ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 8 (August 2026)

Enhancing Decoding Fluency of Learners through Gamified Phonics-Based Intervention

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Date Submitted:
February 27, 2026

Date Accepted:
March 19, 2026

Date Published:
August 22, 2026

DOI:
10.5281/zenodo.22052239

ABSTRACT

This action research investigated the effectiveness of a gamified phonics-based intervention in enhancing the decoding fluency of Grade 3 English as a Foreign Language (EFL) learners in Changhua, Taiwan. A quasi-experimental pretest-posttest control-group design was employed with 40 learners from two intact classes, comprising a control group (n = 20) and an experimental group (n = 20). The experimental group received six gamified phonics sessions using WordWall and Wayground within the Gradual Release of Responsibility model, whereas the control group received regular phonics instruction. A researcher-developed 20-item Decoding Fluency Test measured sound-to-letter recognition, blending, word recognition, and sentence recognition. The instrument obtained an Item-Level Content Validity Index of 1.00 across all validation criteria and Cronbach's alpha of .809. Data were analyzed using mean, standard deviation, skewness, kurtosis, independent-samples t tests, and paired-samples t tests at the .01 significance level. The control group changed from M = 12.30 (SD = 2.89) at pretest to M = 12.05 (SD = 3.25) at posttest, while the experimental group increased from M = 12.00 (SD = 2.77) to M = 13.50 (SD = 2.95). However, no statistically significant differences were found for the pretest, posttest, within-group pretest-posttest comparisons, or mean gain scores. The experimental group nevertheless showed a higher descriptive gain (M = 1.50) than the control group (M = -0.25). The findings indicate that gamified phonics may be a promising supplementary approach for decoding practice, but the six-session intervention did not produce statistically measurable advantages under the conditions of the study. Longer implementation periods and larger samples are warranted.

Keywords: *decoding fluency, gamified phonics, EFL learners, WordWall, Wayground, Gradual Release of Responsibility*

INTRODUCTION

Reading fluency is a foundational component of literacy because accurate and increasingly automatic word recognition allows learners to devote cognitive resources to meaning construction rather than to laborious decoding. Decoding fluency is especially important during the early stages of reading development because it links phoneme-grapheme knowledge, blending, word recognition, and connected-text reading. Automaticity Theory explains that repeated accurate decoding gradually reduces the cognitive effort required for word recognition (LaBerge & Samuels, 1974), while contemporary fluency research continues to emphasize the close relationship among accurate decoding, automatic processing, and comprehension (Rasinski et al., 2017; Stocker et al., 2023).

For English as a Foreign Language learners, the development of decoding fluency can be more demanding because English print and speech may be encountered primarily in the classroom. Taiwanese learners whose first

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language is Mandarin Chinese must learn an alphabetic sound-symbol system that differs markedly from a logographic writing system. Research with Chinese and other EFL learners has shown that systematic phonics instruction can strengthen phonological decoding and word reading when learners receive explicit and repeated practice (Adane et al., 2025; Wang et al., 2021). Classroom-based evidence also points to the value of interactive materials for lower-achieving EFL learners (Lin et al., 2019).

Gamification offers a way to increase participation and repeated practice by incorporating selected game elements such as challenges, feedback, rewards, and progress cues into existing instruction (Deterding et al., 2011). Educational gamification has been associated with engagement and persistence when game elements are aligned with learning goals rather than used as entertainment alone (Dichev & Dicheva, 2017). In literacy contexts, gamified activities can provide frequent opportunities to rehearse phonics skills while sustaining learner attention and motivation (Budiarti et al., 2025; Prados Sánchez et al., 2023).

The source action research identified an immediate instructional need at Tung Fang Primary School in Changhua County, Taiwan. Classroom observations showed that some Grade 3 EFL learners experienced difficulty with sound-letter recognition, phoneme blending, word recognition, and simple sentence recognition. Formal diagnostic and remedial processes were not yet available at the point when these difficulties were observed, creating a need for an early classroom-based intervention that could be implemented within regular instruction.

Accordingly, the study examined whether a gamified phonics-based intervention using WordWall and Wayground, scaffolded through the Gradual Release of Responsibility (GRR) model, could improve decoding fluency. It compared the pretest and posttest performance of experimental and control groups, tested between-group and within-group differences, and examined differences in mean gains. The study was intended to provide practical evidence for teachers and school leaders considering technology-supported phonics as a supplementary literacy strategy for young EFL learners.

