

Impact Evaluation of Doolexia – Effect, Implementation, and Costs from a Randomized Trial in 29 Schools

Key Findings



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All children have the right to learn to read and spell, which is one of the most important goals of primary school education. Students with dyslexia have a particularly hard time spelling and "cracking the reading code," which can have significant consequences for their schooling and later in life. If students with dyslexia receive the necessary support early in school, it is expected that their difficulties can largely be prevented or reduced, allowing them to perform as well as possible.

This report evaluates the implementation and effects of Doolexia and shows positive and lasting effects on both students' spelling and reading skills. Doolexia is a school intervention aimed at students with dyslexia or other reading and spelling difficulties, with the goal of improving their spelling and reading levels. The intervention lasts 16 weeks and combines independent spelling and reading practice using a computer program with weekly group lessons. The intervention is structured in a manual-based format with weekly plans for group lessons and goals for daily practice. The intervention is evaluated through a randomized trial with a control group.

Facts about Doolexia

- Doolexia is for students who are assessed as 'dyslexic' or as having 'weak phonological coding skills' on the Danish national dyslexia test.¹
- Doolexia consists of a combination of individual training in an adaptive computer program, 'Doolexia,' and group lessons with the school's reading instructor.
- On average, students trained 16 minutes per day in the computer program during the 16 weeks the Doolexia course lasted.

Significant effects on spelling, slightly smaller effects on reading

Doolexia students achieve significant effects on their spelling and reading skills compared to students in the control schools. The effects measure the additional progress that students who received Doolexia achieved over the 16 weeks, beyond the progress that the control group achieved over the same period and on the same spelling and reading tests. In practice, this means that on average Doolexia students achieve a 14 percentage point improvement in correct words on the spelling test, 5 percentage points more correct answers on

the reading test, and their reading accuracy increase by 8 points when compared to students who did not receive Doolexia.

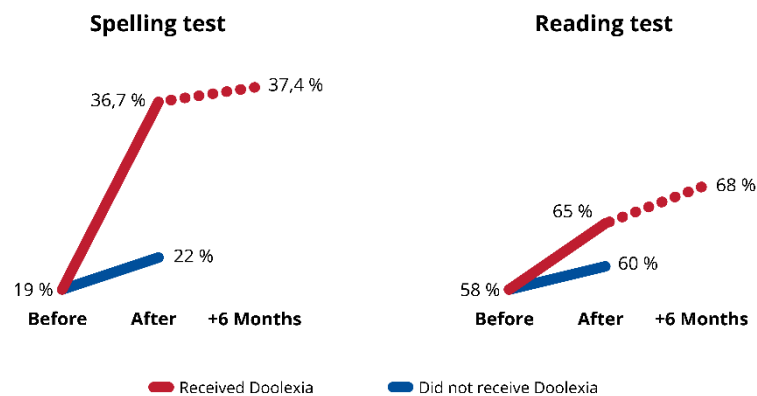
The standardized effect sizes (z-scores) are 0.67 for spelling and 0.31 for reading.

We assess that the effect on spelling is large and on reading it is moderate when we compare standardized effects to those from other school-related reading interventions. In contrast, when evaluated against dyslexia interventions that concentrate exclusively on spelling, the observed improvement is considered moderate.

Improvements can be observed six months after the Doolexia intervention

We tested the students again six months after the Doolexia intervention. Here, we observe that the students, on average, continue to make progress on the spelling and reading tests. In 8 out of 15 schools, we observe that the students' spelling skills remain at the same level or better, and in 10 out of 15 schools, we observe that the students' reading skills remain at the same level or higher than measured immediately after the Doolexia intervention. Thus, there are indications of lasting effects from the Doolexia intervention.

Students' average progress in percentage correct



Source: VIVE.

The reading instructors also notice the students' progress

The reading instructors notice to a great extent that the students improve their spelling and reading as a result of the Doolexia intervention. Several reading instructors also express that this progress is reflected in the students' performance in their regular subject lessons.

Moreover, the reading instructors observe other positive aspects of the intervention for their students, such as increased procession speed and a greater belief in their own abilities.

All student groups we examined benefit from Doolexia

There are positive effects for both boys and girls, as well as for students who are diagnosed 'dyslexic' or with 'weak phonological coding skills' on the Danish national dyslexia test. There are also effects for both students who have previously received special education services and those who have not, as well as effects regardless of the students' starting levels on the pre-tests. Thus, it is an intervention that benefits both the most challenged students and students with lesser reading and spelling difficulties.

