

What Works Clearinghouse



Earobics®

Program description¹

Earobics® is interactive software that provides students in pre-K through third grade with individual, systematic instruction in early literacy skills as students interact with animated characters. *Earobics*® *Foundations* is a version for pre-Kindergarten, Kindergarten, and first graders. *Earobics*® *Connections* is for second and third graders and older struggling readers. The program builds children’s skills in phonemic awareness, auditory processing, and

phonics, as well as the cognitive and language skills required for comprehension. Each level of instruction addresses recognizing and blending sounds, rhyming, and discriminating phonemes within words, adjusting to each student’s ability level. The software is supported by music, audiocassettes, and videotapes and includes picture/word cards, letter-sound decks, big books, little books, and leveled readers for reading independently or in groups.

Research

One study of *Earobics*® met the What Works Clearinghouse (WWC) evidence standards, and one met evidence standards with reservations. The studies included 104 students from grades K–3 in Los Angeles and Chicago. Sixty-one students were English

language learners.² The WWC considers the extent of evidence for *Earobics*® to be small for alphabetics and fluency. No studies that met WWC evidence standards with or without reservations addressed comprehension or general reading achievement.

The *Earobics*® program was found to have positive effects on alphabetics and no discernible effects on fluency.

Effectiveness

	Alphabetics	Fluency	Comprehension	General reading achievement
Rating of effectiveness	Positive effects	No discernible effects	na	na
Improvement index ³	Average: +19 percentile points Range: 0 to +37 percentile points	Average: +4 percentile points Range: +3 to +6 percentile points	na	na

na = not applicable

1. The descriptive information for this program was obtained from a publicly available source: the program’s web site (www.earobics.com, downloaded April 2007). The WWC requests developers to review the program description sections for accuracy from their perspective. Further verification of the accuracy of the descriptive information for this program is beyond the scope of this review.
2. The evidence presented in this report is based on available research. Findings and conclusions may change as new research becomes available.
3. These numbers show the average and range of improvement indices for all findings across the study.

Additional program information

Developer and contact

Earobics® was developed in 1995 and is distributed by Houghton Mifflin Learning Technology. Address: P.O. Box 1363, Evanston, IL 60204-1363. Email: sales@earobics.com. Web: www.earobics.com. Telephone: (888) 328-8199.

Scope of use

According to the developers, *Earobics*® has been used nationally in more than 10,000 schools. The program has been used with at-risk students, general and special education students, and English language learners.

Teaching

The software is a supplemental program that can be used in conjunction with existing language arts programs. The *Earobics*® Teacher's Guides help teachers plan students' use of the software and supporting materials, using a teach, practice, and apply

approach. As students work with the software, the program automatically adjusts based on each student's performance. Reports on student performance can be printed or accessed online. Teachers may also customize the program for students, including selecting one of 10 languages for the directions. Teachers also have access to CD-ROMS with reproducible materials tied to specific lessons for students. Professional development for using *Earobics*® is available and focuses on instructional strategies to incorporate *Earobics*® into the curricula.

Cost

Currently, *Earobics*® *Foundations* and *Earobics*® *Connections* are available for either home use for \$59 per user or a "clinic" version that accommodates up to 12 users for \$299. *Foundations* is targeted for ages 4–7 and includes six interactive games with more than 300 levels of play. *Connections* is targeted for ages 7–10 and includes five interactive games with nearly 600 levels of play.

Research

Eighteen studies reviewed by the WWC investigated the effects of *Earobics*®. One study (Cognitive Concepts, 2003) was a randomized controlled trial that met WWC evidence standards. The other study (Valliath, 2002) was a quasi-experimental design that met WWC evidence standards with reservations. The remaining 16 studies did not meet WWC evidence screens.

Met evidence standards

Cognitive Concepts (2003) conducted a randomized controlled trial of elementary school students in Los Angeles, California. Nineteen teachers identified students in Kindergarten through third grade with reading difficulties. Students were pretested, matched, and then randomly divided into two groups. In all, 39

students used *Earobics*® in addition to *Open Court*, their regular reading curriculum, and 35 students in the comparison group used only *Open Court*.