Literature Review

Decoding Fluency and Early Reading Development

Decoding involves translating written symbols into spoken language through knowledge of phoneme-grapheme relationships and blending. As learners repeatedly decode words, increasingly stable orthographic representations support faster recognition and greater fluency. Ehri (2020) emphasized systematic phonics as a foundation for word reading and orthographic mapping, while the Simple View of Reading identifies decoding as one of the two essential contributors to reading comprehension (Gough & Tunmer, 1986; Hoover & Gough, 1990).

Efficient decoding is also central to Automaticity Theory. LaBerge and Samuels (1974) proposed that lower-level reading processes become less effortful through repeated practice, thereby freeing attention for higher-level comprehension. Rasinski et al. (2017) similarly argued that fluency includes accurate recognition, automatic processing, and meaningful reading rather than speed alone. Intervention research has further shown that explicit decoding practice combined with frequency building can improve word-reading fluency among learners with reading difficulties (Stocker et al., 2023).

These principles are especially relevant for beginning EFL readers. Wang et al. (2021) reported that phonics instruction improved phonological decoding among Chinese EFL learners, while Adane et al. (2025) found gains in decoding and word reading among first-grade EFL learners. Together, these studies support explicit, systematic, and repeated phonics practice as a reasonable foundation for the present intervention.

Gamification in Phonics and Literacy Instruction

Gamification refers to the use of selected game-design elements in non-game contexts to increase engagement and participation (Deterding et al., 2011). In educational settings, these elements may include points, challenges, immediate feedback, progression, and rewards. Dichev and Dicheva (2017) emphasized that gamification is most defensible when game elements are purposefully aligned with instructional objectives and when claims of effectiveness are evaluated empirically.

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For young language learners, gamification can increase opportunities for practice while reducing the repetitiveness of foundational exercises. Budiarti et al. (2025) identified motivation and engagement as recurring outcomes in gamified second-language learning, while Prados Sánchez et al. (2023) reported positive effects of a gamified platform on reading-related outcomes and attitudes. These findings support using digital platforms as delivery tools for systematic phonics rather than as substitutes for explicit instruction.

The present study used WordWall and Wayground to provide interactive phonics activities. The platforms supported repeated sound-letter matching, blending, word recognition, and sentence-level practice. Their use was embedded within a structured instructional sequence so that game features reinforced the same decoding skills measured by the study instrument.

Scaffolding and the Gradual Release of Responsibility

Beginning readers often require explicit modeling, supported practice, and timely feedback before they can perform decoding tasks independently. This principle is consistent with Vygotsky's (1978) concept of the Zone of Proximal Development, in which temporary support enables learners to perform beyond their current independent level. Recent EFL research likewise emphasizes scaffolding as a means of promoting participation and confidence among young learners (Muhammad et al., 2025).

The Gradual Release of Responsibility model operationalizes this support through a progression from teacher modeling to guided, collaborative, and independent practice. Pearson and Gallagher (1983) described the transfer of responsibility from teacher to learner as central to effective instruction, and Fisher and Frey (2014) later elaborated the model for classroom use. In the present intervention, this progression was represented through I Do, We Do, You Do Together, and You Do Alone phases.

Embedding gamified activities within the GRR sequence helped ensure that engagement remained connected to instructional support. Early sessions emphasized modeling of letter sounds and blending, middle sessions used guided and collaborative tasks, and later sessions moved toward independent decoding and reading. This structure was intended to balance motivation with systematic skill development.

Motivation, EFL Context, and the Research Framework

The motivational rationale for gamification is consistent with Self-Determination Theory, which proposes that autonomy, competence, and relatedness support higher-quality motivation (Deci & Ryan, 1985). Game-like practice can provide clear goals, feedback, and visible progress that may strengthen perceived competence, while collaborative activities can support relatedness. However, motivational benefits do not automatically guarantee measurable learning gains, making outcome evaluation essential.

