

# Waterford and ESSA | Evidence Base & Efficacy

Waterford supports states and districts as they implement ESSA, sharing an evidence base that meets even the highest standards of ESSA's four tiers of evidence.

As a nonprofit research organization, Waterford Research Institute, LLC, has always grown innovation from the fertile soil of evidence-based efficacy research. As such, Waterford resources and blended learning designs meet the highest standards of evidence-based frameworks, including the What Works Clearinghouse and the four-tiered evidence model outlined in the Every Child Succeeds Act (ESSA).<sup>1</sup>

In fact, the Waterford Early Reading Program (part of Waterford Reading Academy) is one of the few digital programs for early literacy with study results that meet What Works Clearinghouse evidence standards and shows positive or potentially positive findings.<sup>2</sup>

This document provides a summary table of research studies aligning to each ESSA evidence tier. Waterford supports states and districts as they implement ESSA and harness the power of personalized learning and data transparency to close the achievement gap for their youngest and most vulnerable learners.

## Waterford's Proven Efficacy Evidence Base as Aligned to ESSA's 4 Tiers

- **STRONG, Tier 1 evidence** in 2 new random control trial studies, conducted as part of an U.S. Department of Education Investing in Innovation grant. These studies show the substantively important effects of Waterford Early Learning on at-risk learners, as well as the impact of innovative assessment strategies.
- **MODERATE, Tier 2 evidence** in 3 quasi-experimental studies showing substantively important effects of Waterford technologies on foundational reading skills for preschool and kindergarten learners.
- **PROMISING, Tier 3 evidence** in 5 correlation studies, showing substantively important effects of Waterford Early Learning (Reading, Math & Science) on key learning domains in a variety of instructional settings, locations, and populations.
- **DEMONSTRATES A RATIONALE, Tier 4 evidence** in 20 case studies, often conducted in partnership with a district or state agency that chooses to use historical controls in a study designed to serve as many students as possible.

1. See ESSA Section 8101(21)(A)

2. What Works Clearinghouse. (2007, July 16). WWC Intervention Report: Waterford Early Reading Program. Retrieved from What Works Clearinghouse: [https://ies.ed.gov/ncee/wwc/Docs/InterventionReports/WWC\\_Waterford\\_071607.pdf](https://ies.ed.gov/ncee/wwc/Docs/InterventionReports/WWC_Waterford_071607.pdf).

This table provides a summary of research studies aligning to each ESSA evidence tier.

## 1—STRONG

### Meets WWC Evidence Standards without Reservation

Evidence	Program	Study Design	Instruments Used	# of Children	Outcomes
Hobbs, L. J., & Overby, M. (2019). Impact of UPSTART Reading Participation for Rural Students While Controlling for Prior Reading Achievement and School District.	Waterford Early Learning (UPSTART)	Randomized Controlled Trial	<ul style="list-style-type: none"> <li>Brigance Inventory of Early Development III</li> <li>Preschool Early Literacy Indicators (PELI)</li> </ul>	Students served: 491 Pre K Students Analytic Matched Sample - Brigance & PELI: <ul style="list-style-type: none"> <li>Treatment (students enrolled in UPSTART), N = 252</li> <li>Control (students who did not enroll in UPSTART), N = 239</li> </ul>	The Rural UPSTART program prepares children for success upon entering kindergarten by providing computer-adaptive reading curriculum to pre-kindergarteners (Hobbs & Overby, 2019). This RCT study sampled 491 preschoolers from 13 of the most rural school districts in Utah during the 2014-2015 school year. Students were randomly assigned to receive either the UPSTART Reading program (the treatment group) or the UPSTART Math/Science program (the control group). The treatment group significantly outperformed the control group on six (identifying uppercase letters, reciting the alphabet, phonological awareness, phoneme manipulation, word recognition, and reading words from common signs) of the eight subtests of the Brigance and the initial word sounds subtest on the PELI. The UPSTART Reading program improved foundational literacy skills in treatment students, with meaningful effect sizes for phonological awareness (d = 0.30 to 0.32), letter knowledge (d = 0.21 to 0.51), and decoding (d = 0.22 to 0.49).
Shamir, H., Miner, C., Izzo, A., Feehan, K., Yoder, E., & Pocklington, D. (2019). Improving early literacy skills using technology at home. International Journal of Learning and Teaching (In Press).	Waterford Early Reading	Randomized Controlled Trial	Waterford Assessments of Core Skills (WACS)	523 four-year old PreK students from 13 rural Utah districts	Analysis of Overall WACS end of year scores, while covarying for beginning of year scores, revealed a statistically significant and positive effect of Waterford Early Reading on students in the Waterford treatment group. Treatment group students outperformed control group students in poverty level, gender, and ethnicity across strands.
Shamir, H., Yoder, E., Feehan, K., & Pocklington, D. (2019, June). Randomized controlled trial of kindergarten students using literacy technology. Paper to be presented at International KES Conference on Smart Education and E-Learning, St. Julians, Malta.	Waterford Early Reading	Randomized Controlled Trial	Northwest Evaluation Association (NWEA) Measures of Academic Progress (MAP)	<ul style="list-style-type: none"> <li>Treatment, kindergarten students randomly assigned to use WEL (N = 217)</li> <li>Control, kindergarten students randomly assigned to receive traditional literacy instruction (N = 213)</li> </ul>	In this randomized controlled trial, kindergarten classes were randomly assigned to either use WEL or receive the same amount of traditional, teacher-directed literacy instruction. Students who used WEL during their kindergarten year outperformed their control counterparts on all end of year literacy strands. Across demographics, experimental students outperformed control students on RIT and Reading Foundations scores on ethnicity and lunch status.

## 2—MODERATE

### Meets WWC Evidence Standards with Reservations

Evidence	Program	Study Design	Instruments Used	# of Children	Outcomes
Hecht, S. A. & Close, L. (2002). Emergent literacy skills and training time uniquely predict variability in responses to phonemic awareness training in disadvantaged kindergartners. Journal of Experimental Child Psychology, 82, 93-115	Waterford Early Reading	Quasi-Experimental Study	<ul style="list-style-type: none"> <li>Wide Range Achievement Test</li> <li>Stanford-Binet</li> <li>Stones—Concepts About Print Test</li> <li>Woodcock-Johnson Tests of Achievement (Form B)</li> <li>Comprehensive Test of Phonological Processing</li> </ul>	Treatment (used Waterford Early Reading), N= 42; control (did not use Waterford Early Reading), N= 34	Analysis of pre-literacy gains over the course of their kindergarten year showed that the Waterford treatment group significantly outperformed the comparison group in Phonemic Awareness, Invented Spelling, and Word Reading.

1. These studies are designed to meet WWC's highest study rating, but have not yet been reviewed by WWC.

This table provides a summary of research studies aligning to each ESSA evidence tier.