Met evidence standards with reservations

Valliath (2002) is a quasi-experimental study of first-grade students from three elementary public schools in a high-achieving school district in Chicago, Illinois. Ten teachers each identified three children with the lowest reading ability within their respective classrooms. Students were pretested, matched, and divided into two similar groups. In the analysis sample, 15 students used six exercises of the *Earobics*® software and 15 students in the comparison group used math software.

Extent of evidence

The WWC categorizes the extent of evidence in each domain as small or moderate to large (see the [What Works Clearinghouse Extent of Evidence Categorization Scheme](#)). The extent of evidence takes into account the number of studies and the total sample size across the studies that met WWC evidence standards with or without reservations.⁴

The WWC considers the extent of evidence for *Earobics*® to be small for alphabets and fluency. No studies that met WWC evidence standard with or without reservations addressed comprehension or general reading achievement.

Effectiveness Findings

The WWC review of interventions for beginning reading addresses student outcomes in four domains: alphabets, reading fluency, comprehension, and general reading achievement.⁵ The studies included in this report cover two domains: alphabets and fluency. Within alphabets, results for three constructs—phonological awareness, letter knowledge, and phonics—are reported. The findings below present the authors' estimates and WWC-calculated estimates of the size and the statistical significance of the effects of *Earobics*® on students.⁶

Alphabets. Two studies reviewed findings in the alphabets domain. Cognitive Concepts (2003) found and the WWC confirmed statistically significant positive effects on three phonological awareness measures (ORAL-J: Blending into Words, Segmenting into Sounds, and Rhyming Words subtests). The study authors did not find statistically significant effects of *Earobics*® on the letter knowledge measure (ORAL-J: Letter Naming subtest) or the phonics measure (the ORAL-J: Sound of Letters subtest).⁷ The average effect size across the five

outcomes was large enough to be considered substantively important according to WWC criteria (that is, an effect size of at least 0.25).

Valliath (2002) found that the overall intervention effect across the eight measures of beginning reading was not statistically significant.⁸ The WWC analyzed four phonological awareness measures (Comprehensive Test of Phonological Processing (CTOPP): Blending Words, Blending Non-Words, Elision, and Sound Matching subtests) and two phonics measures (Woodcock Reading Mastery Test: Word Identification and Word Attack subtests). The WWC found that the effect for one of the four phonological awareness tests (CTOPP: Sound Matching subtest) was positive and statistically significant. Effects for the other three phonological awareness and the two phonics subtests were not statistically significant. The average effect size across the six outcomes was large enough to be considered substantively important according to the WWC criteria (that is, an effect size of at least 0.25).

4. The Extent of Evidence Categorization was developed to tell readers how much evidence was used to determine the intervention rating, focusing on the number and size of studies. Additional factors associated with a related concept, external validity, such as the students' demographics and the types of settings in which studies took place, are not taken into account for the categorization.
5. For definitions of the domains, see the [Beginning Reading Protocol](#).
6. The level of statistical significance was reported by the study authors or, where necessary, calculated by the WWC to correct for clustering within classrooms or schools and for multiple comparisons. For an explanation, see the [WWC Tutorial on Mismatch](#). See the [WWC Intervention Rating Scheme](#) for the formulas the WWC used to calculate the statistical significance. In the case of *Earobics*®, corrections for multiple comparisons were needed.
7. Data for some of the phonics outcomes were received through communication with the author.
8. The WWC did not use all eight measures in its analysis. See Appendix A1.2.

Effectiveness *(continued)*

Fluency. Cognitive Concepts (2003) did not find statistically significant effects of *Earobics*® and the effect was not large enough to be considered substantively important according to WWC criteria.

Rating of effectiveness

The WWC rates the effects of an intervention in a given outcome domain as: positive, potentially positive, mixed, no discernible effects, potentially negative, or negative. The rating of effectiveness takes into account four factors: the quality of the research design, the statistical significance of the findings, the size of the difference between participants in the intervention and the comparison conditions, and the consistency in findings across studies (see the [WWC Intervention Rating Scheme](#)).