The Taiwanese EFL context adds another layer to this framework. Learners have limited English exposure outside formal schooling and must acquire phoneme-grapheme correspondences in a writing system different from Mandarin Chinese. Lin et al. (2019) showed that interactive digital materials can support low-achieving EFL learners, but foundational decoding still requires explicit instructional guidance and sufficient practice time.

The study therefore conceptualized the gamified phonics-based intervention as the independent variable and learners' decoding fluency as the dependent variable. Decoding fluency was measured through sound-to-letter recognition, blending, word recognition, sentence recognition, and pretest-posttest performance. The original research paradigm is retained in Figure 1.

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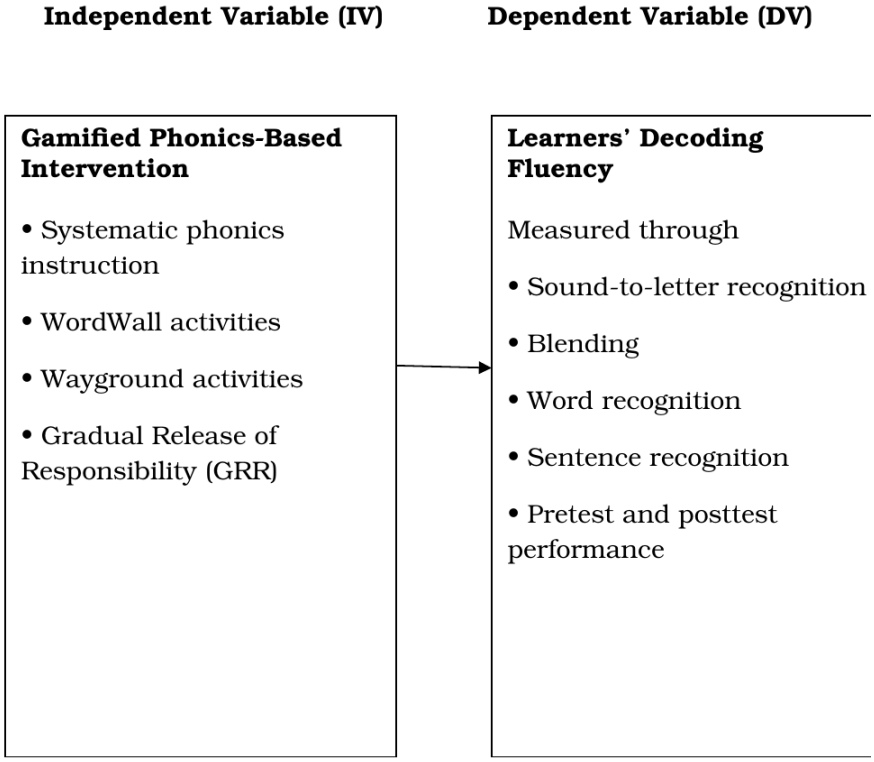
Figure 1. *The Research Paradigm of the Study*



METHODS

Research Design

The study employed a quasi-experimental pretest-posttest control-group design using two intact Grade 3 classes. One class served as the experimental group and received the gamified phonics-based intervention, while the other served as the control group and received the school's regular phonics instruction. Random assignment of individual learners was not feasible because the classes had been established before the study, making a quasi-experimental design appropriate for the school setting (Creswell & Creswell, 2018).

Research Locale

The study was conducted at Tung Fang Primary School, a public elementary school in Changhua County, Taiwan. The investigation focused on Grade 3 EFL learners because this level represents an important stage for developing sound-letter recognition, blending, word recognition, and simple sentence recognition. The researcher was an English teacher at the school and had observed decoding difficulties during regular classroom instruction.

Participants and Sampling Technique

The participants were 40 Grade 3 EFL learners drawn from two intact classes during the second semester of the school year. One intact class comprised the control group (n = 20) and the other the experimental group (n = 20). Existing classroom groupings were retained; therefore, individual random assignment was not used. The selected classes were confirmed as appropriate for the study through teacher observations and baseline assessment of learners who demonstrated difficulty in early decoding skills.

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Research Instrument

A researcher-developed 20-item Decoding Fluency Test was administered as both pretest and posttest. The instrument contained four equally weighted components: Sound-to-Letter Recognition, Blending, Word Recognition, and Sentence Recognition, with five items per component and a maximum score of 20. Prerecorded audio instructions and prompts were used to standardize administration across participants.