## 2 – MODERATE

### Meets WWC Evidence Standards with Reservations

Evidence	Program	Study Design	Instruments Used	# of Children	Outcomes
Evaluation and Training Institute (2016). UPSTART Program Evaluation: Year 6 Program Results.	Waterford Early Learning (UPSTART)	Quasi-Experimental Study	<ul style="list-style-type: none"> <li>• Brigance Inventory of Early Development III (Brigance)</li> <li>• Bader Reading and Language Inventory (Bader)</li> </ul>	<p>Students served: 5,091 PreK Students Analytic Matched Sample - Brigance &amp; Bader:</p> <ul style="list-style-type: none"> <li>• Treatment (students enrolled in UPSTART), N = 138</li> <li>• Control (students who did not enroll in UPSTART), N = 138</li> </ul>	<p>Combined post-test results showed that UPSTART participation using Waterford Early Learning had a large impact on students' early literacy skills. Large effect sizes (Bader = 0.95; Brigance = 0.81) were shown favoring UPSTART students as measured by the total Bader and Brigance composite scores. Favoring the UPSTART treatment group, differences in growth rates between the UPSTART treatment and control group were significantly different for the overall Brigance and for five of the Brigance subtests and for the Total Bader and all three Bader subtests.</p> <p>Children participating in UPSTART demonstrated improvement in word decoding and phonological awareness skills. Medium effect sizes were observed for Survival Sight Words (0.45), Rhyme Recognition (0.44). Large effect sizes were found for Pre-Primer Vocabulary (1.10), Phonemic Blending (0.99), and Phoneme Segmenting (0.85). Children participating in UPSTART also demonstrated greater gains on Pre-Primer Vocabulary, Survival Sight Words, and all Phonological Awareness subscales than control students. Participation in UPSTART was associated with improvement in all phonological awareness strands of the Bader, including Rhyme Recognition, Phoneme Blending, and Phoneme Segmenting. Children participating in UPSTART had a 36 point advantage on Brigance post-test scores compared to non-participating children.</p>
Evaluation and Training Institute (2017). UPSTART Program Evaluation: Year 7 Program Results.	Waterford Early Learning (UPSTART)	Quasi-Experimental Study	<ul style="list-style-type: none"> <li>• Brigance Inventory of Early Development III (Brigance)</li> <li>• Bader Reading and Language Inventory (Bader)</li> </ul>	<p>Students served: 6,639 PreK Students Analytic Matched Sample - Brigance &amp; Bader:</p> <ul style="list-style-type: none"> <li>• Treatment (students enrolled in UPSTART), N = 208</li> <li>• Control (students who did not enroll in UPSTART), N = 208</li> </ul>	<p>Combined post-test results showed that UPSTART participation had a medium impact on students' early literacy skill development: Children enrolled in UPSTART produced significant positive effects (ES = 0.52) compared to control children on the Brigance composite. Similarly, UPSTART participants experienced significant positive effects (ES = 0.62) on the Bader composite.</p> <p>Children participating in UPSTART demonstrated significant improvement in word decoding and phonological awareness skills. Medium effect sizes were observed for Pre-Primer Vocabulary (0.74), Phoneme Segmenting (0.64), and Phoneme Blending (0.63). Children participating in UPSTART also demonstrated greater gains on Pre-Primer Vocabulary, Survival Sight Words, and all Phonological Awareness subtests than control students. Participation in UPSTART was associated with improvement in all phonological awareness strands of the Bader, including Rhyme Recognition, Phoneme Blending, and Phoneme Segmenting. Children participating in UPSTART had a 21 point advantage on Brigance post-test scores compared to non-participating children.</p>
Evaluation and Training Institute (2018a). UPSTART Program Evaluation: Year 8 Program Results.	Waterford Early Learning (UPSTART)	Quasi-Experimental Study	<ul style="list-style-type: none"> <li>• Brigance Inventory of Early Development III (Brigance)</li> <li>• Bader Reading and Language Inventory (Bader)</li> </ul>	<ul style="list-style-type: none"> <li>• Brigance Inventory of Early Development III (Brigance)</li> <li>• Bader Reading and Language Inventory (Bader)</li> </ul> <p>Students served: 10,745 Pre-K Students Analytic Matched Sample - Brigance &amp; Bader:</p> <ul style="list-style-type: none"> <li>• Treatment (students enrolled in UPSTART), N = 245</li> <li>• Control (students who did not enroll in UPSTART), N = 245</li> </ul>	<p>Combined post-test results showed that UPSTART participation had a medium impact on students' early literacy skill development. In the matched post-test sample, UPSTART produced strong to medium effects: Children enrolled in UPSTART produced significant positive effects (ES = 0.50) compared to control children on the Brigance composite. Similarly, UPSTART participants experienced significant positive effects (ES = 0.81) on the Bader composite.</p> <p>Children participating in UPSTART demonstrated significant improvement in word decoding and phonological awareness skills. Medium effect sizes were observed for Phonemic Blending (0.78), Phoneme Segmenting (0.64), and Pre-Primer Vocabulary (0.60). Children participating in UPSTART also demonstrated greater gains on both Phonemic Blending and Phoneme Segmenting subscales than control students. Participation in UPSTART was associated with significant improvement on both of the phonological awareness strands of the Bader assessed, Phoneme Blending and Phoneme Segmenting. Children participating in UPSTART had a significantly higher growth rate, with a 21 point advantage on Brigance post-test scores compared to non-participating children.</p>
Evaluation and Training Institute (2018a). UPSTART Program Evaluation: Year 8 Program Results.	Waterford Early Learning (UPSTART)	Quasi-Experimental Study	Dynamic Indicators of Basic Early Literacy Skills (DIBELS) Next	<p>Analytic Matched Sample - DIBELS:</p> <ul style="list-style-type: none"> <li>• Treatment (1st grade students who were enrolled in UPSTART during Pre-K), N = 2,701</li> <li>• Control (1st grade students who did not enroll in UPSTART during Pre-K), N = 2,701"</li> </ul>	<p>First grade students who were enrolled in UPSTART during pre-kindergarten significantly outperformed control students on beginning of year DIBELS scores. The average beginning of year DIBELS composite score was 7.91 points higher for students who were enrolled in UPSTART compared to students who were not (ES = 0.18).</p>

This table provides a summary of research studies aligning to each ESSA evidence tier.

## 2 — MODERATE

### Meets WWC Evidence Standards with Reservations

Evidence	Program	Study Design	Instruments Used	# of Children	Outcomes
Evaluation and Training Institute (2018b). Utah High-Quality School Readiness Expansion (HQSR-E) Program Evaluation.	Waterford Early Learning (UPSTART)	Quasi-Experimental Study	<ul style="list-style-type: none"> <li>Brigance Inventory of Early Development III (Brigance)</li> <li>Bader Reading and Language Inventory (Bader)</li> <li>PELI</li> </ul>	<p>Cohort 1 - 75 public, 58 private, 93 UPSTART, and 134 students not enrolled in a high-quality school readiness program</p> <p>Cohort 2 - 99 public, 65 private, 101 UPSTART, and 112 students not enrolled in a high-quality school readiness program</p>	77% of UPSTART children had post-test literacy quotients of average or above average, representing a greater level of school readiness than was achieved by either the other intervention groups or children not participating in high-quality school readiness programs. UPSTART children outperformed children not participating in high-quality school readiness programs on Overall Literacy test scores, and subtest scores for UPSTART children were significantly higher in Letter Knowledge, Listening Comprehension, and Phonological Awareness. By the end of the program year, social emotional development (SED) was similar for all three treatment groups.
Hobbs, L. J., Overby, M., & Thomas, A. (2017). Evaluating the impact of the i3 UPSTART summer program on rural elementary school students' literacy skills. Manuscript in preparation (draft available at <a href="https://www.eticonsulting.org/i3">https://www.eticonsulting.org/i3</a> ).	Waterford Early Learning (UPSTART)	Quasi-Experimental Study	Dynamic Indicators of Basic Early Literacy Skills (DIBELS) Next	Students enrolled in the UPSTART program during the summer following Kindergarten. Treatment (students that enrolled in the UPSTART summer program), control (students that did not enroll in the UPSTART summer program).	Independent t-tests on the DIBELS first grade beginning of year scores indicated significant differences between the experimental group and the control group on the DIBELS Composite score, Letter Naming Fluency, and Phoneme Segmentation. At the beginning of first grade, treatment students scored between one and five points higher than control students on the DIBELS Composite score and all four of the tested strands (Letter Naming Fluency; Phoneme Segmentation; Nonsense Word Fluency: Correct Letter Sounds, Nonsense Word Fluency: Whole Words Read).