The WWC found *Earobics*® to have positive effects on alphabets and no discernible effects on fluency

Improvement index

The WWC computes an improvement index for each individual finding. In addition, within each outcome domain, the WWC computes an average improvement index for each study and an average improvement index across studies (see [Technical Details of WWC-Conducted Computations](#)). The improvement index represents the difference between the percentile rank of the average student in the intervention condition versus the percentile rank of the average student in the comparison condition. Unlike the rating of effectiveness, the improvement index is based entirely on the size of the effect, regardless of the statistical significance of the effect, the study design, or the analyses. The improvement index can take on values between -50 and +50, with positive numbers denoting results favorable to the intervention group.

The average improvement index for alphabets is +19 percentile points across the two studies, with a range of +0 to +37 percentile points across findings. The average improvement index for fluency is +4 percentile points in the one study, with a range of +3 to +6 percentile points across findings.

Summary

The WWC reviewed 18 studies on *Earobics*®. One study met WWC evidence standards, and one met evidence standards with reservations; the others did not meet WWC evidence screens. Based on the two studies, the WWC found positive effects on alphabets and no discernible effects on fluency. The evidence presented in this report may change as new research emerges.

References

Met WWC standards

Cognitive Concepts, Inc. (2003). *Outcomes report: Los Angeles Unified School District, California*. Retrieved from <http://www.cogcon.com/research/proven/LAUSD.pdf>

Met WWC standards with reservations

Valliath, S. (2002). An evaluation of a computer-based phonological awareness training program: Effects on phonological awareness, reading and spelling. *Dissertation Abstracts International*, 63(04), 1291A. (UMI No. 3050601)

Did not meet WWC evidence screens

Cognitive Concepts, Inc. (2000). *Earobics Early Literacy Instruction: Chicago Public Schools pilot research report*. Retrieved from <http://www.cogcon.com/research/proven/cpsoutcomes.pdf>⁹

Cognitive Concepts, Inc. (2001). *Outcomes report: Daviess County Public Schools, Kentucky*. Retrieved from <http://www.cogcon.com/research/proven/DaviessCounty.pdf>⁹

Cognitive Concepts, Inc. (2001). *Outcomes report: Newport News Public Schools, Virginia*. Retrieved from <http://www.cogcon.com/research/proven/newportoutcomes.pdf>⁹

9. Does not use a strong causal design: this study did not use a comparison group.

References (continued)

- Cognitive Concepts, Inc. (2001). *Outcomes report: PALS assessment, Virginia*. Retrieved from <http://www.cogcon.com/research/proven/newportPALSoutcomes.pdf>⁹
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- Cognitive Concepts, Inc. (2002). *Outcomes report: Northwestern University, Illinois*. Retrieved from <http://www.cogcon.com/research/proven/NorthwesternU.pdf>¹⁰
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- Hayes, E. A., Warrier, C. M., Nicol, T. G., Zecker, S. G., & Kraus, N. (2002). Neural plasticity following auditory training in children with learning problems. *Clinical Neurophysiology*, 114, 673–684.¹¹
- Pettis, A. M. (2000). *A study on phonological awareness: The comparison of two computer-based programs used as intervention for students with disabilities*. Unpublished master's thesis, Grand Valley State University, Allendale, MI.¹²
- Pobanz, M. S. (2000, January). *The effectiveness of an early literacy/auditory processing training program, called Earobics, with young children achieving poorly in reading*. Paper presented at the meeting of the California Association of Social Psychologists, Los Angeles, CA.⁹
- Pokorni, J. L., Worthington, C. K., & Jamison, P. J. (2004). Phonological awareness intervention: Comparison of Fast ForWord, Earobics, and LiPS. *The Journal of Educational Research*, 97(3), 147–157.¹³

For more information about specific studies and WWC calculations, please see the [WWC Earobics® Technical Appendices](#).

10. The sample is not appropriate to this review: the parameters for this WWC review specified that students should be in grades K–3 during the time of the intervention; this study did not focus on the targeted grades.
11. The outcome measures are not relevant to this review: the parameters for this WWC review specified student outcome measures but this study did not focus on students.
12. High overall attrition: the study, which used a randomized controlled trial design, reported an extreme overall attrition rate.
13. The sample is not appropriate to this review: this study did not disaggregate data for students in other grades K–3, the focus of this WWC review.