated in last year

Plain English summary of protocol

Background and study aims
Some children find it hard to learn to read in the early years of school. Research shows that teaching phonics, which links letters to sounds, can help improve reading skills. However, gains from earlier programmes may not last over time. This study aims to test whether a digital phonics programme can improve reading, spelling, and understanding in children aged 6 to 9 years who are at risk of reading difficulties. It also looks at whether extra follow up lessons given about 3 months later can help maintain these improvements.

Who can participate?
Children aged 6 to 9 years who are in grade 2 and have low scores in reading tests taken in grade 1 can take part. These tests measure skills such as word reading and recognition. Only children who score below a set threshold are included.

What does the study involve?
Children who take part will receive one to one reading support sessions with a teacher using an online programme. The programme includes 36 lessons that focus on learning letter sound links, reading words and sentences, and practising spelling. Some children will also receive extra booster lessons about 3 months after the main programme. Reading and spelling skills will be tested several times during the study.

What are the possible benefits and risks of participating?
Children may benefit from improved reading and spelling skills. This could help their learning at school. There are no known significant risks, but some children may find the sessions tiring or challenging.

Where is the study run from?
The study is run from Linköping University in Sweden and takes place in participating schools.

When is the study starting and how long is it expected to run for?
May 2026 to June 2028.

Who is funding the study?
The study is funded by several organisations, including the Swedish Research Council, Linköping University, the University of Gothenburg, LegiLexi, and Mälardalen University.

Who is the main contact?
Professor Stefan Samuelsson at Linköping University, stefan.samuelsson@liu.se

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Study information

Scientific Title
Effects of a digitized phonics intervention in a Swedish context: intervention and booster outcomes for secondgrade students. KILA (Kompletterande intensiv lästräning i avkodning; Supplementary intensive reading instruction in decoding)

Acronym
KILA

Study objectives
RQ1: To what extent does a RCT using a digitalized phonics intervention improve word decoding, word recognition, spelling, and reading comprehension among second-grade students at risk of early reading difficulties?
RQ2: To what extent do pre-test scores, language background and neurodevelopmental traits moderate intervention effects on reading and spelling outcomes?
RQ3: Does providing a set of booster lessons approximately three months after the digitalized phonics intervention enhance the gains of a second-grade intervention?
RQ4: To what extent do pre-test scores and intervention gains moderate boost effects on reading and spelling outcomes?

Ethics approval required
Ethics approval required

Ethics approval(s)
Approved 26/03/2026, Etikprövningsmyndigheten (Box 2110, Uppsala, 750 02, Sweden; +46-10-475 08 00; registrator@etikprovning.se), ref: 2026-01512-01

Primary study design
Interventional

Allocation
Randomized controlled trial

Masking
Open (masking not used)

Control
Uncontrolled

Assignment
Parallel

Purpose
Treatment

Study type(s)

Health condition(s) or problem(s) studied
Risk for reading difficulties

Interventions
Current interventions as of 09/09/2026:

The intervention focuses on phonics to improve reading skills in Swedish students at risk of reading difficulties. The intervention is a digital adaptation of the program described in Lindström Sandahl et al. (2023). The program consists of 36 lessons, delivered 4 times a week for 9 weeks, and provides structured instruction in grapheme–phoneme correspondences to

support decoding and spelling of simple words. Students repeatedly practice phoneme blending, segmentation, word reading, and sentence reading to strengthen phonological awareness, decoding, and spelling skills and to develop reading fluency. The intervention is delivered one-to-one (one student and one teacher) via the web portal of the non-profit organisation LegiLexi. The program is complementary as students also take part of regular classroom reading instruction. A total of 200 students will be randomly assigned to the intervention group and an equal number to the control group. The control group will receive regular instruction, including special education support in accordance with the Swedish national curriculum. Participants in the control group will be offered the opportunity to complete the program in the following semester (spring 2027) as part of a wait-list control design.

After completing the post-tests, half of the students in the intervention group (N = 100) will be randomly assigned to participate in a booster component consisting of 12 selected lessons from the intervention program delivered over three weeks (boost intervention group). The remaining half of the intervention group will serve as a comparison group for the effects of this additional reinforcement (boost control group, N = 100) and will receive teaching as usual. The booster phase will be implemented three months after the completion of the original 36 intervention lessons.

The LegiLexi Foundation assesses reading, spelling, and language skills three times per year during specified testing windows (autumn, winter, and spring assessments). In this study, the autumn assessment will serve as the pre-test for the original intervention, while the winter assessment will function as the post-test. The spring assessment will be used as the post-boost measurement. The post-test and post-boost assessments will be administered no later than one month following the completion of the respective interventions. The study design is illustrated in the figure (see outputs table at end of record).

Lindström Sandahl, H., Elwér, Å., Samuelsson, S., & Danielsson, H. (2023). Effects of a phonics intervention in a randomized controlled study in Swedish second-grade students at risk of reading difficulties. Dyslexia, 29(4), 290-311.