Three experts in English language education and phonics instruction evaluated the instrument using a 17-criterion validation checklist. All criteria obtained an Item-Level Content Validity Index of 1.00, indicating unanimous expert agreement on relevance and appropriateness following the approach described by Polit and Beck (2006). A pilot test with 21 Grade 3 learners from the previous school year yielded Cronbach's alpha = .809, which the thesis interpreted as good internal consistency using the guidance discussed by Taber (2018).

Data Gathering Procedure

After school approval and parental or guardian consent were secured, the Decoding Fluency Test was administered as a pretest to both groups. The intervention then ran for six weeks with one instructional session per week. The experimental group received systematic phonics activities delivered through WordWall and Wayground and organized according to the GRR sequence. The control group received regular classroom phonics instruction. At the end of the intervention, both groups completed the same Decoding Fluency Test under comparable testing conditions.

Table 1. Structure of the Six-Session Gamified Phonics Intervention

Session	GRR Stage	Primary Focus	Digital/Instructional Activities
1	I Do	Letter-sound recognition	WordWall flashcards and picture-sound matching
2	I Do	Phoneme blending	Wayground/Quizizz listening tasks and WordWall anagram
3	We Do	CVC word families	WordWall group sort and timed identification game
4	We Do	Sentence recognition	Flashcards and sentence-reordering activities
5	You Do Together	Guided decoding fluency	Audio/video reading tasks with peer and teacher support
6	You Do Alone	Independent decoding	Independent audio-response and fluency tasks

Data Analysis

Mean and standard deviation described average performance and score variability, while skewness and kurtosis were examined to assess distributional characteristics. Independent-samples t tests compared the control and experimental groups at pretest, posttest, and on mean gain scores. Paired-samples t tests compared pretest and posttest performance within each group. Levene's test and Shapiro-Wilk results reported in the thesis were used to assess relevant assumptions. All inferential tests were interpreted at the .01 significance level using JASP statistical software.

Ethical Consideration

Approval was obtained from the school principal, and informed consent was secured from parents or legal guardians. The intervention was implemented during regular English classes to minimize disruption. Learner identities were coded, collected data were treated confidentially and stored securely, and the study followed the principles of respect for persons, beneficence, and justice.

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RESULTS AND DISCUSSION

Pretest and Posttest Decoding Fluency Performance

The two groups began with closely comparable decoding fluency performance. The control group obtained a pretest mean of 12.30 (SD = 2.89), while the experimental group obtained M = 12.00 (SD = 2.77). After the six-week intervention, the control group obtained M = 12.05 (SD = 3.25), whereas the experimental group increased to M = 13.50 (SD = 2.95). Thus, the experimental group showed a descriptive increase of 1.50 points, while the control group showed a slight decline of 0.25 point.

Table 2. Descriptive Decoding Fluency Performance of the Two Groups

Group	Test	n	Mean	SD	Skewness / Kurtosis
Control	Pretest	20	12.30	2.89	-0.319 / -0.535
Experimental	Pretest	20	12.00	2.77	0.198 / 0.016
Control	Posttest	20	12.05	3.25	-0.009 / -0.900
Experimental	Posttest	20	13.50	2.95	0.782 / -0.327

The descriptive pattern is consistent with the rationale for systematic, repeated decoding practice. Phonics instruction strengthens word recognition by reinforcing letter-sound connections and orthographic mapping (Ehri, 2020), while repeated decoding contributes to automaticity and fluency (LaBerge & Samuels, 1974; Rasinski et al., 2017). The higher posttest mean of the experimental group suggests a favorable trend, but descriptive improvement alone does not establish a treatment effect.

Between-Group and Within-Group Significance Tests

Inferential testing showed no statistically significant difference between the groups at pretest, $t(38) = 0.335$, $p = .739$, confirming baseline comparability. The posttest difference was also not significant, $t(38) = -1.478$, $p = .148$. Within the control group, the pretest-posttest change was not significant, $t(19) = 0.316$, $p = .755$. The experimental group likewise did not show a statistically significant pretest-posttest difference, $t(19) = -1.714$, $p = .103$. Finally, the comparison of mean gains was not significant, $t(38) = -1.484$, $p = .146$.