## 3 — PROMISING

### Does Not Meet WWC Evidence Standards

Evidence	Program	Study Design	Instruments Used	# of Children	Outcomes
Powers, S., & Price-Johnson, C. (2006). Evaluation of the Waterford Early Reading Program in Kindergarten, 2005-06. Online Submission.	Waterford Early Reading	Correlational Study (with statistical controls for selection bias)	<ul style="list-style-type: none"> <li>Dynamic Indicators of Basic Early Literacy Skills (DIBELS)</li> <li>Core Curriculum Standard Assessment (CCSA)</li> </ul>	1838 kindergarten children in 15 classes treatment (students who used Waterford), N= 358 control (students who did not use Waterford), N= 1480	The students who used Waterford Early Learning significantly outperformed control students on both the DIBELS (effect size = 0.42) and CCSA (effect size = 0.28) tests. ELL students in the treatment group demonstrated greater gains than the English-proficient group in the comparison schools ( $F[1, 1045] = 8.62, p = .003$ ).
Shamir, H., Feehan, K., & Yoder, E. (2016). Using technology to improve reading and math scores for the digital native. In Proceedings of EdMedia 2016—World Conference on Educational Media and Technology (pp. 1405-1412). Vancouver, BC, Canada: Association for the Advancement of Computing in Education (AACE).	<ul style="list-style-type: none"> <li>Waterford Early Reading</li> <li>Waterford Early Math and Science</li> </ul>	Correlational Study (with statistical controls for selection bias)	Florida Voluntary Pre-Kindergarten (VPK) Assessment	<p>Early Reading Program</p> <ul style="list-style-type: none"> <li>treatment (usage over 900 minutes throughout the school year), N= 653</li> <li>control (usage less than 300 minutes throughout the school year), N= 67</li> </ul> <p>Early Math and Science</p> <ul style="list-style-type: none"> <li>treatment (usage over 1,000 minutes throughout the school year), N= 183</li> <li>control (usage less than 300 minutes throughout the school year), N= 372</li> </ul>	Treatment students significantly outperformed control students on end of year scores while covarying for beginning of year scores on all strands of the VPK. Effect sizes are substantively important for each strand, including Oral Language Vocabulary (0.72), Phonological Awareness (1.32), Print Knowledge (1.12), and Math (0.77). Across most demographics including gender, ELL status, ethnicity, and special education status, treatment group students outperformed their control group counterparts across all strands.

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### 3 — PROMISING

#### Does Not Meet WWC Evidence Standards

Evidence	Program	Study Design	Instruments Used	# of Children	Outcomes
Shamir, H. & Goethe, R. (2015). Common Core State Standards: Is computer assisted instruction up for the challenge? In Proceedings of E-Learn: World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2015 (pp. 220-227). Chesapeake, VA: Association for the Advancement of Computing in Education (AACE).	Waterford Early Reading	Correlational Study (with statistical controls for selection bias)	AIMSweb	<p>Kindergarten</p> <ul style="list-style-type: none"> <li>treatment (used Waterford Early Reading for more than 700 minutes during the school year; had assessment scores in at least 2/3 administrations), N= 41</li> <li>control (did not use Waterford Early Reading; had assessment scores in at least 2/3 administrations), N= 77</li> </ul> <p>First Grade</p> <ul style="list-style-type: none"> <li>treatment (used Waterford Early Reading for more than 700 minutes during the school year; had assessment scores in at least 2/3 administrations), N= 44</li> <li>control (did not use Waterford Early Reading; had assessment scores in at least 2/3 administrations), N= 50</li> </ul>	Students that used Waterford Early Reading significantly outperformed the comparison group on end of year scores covarying for beginning or middle of year scores (depending on the skill) on three of the four sub-strands: Letter Sound Fluency (LSF), Letter Name Fluency (LNF), and Nonsense Word Fluency (NWF).
Shamir, H., Feehan, K., & Yoder, E. (2017b). Does CAI improve early math skills? In Proceedings of the 9th International Conference on Computer Supported Education (CSEDU 2017) - Volume 2 (pp. 285-292). Porto, Portugal: Institute for Systems and Technologies of Information, Control and Communication.	Waterford Early Math and Science	Correlational Study (with statistical controls for selection bias)	mClass: Math	<p>Kindergarten</p> <ul style="list-style-type: none"> <li>treatment (used Early Math and Science), N= 114</li> <li>control (did not use Early Math and Science), N= 58</li> </ul> <p>First Grade</p> <ul style="list-style-type: none"> <li>treatment (used Early Math and Science), N= 68</li> <li>control (did not use Early Math and Science), N= 255</li> </ul>	Students in the Kindergarten treatment group significantly outperformed control group students in end of year scores covarying for beginning of year scores with substantively important effect sizes in Number Identification (effect size = 0.33) and Quantity Discrimination (effect size = 0.29). For first grade, effect sizes were substantively important in Number Facts, Quantity Discrimination, Missing Number, and Next Number strands. For Kindergarten and first grade, students in the treatment group outperformed students in the control group across demographics including gender, free/reduced lunch status, and special education status.
Evaluation and Training Institute (2012). Utah UPSTART Education Program Evaluation: Program Impacts on Early Literacy. Cohort 2 Results: Technical Report.	Waterford Early Learning (UPSTART)	Correlational Study (with statistical controls for selection bias)	<ul style="list-style-type: none"> <li>Brigance Inventory of Early Development</li> <li>Bader Reading and Language Inventory</li> </ul>	<p>Students served: 1,018 PreK Students</p> <p>Analytic Matched Sample - Brigance:</p> <ul style="list-style-type: none"> <li>Treatment (students enrolled in UPSTART), N = 77</li> <li>Control (students who did not enroll in UPSTART), N = 82</li> </ul> <p>Analytic Matched Sample - Bader:</p> <ul style="list-style-type: none"> <li>Treatment (students enrolled in UPSTART), N = 76</li> <li>Control (students who did not enroll in UPSTART), N = 82</li> </ul>	The UPSTART treatment group performed significantly better than the control group on the Total Brigance post-test, with an average difference of 7.9 points. The UPSTART treatment group also performed significantly better than the control group on the overall Bader and the Bader Phoneme Blending subtest. Growth rates between the treatment group and the control group were significantly different at the 99% Confidence Interval (CI) for the Total Brigance and the Total Bader. Children participating in UPSTART demonstrated moderately strong improvements in literacy skills on the Brigance and small improvements in literacy skills on the Bader compared to control children on the Brigance. Children participating in UPSTART scored higher on strands for Lower Case Letters and Lower Case Letter Sounds even when taking initial literacy skills into account. Improvements on the Bader were driven by performance on the Phoneme Blending subtest.