Assignment
In the initial randomization procedure, randomization will be conducted at the individual pupil level within participating schools. Because schools differ in the number of pupils they can include in the intervention, the randomization procedure incorporates school-specific intervention capacity constraints. Each participating school will define the maximum number of pupils that can receive the intervention within that school. For each participating school, the number of pupils assigned to the intervention condition is therefore limited by the school-defined intervention capacity. For schools with at least two participating pupils, the randomization procedure will require at least one pupil to be allocated to each condition, thereby promoting representation of both conditions within schools.

To improve baseline comparability between conditions, constrained randomization with rerandomization will be used. Candidate random allocations will be repeatedly generated until predefined balance criteria are satisfied. Balance will be evaluated on two prespecified baseline characteristics considered important for intervention response and study validity:
• absolute proportion difference ≤ 0.025 of SVA (pupils receiving Swedish as a second language instruction), and
• standardized mean difference (SMD) ≤ 0.05 for a composite of word decoding and nonword decoding at spring grade 1.

Candidate allocations are accepted if both criteria fall below predefined thresholds. The decoding criterion was informed by recommendations from the What Works Clearinghouse (WWC), which considers standardized baseline differences below 0.05 to represent negligible imbalance between groups in randomized educational studies. According to WWC standards, groups with baseline differences below this threshold are considered sufficiently equivalent without requiring additional statistical adjustment for baseline imbalance.

For the binary SVA variable, balance will be evaluated using absolute differences in proportions rather than standardized mean differences. Given an expected SVA prevalence of approximately 33% in the study population, an absolute proportion difference of approximately 0.025 corresponds to a standardized mean difference of approximately 0.05. The selected threshold for SVA was therefore chosen to align with the WWC criterion used for decoding balance.

Simulations of data and randomization indicated that the selected thresholds substantially improved baseline balance while still retaining a sufficiently large proportion of acceptable random allocations. The purpose of the constrained randomization procedure is not to achieve perfect equivalence between groups, but rather to reduce the probability of practically important baseline imbalance while preserving the advantages of random allocation. The rerandomization procedure will be implemented using a reproducible r-script that will use base-r functions for randomization.

In the second randomization procedure, participants from the intervention group will be randomly assigned to the 12-lesson boost-intervention and the remaining students will serve as controls (the boost-control group). No restrictions will be applied in this second randomization.

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Previous interventions:

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Intervention Type
Behavioural

Primary outcome(s)
1. Word decoding measured using LegiLexi at baseline, pre-test, post-test, post-boost

2. Word recogntion measured using LegiLexi at baseline, pre-test, post-test, post-boost

3. Spelling 1 measured using LegiLexi at baseline, pre-test, post-test, post-boost

Key secondary outcome(s)
1. Reading comprehension 1 measured using LegiLexi at baseline, pre-test, post-test, post-boost

Completion date
30/06/2028

Eligibility

Key inclusion criteria
1. Enrolment in Grade 2
2. Scores below the 10th percentile on a composite measure based on screening tests of word decoding and word recognition from the LegiLexi battery administered during the spring term of Grade 1

Healthy volunteers allowed
No

Age group
Child

Lower age limit
6 Years

Upper age limit
9 Years

Sex
All

Total final enrolment
0

Key exclusion criteria

1. No children meeting the inclusion criteria will be excluded from participation
2. Children who do not complete the intervention or the post-test assessments will be excluded from the analyses

Date of first enrolment
29/05/2026

Date of final enrolment
14/09/2026

Locations

Countries of recruitment
Sweden

Study participating centre
Linköping University
Sweden

Sponsor information

Organisation
Linköpings universitet

Funder(s)

Funder type

Funder Name
Vetenskapsrådet

Alternative Name(s)
Swedish Research Council, VR

Funding Body Type
Government organisation

Funding Body Subtype
National government

Location

Sweden

Funder Name
Linköpings Universitet

Alternative Name(s)
Linköping University, Linköping University, LiU

Funding Body Type
Government organisation

Funding Body Subtype
Local government

Location
Sweden

Funder Name
Göteborgs Universitet

Alternative Name(s)
University of Gothenburg

Funding Body Type
Private sector organisation

Funding Body Subtype
Universities (academic only)

Location
Sweden

Funder Name
LegiLexi

Funder Name
Mälardalens högskola

Alternative Name(s)
Mälardalen University, Mälardalen University

Funding Body Type

Private sector organisation

Funding Body Subtype
Universities (academic only)

Location
Sweden

Results and Publications

Individual participant data (IPD) sharing plan
A pseudonymised data set will be stored in a publicly available repository.

IPD sharing plan summary
Stored in publicly available repository

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Other files	Study design figure	22/05/2026	22/05/2026	No	No
Other files	Study design figure version 2		09/09/2026	No	No
Protocol (other)			21/09/2026	No	No