Community and cohesion across ages and challenges

School observations, surveys, and interviews with teachers and students demonstrate that the intervention fosters a sense of community and cohesion across the age groups of participating students (grades 4-8) — for example, when 4th-grade students meet 8th-grade students with the same difficulties with letters as themselves. These qualitative data support the effect analyses, which demonstrate significant effects of Doolexia across all grade levels, and in particular, a significantly higher effect for 4th-grade students compared to other grade levels.

The reading instructors point out that particularly younger students are more engaged and feel that they are improving in writing and spelling. Log data from the computer program also document that the oldest students train significantly less than average, which may explain why they achieve less effect than the younger students, although they still achieve a positive effect.

A well-organized intervention

The general assessment of the reading instructors is that the Doolexia intervention works very well in schools. The instructional guides are generally good and provide a solid foundation for conducting the weekly group lessons, and the computer program has several important features that support the reading instructors' individually tailored approach to the students. The implementation support from Doolexia ApS to the reading instructors has been good and well adjusted, and there are generally reasonable structural conditions at the school for the reading instructors.

The intervention requires school support and parental involvement

The implementation analyses emphasize that Doolexia should not be seen as a self-running computer program. The weekly group lesson is an integral part of the intervention, and the reading instructors' monitoring and motivation of the students are very important.

Several reading instructors also point out that Doolexia requires parental involvement to ensure students' motivation and home practice. School observations illustrate how Doolexia attempts to engage parents through very structured weekly plans for group lessons and parent letters—both for parents who find it difficult to manage a daily routine with exercises and those who are challenged in helping because they may themselves have dyslexia.

Takes longer than usual practices, but is also worth it

More than half of the reading instructors estimate that Doolexia takes more time than usual practices. However, they are overall satisfied with the intervention, and the reading instructors assess the results of the intervention for the students as positive. The reading instructors also highlight cost-effective elements; that they can "reach more students" with the intervention, and that the intervention is expected to be easier to implement as schools conduct more courses and gain more experience.

Intervention costs

The report estimates the total intervention costs to be an average of approximately DKK 127,000 per school (18,450 US\$). This includes purchase of the Doolexia computer program plus the reading instructors' time spent on preparation and teaching, approximately 160 hours per school. Schools participated with an average of 15 students, which gives an average cost per student of approximately DKK 8,000 (1,200 US\$). This amount does not include the regular expenses for a public-school student. That is, the intervention cost of 8,000 DKK/student is the extra cost of providing a student with Doolexia beyond the instruction the student already receives in the general class.

For a school considering investing in the Doolexia intervention for its students, the cost per student (approximately DKK 8,000) can be compared to what it costs to provide a student with an alternative intervention for students with dyslexia. For example, a course where students with dyslexia are taken out of their regular classes and taught in smaller groups of 3-4 students several times a week over a number of weeks. The intervention cost can also be compared to the expenses of providing special education services for the student for a specified number of hours each week.

What results can new schools expect?

Both teacher surveys and interviews suggest that whilst Doolexia might seem time-consuming, it offers something different than other instructional courses for students with dyslexia. Reading instructors observe engaged students who improve their writing and spelling skills. Several reading instructors also anticipate that, with

more experience, running the intervention will become easier for future groups of students.

The report documents positive effects of Doolexia on students' spelling and reading skills on average and for several specific student groups. It is worth highlighting that students who are diagnosed dyslexic benefit from Doolexia. It is also important to note that both girls and boys achieve positive and significant effects on their spelling and reading.

The Doolexia intervention also benefits students with moderate reading difficulties, such as reduced reading speed, a student group often overlooked. Expanding a Doolexia class to include these students can help more children while also making the intervention more cost-effective for schools.

Facts about the evaluation

The evaluation is based on a randomized controlled trial, implementation analysis, cost analysis, interviews, and school observations.

- Doolexia has been tested on students in grades 4-8.
- To evaluate the effect of Doolexia, we conducted a randomized controlled trial with a waiting list design. Half of the participating schools tested Doolexia in the spring of 2023, while the other half served as a control group. The following school year, the schools on the waitlist received the intervention.
- The students' results were measured through spelling and reading tests from Hogrefe. There were three test rounds: before the randomization and trial start, immediately after the Doolexia course ended, and approximately six months after the Doolexia course ended.
- A total of 29 schools and 434 students participated in the randomized trial.
- Teachers' assessments of implementation, costs, and benefits were examined through surveys, interviews, and school observations.

References

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Key Findings: Evaluation of Doolexia – Effect, Implementation, and Costs from a Randomized Trial in 29
Schools
VIVE/2024
HR_302218