Table 3. Summary of Inferential Tests on Decoding Fluency

Comparison	t	df	p	Decision at α = .01
Control vs. Experimental: Pretest	0.335	38	.739	Not significant
Control vs. Experimental: Posttest	-1.478	38	.148	Not significant
Control: Pretest vs. Posttest	0.316	19	.755	Not significant
Experimental: Pretest vs. Posttest	-1.714	19	.103	Not significant
Control vs. Experimental: Mean gains	-1.484	38	.146	Not significant

These findings require a cautious interpretation. The gamified phonics group improved descriptively, but the increase was not large enough to reject the null hypothesis under the study's stringent .01 significance criterion. The absence of statistical significance is compatible with the developmental nature of decoding fluency: automatic word recognition typically requires sustained practice over time rather than a brief intervention (LaBerge & Samuels, 1974; Rasinski et al., 2017). The six-session duration and small intact-class sample may also have limited the study's ability to detect modest changes.

Instructional Meaning of the Experimental Trend

Although the study did not demonstrate a statistically significant treatment effect, the experimental group's gain of 1.50 points compared with the control group's -0.25-point change suggests that the intervention may have instructional value as a supplementary practice structure. The intervention combined explicit phonics with interactive digital repetition rather than replacing phonics with games. This distinction is consistent with evidence that systematic phonics remains central to decoding development among EFL learners (Adane et al., 2025; Wang et al., 2021).

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International Journal
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The GRR structure may also have supported participation by matching instructional support to learners' growing independence. Modeling, guided practice, collaboration, and independent performance reflect the gradual transfer of responsibility described by Pearson and Gallagher (1983) and Fisher and Frey (2014). Scaffolding is especially relevant for young EFL learners who may require repeated support before they can apply phonics knowledge independently (Muhammad et al., 2025; Vygotsky, 1978).

From a motivational perspective, WordWall and Wayground provided immediate feedback and repeated interactive practice that may have made decoding work more engaging. Self-Determination Theory suggests that competence, autonomy, and relatedness can support learner motivation (Deci & Ryan, 1985), while gamification research indicates that game elements can help sustain engagement when they remain aligned with instructional goals (Budiarti et al., 2025; Dichev & Dicheva, 2017). The present results therefore support continued testing of the approach rather than a claim of established superiority.

CONCLUSION

The study showed that the control and experimental groups had comparable decoding fluency before the intervention. After six gamified phonics sessions, the experimental group demonstrated a higher posttest mean and a positive mean gain, whereas the control group showed a slight decline. These descriptive results indicate a favorable trend for the gamified phonics-based approach in supporting sound-to-letter recognition, blending, word recognition, and sentence recognition.

However, none of the between-group or within-group comparisons reached statistical significance at the .01 level. The study therefore does not establish that the gamified intervention was superior to regular phonics instruction under the conditions examined. Its contribution lies in demonstrating a feasible, structured, and engaging supplementary approach that warrants longer and larger-scale evaluation before stronger effectiveness claims are made.

Recommendation

School administrators may support teachers who wish to integrate gamified phonics by providing access to appropriate digital platforms, reliable classroom technology, and professional development focused on evidence-based literacy instruction.

English and literacy teachers may use WordWall, Wayground, or similar tools as supplementary practice environments while retaining explicit phonics instruction and scaffolded teaching. Activities should be aligned with clearly defined decoding skills and should provide repeated practice rather than relying primarily on rewards or competition.

Schools and teachers should monitor learner performance during implementation and adjust the intensity, pacing, and scaffolding of the intervention according to learners' needs. Gamified practice may be most useful when embedded in a broader early-literacy program rather than implemented as a stand-alone solution.

Future researchers should examine the intervention using larger samples, more schools, longer instructional periods, and delayed posttests. Additional outcomes such as reading accuracy, reading comprehension, vocabulary, learner motivation, and retention may also be studied to determine whether descriptive gains become statistically and educationally meaningful over time.

References

Adane, A., Amogne, D., & Nurie, Y. (2025). Effects of phonics instruction on improving the decoding and word reading skills of first-grade English as foreign language students in Ethiopia. *Ethiopian Journal of Language, Culture and Communication, 10*(1), 42-60.