This table provides a summary of research studies aligning to each ESSA evidence tier.

### 3 — PROMISING

#### Does Not Meet WWC Evidence Standards

Evidence	Program	Study Design	Instruments Used	# of Children	Outcomes
Evaluation and Training Institute (2013). Utah UPSTART Program Evaluation: Program Impacts on Early Literacy. Third Year Results: Cohort 3 Technical Report.	Waterford Early Learning (UPSTART)	Correlational Study (with statistical controls for selection bias)	<ul style="list-style-type: none"> <li>• Brigance Inventory of Early Development</li> <li>• Bader Reading and Language Inventory</li> </ul>	<p>Students served: 1,168 PreK Students Analytic Matched Sample - Brigance:</p> <ul style="list-style-type: none"> <li>• Treatment (students enrolled in UPSTART), N = 129</li> <li>• Control (students who did not enroll in UPSTART), N = 130</li> </ul> <p>Analytic Matched Sample - Bader:</p> <ul style="list-style-type: none"> <li>• Treatment (students enrolled in UPSTART), N = 112</li> <li>• Control (students who did not enroll in UPSTART), N = 120</li> </ul>	<p>The UPSTART treatment group significantly outperformed the control group on both the Total Brigance and Total Bader. Effect sizes range from 0.33 to 0.85. Favoring the UPSTART treatment group, growth rates between the treatment group and the control group were significantly different at the 99% Confidence Interval (CI) for the Total Brigance and the Total Bader.</p> <p>Consistent with prior cohorts, children participating in UPSTART demonstrated moderately strong improvements in measures of phonics skills: At the beginning of kindergarten, improvement was observed across all but one strand of the Brigance. Participation in UPSTART was associated with improvement in all phonological awareness strands of the Bader, including Rhyme Recognition, Phoneme Blending, and Phoneme Segmenting. Children participating in UPSTART had a 28 point advantage on Brigance post-test scores compared to non-participating children.</p>
Evaluation and Training Institute (2014). Utah UPSTART Program Evaluation: Program Impacts on Early Literacy. Fourth Year Results: Cohort 4 Technical Report.	Waterford Early Learning (UPSTART)	Correlational Study (with statistical controls for selection bias)	<ul style="list-style-type: none"> <li>• Brigance Inventory of Early Development</li> <li>• Bader Reading and Language Inventory</li> </ul>	<p>Students served: 1,250 PreK Students Analytic Matched Sample - Brigance:</p> <ul style="list-style-type: none"> <li>• Treatment (students enrolled in UPSTART), N = 101</li> <li>• Control (students who did not enroll in UPSTART), N = 102</li> </ul> <p>Analytic Matched Sample - Bader:</p> <ul style="list-style-type: none"> <li>• Treatment (students enrolled in UPSTART), N = 79</li> <li>• Control (students who did not enroll in UPSTART), N = 93</li> </ul>	<p>The UPSTART treatment group performed significantly better than the control group on both the Total Brigance and Total Bader. Effect sizes range from 0.34 to 0.59. Favoring the UPSTART treatment group, growth rates between the treatment group and the control group were significantly different at the 99% Confidence Interval (CI) for the Total Brigance and the Total Bader.</p> <p>Preschool children participating in UPSTART improved phonics skills with small to medium effect sizes, as demonstrated on the Overall Brigance Composite as well as on Visual Discrimination, Letter Sounds, and Basic Pre-Primer Vocabulary subtests. Children participating in UPSTART had a 29 point advantage on Brigance post-test scores compared to non-participating children.</p>
Evaluation and Training Institute (2015). Utah UPSTART Program Evaluation: Program Impacts on Early Literacy. Year 5 Results: Cohort 5 Technical Report.	Waterford Early Learning (UPSTART)	Correlational Study (with statistical controls for selection bias)	<ul style="list-style-type: none"> <li>• Brigance Inventory of Early Development</li> <li>• Bader Reading and Language Inventory</li> </ul>	<p>Students served: 1,577 PreK Students Analytic Matched Sample - Brigance:</p> <ul style="list-style-type: none"> <li>• Treatment (students enrolled in UPSTART), N = 94</li> <li>• Control (students who did not enroll in UPSTART), N = 100</li> </ul> <p>Analytic Matched Sample - Bader:</p> <ul style="list-style-type: none"> <li>• Treatment (students enrolled in UPSTART), N = 89</li> <li>• Control (students who did not enroll in UPSTART), N = 100</li> </ul>	<p>The UPSTART treatment group performed significantly better than the control group on the Total Brigance and Total Bader. Effect sizes range from 0.27 to 0.85. Favoring the UPSTART treatment group, growth rates between the UPSTART treatment group and the control group were significantly different at the 99% Confidence Interval (CI) for three of the Brigance subtests, and for the Total Bader and for two of the Bader subtests: Phoneme Blending and Phoneme Segmenting.</p> <p>Children participating in UPSTART demonstrated small overall improvements in phonics skills when assessed on the Brigance, indicated by a 12 point advantage on the Overall Brigance Composite compared to control children. Additionally, large effects were found for Pre-Primer Vocabulary. Participation in UPSTART was associated with significant improvement in two of the three phonological awareness strands of the Bader, including Phoneme Blending and Phoneme Segmenting</p>
Shamir, H., Pocklington, D., Feehan, K., & Yoder, E. (2018). Educational equity using computer-assisted instruction. In E. Langran & J. Borup (Eds.), Proceedings of Society for Information Technology & Teacher Education International Conference (pp. 717-722). Washington, D.C.: Association for the Advancement of Computing in Education (AACE).	Waterford Early Learning	Correlational Study	Developmental Reading Assessment (DRA)	<p>Treatment</p> <ul style="list-style-type: none"> <li>• Kindergarten students who used WEL for more than 2,000 minutes, N= 699</li> <li>• First grade students who used WEL for more than 2,000 minutes, N= 777</li> </ul> <p>Control</p> <ul style="list-style-type: none"> <li>• Kindergarten students who used WEL for less than 500 minutes, N=40</li> <li>• First grade students who used WEL for less than 500 minutes, N=61</li> </ul>	<p>Significant, positive results were found in both kindergarten and first grade. Significant differences in usage of WEL were found between ethnicities despite equal access in the school district. Despite significant differences in overall usage of WEL between ethnicities, improvements in literacy skills were observed in all students.</p>

This table provides a summary of research studies aligning to each ESSA evidence tier.

### 3—PROMISING

#### Does Not Meet WWC Evidence Standards

Evidence	Program	Study Design	Instruments Used	# of Children	Outcomes
Shamir, H., Pocklington, D., Feehan, K., & Yoder, E. (2019c). Game-based learning for young learners. <i>International Journal of Learning and Teaching</i> (In Press).	Waterford Early Learning	Correlational Study	District-Administered Literacy Assessment	Treatment <ul style="list-style-type: none"> <li>•Kindergarten students who used WEL for more than 2,000 minutes, N = 967</li> <li>•First grade students who used WEL, N = 4,032</li> <li>•Second grade students who used WEL, N = 4,018</li> <li>Control  <ul style="list-style-type: none"> <li>•Kindergarten students who used WEL for less than 500 minutes, N = 723</li> <li>•First grade students who did not use WEL, N = 1,680</li> <li>•Second grade students who did not use WEL, N = 2,887</li> </ul> </li> </ul>	This study supports the hypothesis that the use of WEL in a classroom setting can have a positive effect on learning in elementary school students. Students in kindergarten, first grade, and second grade who used WEL as part of their curriculum had higher literacy end of year scores, while covarying for beginning of year scores, compared to students who were exposed only to traditional classroom instruction. Experimental students outperformed control counterparts across demographics as well.
Shamir, H., Pocklington, D., Feehan, K., & Yoder, E. (2019a). Bridging the achievement gap for low-performing students using computer-adaptive instruction. <i>International Journal of Information and Education Technology</i> , 9(3), 196-200.	Waterford Early Learning	Correlational Study	<ul style="list-style-type: none"> <li>• Northwest Evaluation Association (NWEA) Measures of Academic Progress (MAP)</li> </ul>	Treatment <ul style="list-style-type: none"> <li>• Kindergarten students who used WEL, N= 88</li> <li>• First grade students who used WEL, N= 78</li> <li>Control  <ul style="list-style-type: none"> <li>• Kindergarten students who did not use WEL, N=100</li> <li>• First grade students who did not use WEL, N= 79</li> </ul> </li> </ul>	For students in kindergarten and first grade, use of WEL lead to significantly higher end of year literacy scores, while covarying for beginning of year scores, than scores by students who had traditional literacy instruction alone.
Shamir, H., Pocklington, D., Yoder, E., & Feehan, K. (2019). Reinforcing second grade literacy skills using a computer-adaptive reading program (In Review).	Waterford Early Learning	Correlational Study	Northwest Evaluation Association (NWEA) Measures of Academic Progress (MAP)	Treatment <ul style="list-style-type: none"> <li>• Second grade students who used WEL for more than 2,000 minutes (N = 778)</li> <li>Control  <ul style="list-style-type: none"> <li>• Second grade students who used WEL for less than 300 minutes (N = 784)</li> </ul> </li> </ul>	Second grade students with high usage of WEL outperformed their control counterparts on the MAP literacy assessment. After using WEL for only thirty minutes per day, five days per week, students who used WEL to fidelity outperformed their control counterparts across all literacy strands
Waterford Institute (1996). Preliminary research: Waterford Institute's Early Research in Utah and New York schools. <i>Research Compendium</i> , 1998.	Waterford Early Learning	Waterford Early Reading Instrument	Waterford Early Reading Instrument		In every case, classes that used the software made greater gains in skills than comparison classrooms. Waterford students at one elementary school improved reading test average scores from 50% to 91.8% over the course of the year—compared with score averages of 55% (pretest) to 73% (posttest) among the control group. In two schools, ELL classes performed better on posttests than the English-proficient classes in the control group (60% vs. 47% on the WERI in PS 43 and 85% vs. 68% in PS 1).

This table provides a summary of research studies aligning to each ESSA evidence tier.

## 4—DEMONSTRATES A RATIONALE

### Does Not Meet WWC Evidence Standards

Evidence	Program	Study Design	Instruments Used	# of Children	Outcomes
Waterford Institute (1996). Preliminary research: Waterford Institute's Early Reading in Utah and New York schools. Research Compendium, 1998.	Waterford Early Learning	Waterford Early Reading Instrument	Waterford Early Reading Instrument		In every case, classes that used the software made greater gains in pre-literacy skills than comparison classrooms. Waterford students at one elementary school improved reading test average scores from 50% to 91.8% over the course of the year—compared with score averages of 55% (pretest) to 73% (posttest) among the control group. In two schools, ELL classes performed better on posttests than the English-proficient classes in the control group (60% vs. 47% on the WERI in PS 43 and 85% vs. 68% in PS 1).
Waterford Institute (1997). A preliminary report of the 1996-97 test results from elementary schools in the Dallas ISD on the effectiveness of the Waterford Early Reading Program. Research Compendium, 1998.	Waterford Early Learning	Provides a well-specified logical model informed by research or evaluation		668 Kindergarten children	After a one year trial, researchers noted highly significant differences ( $p < 0.01$ ) between students using the Waterford program and control classrooms.
Research, Assessment, & Measurement, Inc. (1999). Evaluation of Waterford Early Reading Program: Hacienda la Puente and Whittier School Districts. Los Angeles, California. Research Compendium, 1999.	Waterford Early Learning	Provides a well-specified logical model informed by research or evaluation		Treatment (used Waterford for approximately six months), N= 558	The average growth scores for Waterford students were significantly higher than those of comparison classes ( $p < .001$ ).
Hecht, S. A (2000). Waterford Early Reading Program in Ohio: An Evaluation. Research Compendium, 2000.	Waterford Early Learning	Provides a well-specified logical model informed by research or evaluation			This study found significant gains among students using the program in comparison with the control group ( $p < .05$ ) for skills including Letter-Word Identification, Spelling, and Phonological Awareness.
Young, J. W., & Tracey, D. H. (1999). An evaluation of the Waterford Early Reading Program: Newark, New Jersey. Research Compendium, 1998.	Waterford Early Learning	Provides a well-specified logical model informed by research or evaluation	TERA-2	N= 265	The Waterford software student group over the control group ( $p < .02$ ) on the TERA-2 standardized assessment.
Reynolds, C. (2000). An evaluation of the Waterford Early Reading Program in the Decatur, Ill., school district: Analysis of impact on vocabulary development. Research Compendium, 2000.	Waterford Early Learning	Provides a well-specified logical model informed by research or evaluation	Iowa Test of Basic Skills (ITBS)	Treatment (Kindergarten and first grade students during two successive years), N= 700	First grade students who used the software significantly outperformed control group students on the Iowa Basic Test of Skills for reading ( $p = .003$ ).



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## 4—DEMONSTRATES A RATIONALE