Budiarti, F., Al Masjid, A., & Djufri, E. (2025). Gamification in L2 vocabulary acquisition for primary education: A systematic literature review (2019-2024). *IDEAS: Journal on English Language Teaching and Learning, Linguistics and Literature, 13*(2). https://doi.org/10.24256/ideas.v13i2.8918

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications.

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. Plenum Press.

Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011). From game design elements to gamefulness: Defining gamification. In *Proceedings of the 15th International Academic MindTrek Conference* (pp. 9-15). ACM. https://doi.org/10.1145/2181037.2181040

Dichev, C., & Dicheva, D. (2017). Gamifying education: What is known, what is believed, and what remains uncertain. *International Journal of Educational Technology in Higher Education, 14*(1), 1-36. https://doi.org/10.1186/s41239-017-0042-5

Ehri, L. C. (2020). The science of learning to read words: A case for systematic phonics instruction. *Reading Research Quarterly, 55*(S1), S45-S60. https://doi.org/10.1002/rrq.334

Fisher, D., & Frey, N. (2014). *Better learning through structured teaching: A framework for the gradual release of responsibility* (2nd ed.). ASCD.

Gough, P. B., & Tunmer, W. E. (1986). Decoding, reading, and reading disability. *Remedial and Special Education, 7*(1), 6-10. https://doi.org/10.1177/074193258600700104

Hoover, W. A., & Gough, P. B. (1990). The simple view of reading. *Reading and Writing, 2*(2), 127-160. https://doi.org/10.1007/BF00401799

LaBerge, D., & Samuels, S. J. (1974). Toward a theory of automatic information processing in reading. *Cognitive Psychology, 6*(2), 293-323. https://doi.org/10.1016/0010-0285(74)90015-2

Lin, Y.-T., Chen, H.-R., & Chang, C.-C. (2019). Enhancing low achievers' EFL learning with interactive digital teaching materials. *Interactive Learning Environments, 29*(8), 1091-1105. https://doi.org/10.1080/10494820.2019.1619584

Muhammad, A. F., Rosmawati, Fitrah, M. A., Nurwidyayanti, & Rizal, A. (2025). Scaffolding techniques for young learners in EFL classrooms: A study at primary schools in Kecamatan Tempe. *Journal of Language Development and Linguistics, 4*(1), 63-76. https://doi.org/10.55927/jldl.v4i1.14320

Pearson, P. D., & Gallagher, M. C. (1983). The instruction of reading comprehension. *Contemporary Educational Psychology, 8*(3), 317-344. https://doi.org/10.1016/0361-476X(83)90019-X

Polit, D. F., & Beck, C. T. (2006). The content validity index: Are you sure you know what's being reported? Critique and recommendations. *Research in Nursing & Health, 29*(5), 489-497. https://doi.org/10.1002/nur.20147

Prados Sánchez, G., Cózar-Gutiérrez, R., del Olmo-Muñoz, J., & González-Calero, J. A. (2023). Impact of a gamified platform in the promotion of reading comprehension and attitudes towards reading in primary education. *Computer Assisted Language Learning, 36*(4), 669-693. https://doi.org/10.1080/09588221.2021.1939388

Rasinski, T. V., Rikli, A., & Johnston, S. (2017). Reading fluency: More than automaticity? *The Reading Teacher, 71*(3), 351-356. https://doi.org/10.1002/trtr.1604

Stocker, J. D., Kubina, R. M., Crumpler, E. R., Kozloff, M., & Swanton-Derushia, E. (2023). Effects of an explicit decoding plus frequency building intervention on word reading fluency for students with disabilities in an urban elementary setting. *Journal of Learning Disabilities, 56*(1), 5-17. https://doi.org/10.1177/07319487221136279

Taber, K. S. (2018). The use of Cronbach's alpha when developing and reporting research instruments in science education. *Research in Science Education, 48*(6), 1273-1296. https://doi.org/10.1007/s11165-016-9602-2

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.

Wang, Y., Zhang, J., Liu, Y., & Gong, Y. (2021). The effects of phonics instruction on L2 phonological decoding and vocabulary learning: An experimental study of Chinese EFL learners. *System, 99*, 102489. https://doi.org/10.1016/j.system.2021.102489