### Does Not Meet WWC Evidence Standards

Evidence	Program	Study Design	Instruments Used	# of Children	Outcomes
Walberg, H. J. (2001). Final evaluation of the reading initiative. Research Compendium, 2002.	Waterford Early Learning	Provides a well-specified logical model informed by research or evaluation	Waterford Early Reading Instrument	Treatment (Kindergarten students using Waterford), N= 2414	After a statewide implementation of the reading software in Idaho kindergartens, evaluators working in connection with the Albertson Foundation reported the effect size for students who had originally tested in the lowest third on standardized reading measures was 1.14, and the overall effect size for students who completed the program was 0.52.
Electronic Education (2002). Los Angeles Unified school district - Waterford Early Reading Program initial implementation findings. Research Compendium, 2002.	Waterford Early Learning	Provides a well-specified logical model informed by research or evaluation			The average growth rate for limited English-proficient students was twice that of the English-proficient group in letter recognition and phonological awareness.
Research, Assessment, & Measurement, Inc. (1998). A study of the effectiveness of the Waterford program at Glenridge elementary school. Research Compendium, 1998.	Waterford Early Learning	Provides a well-specified logical model informed by research or evaluation			The use of Waterford software increased ELL students' scores more than 600% (as compared to 283% for the control group).
Cassady, J. C., & Smith, L. L. (2003). The impact of a reading-focused integrated learning system on phonological awareness in kindergarten. Journal of Literacy Research, 35(4), 947-964.	Waterford Early Learning	Provides a well-specified logical model informed by research or evaluation	Phonological Abilities Test (PAT)	Treatment (Kindergarten students using Waterford), N= 26; Control (Kindergarten students not using Waterford), N = 62	Despite no significant differences in pretest scores, students using Waterford software experienced a faster acquisition of phonological awareness skills than students who had not used the program, $F(2, 85) = 3.05, p < .05, \eta^2 = .07$ .
Cassady, J. C. & Smith, L. L. (2005). The impact of a structured integrated learning system on first grade students' reading gains. Reading and Writing Quarterly, 21, 361-376.	Waterford Early Learning	Provides a well-specified logical model informed by research or evaluation	CTBS Terra Nova	Treatment (first grade students in fall 2001 that used Waterford), N = 46; Control (first grade students in fall 2000 that did not use Waterford), N = 47;	Students who used Waterford experienced significantly greater reading skill gains on the CTBS Terra Nova than the comparison group, $F(1, 91) = 10.61, p < .01, \eta^2 = .10$ . The lowest performing students in the treatment group outperformed the low-performing comparison group ( $F[1, 21] = 15.67, p < .01, \eta^2 = .43$ ). By the end of the first grade year, test scores among this at-risk group were equivalent to those of the moderate-performing students in the comparison group.
"Standardized Test for the Assessment of Early Reading (STAR) Dynamic Indicators of Early Literacy Skills (DIBELS)"	Waterford Early Learning	Provides a well-specified logical model informed by research or evaluation	"Standardized Test for the Assessment of Early Reading (STAR) Dynamic Indicators of Early Literacy Skills (DIBELS)"	First sample group (first grade): Treatment (Waterford usage over 600 minutes), N = 78, Control (Did not use Waterford), N = 28 ; second sample group (K): Treatment (Waterford usage over 1,000 minutes), N = 105; Control (Did not use Waterford), N = 128; third sample group (K): Treatment (Waterford usage over 1,000 minutes), N = 189; Control (Did not use Waterford), N = 94	On all measured skills, students who used ERP outperformed the control groups. In the first sample group, the treatment group significantly outperformed the control group on six of the ten sub-strands; in the second sample group, the treatment group significantly outperformed the control group on seven of the ten sub-strands; and in the third sample group, the treatment group significantly outperformed the control group on two of the three sub-strands.

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## 4—DEMONSTRATES A RATIONALE

### Does Not Meet WWC Evidence Standards

Evidence	Program	Study Design	Instruments Used	# of Children	Outcomes
Shamir, H. & Goethe, R. (2015). Common Core State Standards: Is computer assisted instruction up for the challenge? In Proceedings of E-Learn: World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2015 (pp. 220-227). Chesapeake, VA: Association for the Advancement of Computing in Education (AACE).	Waterford Early Learning	Provides a well-specified logical model informed by research or evaluation	Developmental Reading Assessment (DRA)	Treatment (K students that used Waterford more than 470 minutes), N = 12; Control (K students that used an earlier version of Waterford), N= 61	The treatment students using ERP Cloud Version significantly outperformed the comparison group on three of the four sub-strands: Initial Sounds, Capital Letters, and Segmenting Phonemes.
Shamir, H., Feehan, K., & Yoder, E. (2017c). Effects of personalized learning on kindergarten and first grade students' early literacy skills. In Proceedings of the 9th International Conference on Computer Supported Education (CSEDU 2017) - Volume 2 (pp. 273-279). Porto, Portugal: Institute for Systems and Technologies of Information, Control and Communication.	Waterford Early Learning	Provides a well-specified logical model informed by research or evaluation	Developmental Reading Assessment (DRA)	Kindergarten <ul style="list-style-type: none"> <li>treatment (used Waterford for more than 1000 minutes throughout the school year), N= 1004</li> <li>control (used Waterford for less than 500 minutes throughout the school year), N= 28</li> </ul> First Grade <ul style="list-style-type: none"> <li>treatment (used Waterford for more than 1000 minutes throughout the school year), N= 1064</li> <li>control used Waterford for less than 500 minutes throughout the school year), N= 52</li> </ul>	Analysis of end of year scores revealed a significant difference between groups due to higher end of year scores made by treatment students than by control students in both kindergarten and first grade. Further analysis was conducted to examine the effects of gender and subsidized lunch on end of year scores, covarying for beginning of year scores, revealing that kindergarten and first grade treatment group students outperformed control group students across demographics.
Shamir, H., Feehan, K., & Yoder, E. (2017d). Literacy improvement in early learners using technology. In Proceedings of the 11th International Technology, Education and Development Conference (pp. 7889-7896). Valencia, Spain: International Academy of Technology, Education and Development.	Waterford Early Learning	Provides a well-specified logical model informed by research or evaluation	Volusia Literacy Test (VLT)	<ul style="list-style-type: none"> <li>Kindergarten: treatment (Waterford usage more than 1000 minutes), N = 1287, control (usage less than 500 minutes), N= 43</li> <li>First grade: treatment (Waterford usage more than 1000 minutes), N = 1892, control (usage less than 300 minutes), N= 34</li> <li>Second grade: treatment (Waterford usage more than 1200 minutes), N = 2150 control (usage less than 500 minutes), N= 109</li> </ul>	Independent sample t-tests showed statistically significant positive effects for high use of WEL on the end of year VLT scores of Kindergarten students, $t(1, 1328) = -1.97, p < .05$ , first grade, $t(1, 1924) = -3.14, p < .01$ , and second grade, $t(1, 2257) = -2.57, p < .05$ .

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## 4—DEMONSTRATES A RATIONALE

### Does Not Meet WWC Evidence Standards

Evidence	Program	Study Design	Instruments Used	# of Children	Outcomes
Shamir, H., Feehan, K., & Yoder, E. (2017e). Using computer-assisted instruction to improve early literacy skills for struggling students. In Proceedings of the 11th International Technology, Education and Development Conference (pp. 7897-7903). Valencia, Spain: International Academy of Technology, Education and Development.	Waterford Early Learning	Provides a well-specified logical model informed by research or evaluation	Developmental Reading Assessment (DRA)	<p>First Grade</p> <ul style="list-style-type: none"> <li>treatment (used Waterford), N= 103</li> <li>control (did not use Waterford), N=534</li> </ul> <p>Second Grade</p> <ul style="list-style-type: none"> <li>treatment (used Waterford), N= 70</li> <li>control (did not use Waterford), N= 407</li> </ul>	Analysis of percent gains between beginning of year and end of year scores revealed a significant difference between groups due to higher percent gains made by first and second grade students who used WEL than by control students. First and second grade treatment group students outperformed control group students in gender, free/reduced lunch status, and special education status.
Shamir, H., Feehan, K., Yoder, E., & Pocklington, D. (2018b, May). Can CAI improve reading achievement in young ELL students? Paper presented at the Conference on Education, Teaching, and E-Learning, Prague, Czech Republic.	Waterford Early Learning	Provides a well-specified logical model informed by research or evaluation	<ul style="list-style-type: none"> <li>The Texas Primary Reading Inventory (TPRI)</li> <li>VLT</li> </ul>	<p>District 1</p> <ul style="list-style-type: none"> <li>Treatment, K: Students who used WEL, N= 212</li> <li>Treatment, second grade: Students who used WEL, N= 138</li> <li>Control, K: Students who did not use WEL, N= 1484</li> <li>Control, second grade: Students who did not use WEL, N= 1492</li> </ul> <p>District 2</p> <ul style="list-style-type: none"> <li>Treatment, K: Students who used WEL for more than 1,000 minutes, N= 1287</li> <li>Treatment, second grade: Students who used WEL for more than 1,200 minutes, N= 2150</li> <li>Control, K: Students who used WEL for less than 500 minutes, N= 43</li> <li>Control, second grade: Students who used WEL for less than 500 minutes, N= 109</li> </ul>	ELL students demonstrated dramatic improvements in learning skills following use of WEL enhanced curriculum: Use of WEL consistently increased performance on reading metrics.

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## 4—DEMONSTRATES A RATIONALE

Does Not Meet WWC Evidence Standards

Evidence	Program	Study Design	Instruments Used	# of Children	Outcomes
	Waterford Early Learning	Provides a well-specified logical model informed by research or evaluation	<ul style="list-style-type: none"> <li>• Developmental Reading Assessment (DRA)</li> <li>• Mobile Classroom: The Dynamic Indicators of Basic Early Literacy Skills (mCLASS: DIBELS Next)</li> </ul>	District 1 <ul style="list-style-type: none"> <li>• Treatment, K: Students who used WEL for more than 1,000 minutes, N= 1,004</li> <li>• Treatment, first grade: Students who used WEL for more than 1,000 minutes, N= 1,064</li> <li>• Control, K: Students who used WEL for less than 500 minutes, N= 28</li> <li>• Control, first grade: Students who used WEL for less than 500 minutes, N= 52 District 2</li> <li>• Treatment (reading) K: Students who used WEL for more than 1,000 minutes, N= 108</li> <li>• Treatment (math) K: Students who used WEL for more than 1,000 minutes, N= 114</li> <li>• Treatment (math) first grade: Students who used WEL for more than 1,000 minutes, N= 255</li> <li>• Control (reading) K: Students who used WEL for less than 400 minutes, N= 30</li> <li>• Control (math) K: Students who used WEL for less than 400 minutes, N=58</li> <li>• Control (math) first grade: Students who did not use WEL, N= 68</li> </ul>	Students who used WEL throughout the school year in addition to traditional classroom learning scored consistently higher on reading and math assessments than their peers who did not use WEL.

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## 4—DEMONSTRATES A RATIONALE

Does Not Meet WWC Evidence Standards

Evidence	Program	Study Design	Instruments Used	# of Children	Outcomes
Shamir, H., Yoder, E., Pocklington, D., & Feehan, K. (2018b). Using CAI for improving academic skills of students with special needs. In M. Carmo (Ed.), <i>Proceedings of the International Conference on Education and New Developments (END 2018)</i> (pp. 557-561). Budapest, Hungary: World Institute for Advanced Research and Science.	Waterford Early Learning	Provides a well-specified logical model informed by research or evaluation	<ul style="list-style-type: none"> <li>• Mobile Classroom: The Dynamic Indicators of Basic Early Literacy Skills (mCLASS: DIBELS Next)</li> <li>• Mobile Classroom: Math (mCLASS: Math)</li> <li>• The Texas Primary Reading Inventory (TPRI)</li> </ul>	District 1 <ul style="list-style-type: none"> <li>• Treatment (reading): Students with active special education status who used WEL for more than 1,000 minutes, N= 28</li> <li>• Control (reading): Students with active special education status who used WEL for less than 400 minutes, N= 8</li> <li>• Control (reading): Students with no special education status who used WEL for less than 400 minutes, N= 12</li> <li>• Treatment (math): Students with active special education status who used WEL for more than 1,000 minutes, N= 33</li> <li>• Control (math): Students with active special education status who used WEL for less than 400 minutes, N= 21</li> <li>• Control (math): Students with no special education status who used WEL for less than 400 minutes, N= 36</li> </ul> District 2 <ul style="list-style-type: none"> <li>• Treatment (reading): Students with active special education status who used WEL, N= 7</li> <li>• Control (reading): Students with active special education status who did not use WEL, N= 30</li> <li>• Control (reading): Students with no special education status who did not use WEL, N= 257"</li> </ul>	Students who used WEL throughout the school year in addition to traditional classroom learning scored consistently higher on reading and math assessments than their peers who did not use WEL.
Shamir, H., Yoder, E., Pocklington, D., & Feehan, K. (2018a). Using adaptive CAI to supplement literacy development in early learners. <i>Journal of Educational Multimedia and Hypermedia</i> , 27(3), 367-389.	Waterford Early Learning (UPSTART)	Provides a well-specified logical model informed by research or evaluation	Texas Primary Reading Inventory (TPRI)	Kindergarten <ul style="list-style-type: none"> <li>• Treatment (used Waterford), N= 212</li> <li>• control (did not use Waterford), N= 1484</li> <li>• treatment (used Waterford), N= 160</li> <li>• control (did not use Waterford), N= 1391</li> </ul>	Analysis of Kindergarten TPRI gains by sub-strand shows substantively important effect sizes (>0.25) for 6 of the 11 strands, including Letter Name Identification (0.74), Letter to Sound Linking (0.51), Inferring Word Meaning (0.34), Linking Details (0.49), Recalling Details (0.30), and Listening Comprehension Total Score (0.58). First Grade TPRI gains by sub-strand show substantively important effect sizes (>0.25) for eight of the nine substrands, including Blending Phonemes (0.85), Blending Word Parts (0.37), Blends in Final Position (0.71), Deleting Initial Sounds (0.68), Final Consonant Substitution (0.48), Initial Blending Substitution (0.51), Initial Consonant Substitution (0.39), and Middle Vowel Substitution (0.97).not (ES = 0.18).

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## 4—DEMONSTRATES A RATIONALE

### Does Not Meet WWC Evidence Standards

Evidence	Program	Study Design	Instruments Used	# of Children	Outcomes
Shamir, H., Feehan, K., Pocklington, D., & Yoder, E. (2019a, June). Dosage effects of CAI on literacy skills. Paper to be presented at the International KES Conference on Smart Education and E-Learning, St. Julians, Malta.	Waterford Early Learning (UPSTART)	Provides a well-specified logical model informed by research or evaluation	<ul style="list-style-type: none"> <li>Standardized Test for the Assessment of Reading (STAR)</li> <li>Idaho Reading Indicator (IRI)</li> </ul>	STAR <ul style="list-style-type: none"> <li>Treatment, kindergarten students randomly assigned to use WEL, who used WEL for at least 1,500 minutes (N = 142)</li> <li>Control, Kindergarten students randomly assigned to receive traditional literacy instruction (N = 289) IRI</li> <li>Treatment, kindergarten students randomly assigned to use WEL, who used WEL for at least 1,500 minutes (N = 145)</li> <li>Control, Kindergarten students randomly assigned to receive traditional literacy instruction (N = 314)</li> </ul>	Students who used WEL for at least 1,500 minutes over the course of their Kindergarten school year had significantly higher gains from beginning of year to end of year across literacy strands on the STAR assessment. Additionally, students who met the recommended usage of WEL had higher gains than their control counterparts on the IRI Letter Naming Fluency strand and significantly higher gains on the IRI Letter Sound Fluency strand.
Shamir, H., Yoder, E., Pocklington, D., & Feehan, K. (2019b). Technology improving literacy skills for all students: Findings from three districts. <i>International Journal of Information and Education Technology</i> , 9(4), 280-285.	Waterford Early Learning (UPSTART)	<ul style="list-style-type: none"> <li>The Texas Primary Reading Inventory (TPRI)</li> <li>Developmental Reading Assessment (DRA)</li> <li>VLT</li> </ul>	District 1 <ul style="list-style-type: none"> <li>Treatment, K: Students who used WEL, N= 212</li> <li>Treatment, first grade: Students who used WEL, N= 160</li> <li>Control, K: Students who did not use WEL, N= 1484</li> <li>Control, first grade: Students who did not use WEL, N= 1391 District 2</li> <li>Treatment, second grade: Students who used WEL, N= 70</li> <li>Control, second grade: Students who did not use WEL, N= 407 District 3</li> <li>Treatment, K: Students who used WEL for more than 1,000 minutes, N= 1287</li> <li>Treatment, first grade: Students who used WEL for more than 1,000 minutes, N= 1892</li> <li>Control, K: Students who used WEL for less than 500 minutes, N= 43</li> <li>Control, first grade: Students who used WEL for less than 300 minutes, N= 34</li> </ul>	District 1 <ul style="list-style-type: none"> <li>Treatment, K: Students who used WEL, N= 212</li> <li>Treatment, first grade: Students who used WEL, N= 160</li> <li>Control, K: Students who did not use WEL, N= 1484</li> <li>Control, first grade: Students who did not use WEL, N= 1391 District 2</li> <li>Treatment, second grade: Students who used WEL, N= 70</li> <li>Control, second grade: Students who did not use WEL, N= 407 District 3</li> <li>Treatment, K: Students who used WEL for more than 1,000 minutes, N= 1287</li> <li>Treatment, first grade: Students who used WEL for more than 1,000 minutes, N= 1892</li> <li>Control, K: Students who used WEL for less than 500 minutes, N= 43</li> <li>Control, first grade: Students who used WEL for less than 300 minutes, N= 34</li> </ul>	For all three districts, students who used WEL in addition to traditional classroom instruction had higher gains, percent gains, or end of year scores on reading assessments than students who did not use WEL. Results from District 3 demonstrated that students who had higher usage of WEL had higher literacy scores than students with less usage of WEL.

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## 4—DEMONSTRATES A RATIONALE

Does Not Meet WWC Evidence Standards

Evidence	Program	Study Design	Instruments Used	# of Children	Outcomes
Shamir, H., Yoder, E., Pocklington, D., & Feehan, K. (2019a). Computer-assisted instruction: Long-term effects on early literacy skills of low socioeconomic status students. <i>International Journal for Information and Education Technology</i> , 9(4), 263-267.	Waterford Early Learning (UPSTART)	Provides a well-specified logical model informed by research or evaluation	Kindergarten Readiness Test (KRT)	Treatment <ul style="list-style-type: none"> <li>Kindergarten students who used WEL in pre-kindergarten for more than 1,250 minutes, N= 266</li> <li>Control (Kindergarten students with no WEL usage, N= 9,435"</li> </ul>	In this longitudinal study, the students who used WEL outperformed the control group on the overall assessment score and on each of the substrands tested, and the differences in scores were statistically significant across almost all demographics analyzed.
Shamir, H., Pocklington, D., Feehan, K., & Yoder, E. (2019b). Evidence for dosage and long-term effects of computer-assisted instruction. <i>International Journal of Learning and Teaching</i> (In Press).	Waterford Early Learning (UPSTART)	Provides a well-specified logical model informed by research or evaluation	Developmental Reading Assessment (DRA)	Treatment <ul style="list-style-type: none"> <li>Kindergarten students who used WEL in pre-kindergarten for more than 1,250 minutes, N= 266</li> <li>Control (Kindergarten students with no WEL usage, N= 9,435</li> </ul>	Students who used WEL had higher literacy test scores than their control counterparts, demonstrating an overall effect for the use of WEL. Students who used, and then stopped using, WEL still outperformed their control counterparts one year after they stopped using WEL, demonstrating a long-term effect for the use of WEL. Additionally, students who started using WEL early in their academic careers outperformed their counterparts who started later, demonstrating an effect for the early use of WEL.
Evaluation and Training Institute (2011). Kindergarten Outcomes: Program Impacts on Reading Proficiency. First Year Results: Utah UPSTART Education Program Evaluation Technical Report.	Waterford Early Learning (UPSTART)	Provides a well-specified logical model informed by research or evaluation	Dynamic Indicators of Basic Early Literacy Skills (DIBELS) Next	Students served: 1,248 Pre-K Students <ul style="list-style-type: none"> <li>Treatment (students enrolled in the UPSTART program), N = 137</li> <li>Control (students not enrolled in the UPSTART program), N = 247 "</li> </ul>	Findings revealed that children who had participated in UPSTART during preschool scored almost 18 points higher in reading proficiency on the DIBELS Next (DN) Composite compared to beginning kindergarten children who did not participate in UPSTART prior to enrolling in public school. Additionally, middle kindergarten children who had participated in the UPSTART preschool program scored approximately 19 points higher in reading proficiency on the DN Composite compared to middle kindergarten children who did not participate in UPSTART prior to enrolling in public school. When assessed at the beginning of kindergarten by the DIBELS Next Beginning Kindergarten Composite, children participating in UPSTART demonstrated moderately strong improvements in reading proficiency compared to children who did not participate in UPSTART and demonstrated higher gains when assessed on the DIBELS Next Middle Kindergarten Composite. "
Shamir, H., Miner, C., Izzo, A., Pocklington, D., Feehan, K., & Yoder, E. (2018). Preparing students for kindergarten using UPSTART at home. <i>Journal of Educational Multimedia and Hypermedia</i> , 27(2), 209-230.	Waterford Early Learning (UPSTART)	Provides a well-specified logical model informed by research or evaluation	Waterford Assessments of Core Skills (WACS)		Using a pre- and posttest study design, UPSTART participants completed the program at the WACS Kindergarten Advanced level on average. Students made WACS reading score gains across demographics including ethnicity, other preschool attendance, and socioeconomic status.
Sudreth, D., Thronsen, J., & Wiebke, S. (2016). UPSTART Program: Report of FY 2016. Utah State Office of Education.	Waterford Early Learning (UPSTART)	Provides a well-specified logical model informed by research or evaluation	"Dynamic Indicators of Basic Early Literacy Skills (DIBELS) Student Assessment of Growth and Excellence (SAGE)"		This study shows that students who participated in the UPSTART program as preschoolers maintained their gains longitudinally on state testing, outscoring non-UPSTART students on state testing in Grades 1-4.