



## **Designing Phoneme Blending Web Site to Enhance Language Learning of Primary School Students**

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## Abstract

This research project focuses on developing an interactive website to teach primary school learners aged 6 to 9 years old English sounds and their blending using CVC (consonant–vowel–consonant) word structures. Recognizing individual sounds, blending them correctly, and linking the sounds to form words are essential skills at the early stages of learning to read. This website aims to help primary school learners develop these skills in a fun, age-appropriate way. It combines a variety of engaging learning tools for primary learners, such as phonetic clues, visual cues, interactive tasks that focus on identifying sounds and combining them into words, and exercises. Word segmentation is also included and is designed around the CVC pattern to simplify the process as much as possible.

The website also allows learners, their parents, and teachers to effectively monitor language development and progress, as it includes adjustable difficulty levels and progress tracking features. The primary goal of this project is to support students at risk of reading difficulties and to connect letter sounds with their shapes. Ultimately, this study aims to support and develop foundational skills in listening, reading, and speaking by providing primary learners with fun and effective ways to explore phonemes and build confidence in their first educational steps.

### Key Words:

Phoneme blending: is the ability to combine individual sounds (phonemes) to form complete words.

Phoneme awareness (PA): is the ability to recognize and understand the sound structure of words. Phonemic Awareness is a sub–category of phonological awareness. It describes the specific skills of identifying phonemes, which are the smallest sounds in a word. Within the English language, there are 44 phonemes.

Website: According to Merriam–Webster a website is a group of World Wide Web pages usually containing hyperlinks to each other and made available online by an individual, company, educational institution, government, or organization.

Primary School Children: School children attending government and private primary Schools where they study subjects like English, mathematics, social studies and science.

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## 1. Introduction:

Phoneme blending has its roots in linguistics and phonology—the study of the structure and

function of speech sounds. A phoneme, defined as the smallest and most distinguishable sound unit capable of altering meaning in a language, forms the foundation of this skill. While phoneme

blending may have intuitively aided human communication for centuries, it formally entered educational discourse around the mid-20th century. Early research conducted by linguists and educators during the late 1960s and 1970s laid the groundwork for its integration into phonics instruction.

A notable milestone was the publication of Marilyn Jager Adams’ *Beginning to Read: Thinking and Learning about Print* (1990), which emphasized the importance of phoneme blending and established phonological awareness as a core component of literacy. Foundational studies by David P. Read further clarified the relationship between phonemic awareness and reading ability. Isabelle Y. Liberman also contributed significantly by highlighting the crucial role of phonemic awareness in literacy acquisition.

Today, phoneme blending is recognized as a key concept in English language instruction and is embedded in educational policies as an essential mechanism for developing fluent and confident readers. However, young children often face challenges in mastering this skill. They naturally perceive speech in meaningful chunks—such as syllables or words—rather than breaking it down into individual phonemes. As a result, many struggle to detect and manipulate these subtle sound units. Difficulties in producing or distinguishing between sounds, syllables, and words can significantly hinder early reading development, as decoding requires a refined ability to discriminate between phonemes.

Explicit instruction in phonemic awareness and its corresponding alphabetic principles—namely, that letters represent sounds—is essential until these

skills become automatic. However, traditional approaches often require years to yield results, potentially putting students’ literacy development at risk. A promising alternative is the integration of technology. Utilizing a specialized phonics website in the classroom allows teachers to deliver instruction that is both engaging and accessible from the very beginning of a child’s learning journey. This approach facilitates the acquisition of reading skills and helps prevent some learners from falling behind.

Phoneme blending can be considered the most fundamental skill for achieving reading success. Children typically begin by learning letter-sound relationships, which eventually enable them to blend these sounds to form words. The 44 phonemes represented by the 26 letters of the English alphabet serve as the bridge between spoken and written language. Mastery of these connections allows learners to decode unfamiliar words and texts. Once a child has established basic letter-sound associations, they are ready to begin blending sounds—marking the first significant step toward independent reading.

**Table (1): Blending skills CVC words with short medial vowels**

CVC	CVC	CVC	CVC	CVC
box	dog	pig	jug	Fix
fox	dig	big	mug	Mix
fog	big	bin	tug	Six
dog	bug	win	tag	Sip
dig	but	tin	tog	Lip
fig	hut	tip	tot	Lap
wig	hat	tap	not	Cap
big	hit	map	hot	Cup
bag	kit	mop	lot	Cut
bad	nit	mob	lit	Hut

bed	nip	rob	let	Hit
red	tip	rib	wet	Him
rod	hip	rub	met	Hum
rot	lip	run	men	Mum
rat	lap	fun	pen	Mug
mat	zap	fan	pet	Rug
sat	tap	fat	pot	Rag
set	tag	cat	pit	Rat
yet	bag	kit	pill	Rot
yes	bog	fit	will	Cot

### **The importance of phoneme blending:**

Phoneme blending Is a fundamental skill in the process of learning to read. To read effectively, students must be able to recognize the individual sounds associated with each letter and blend these sounds together to form words. This ability Is a core component of phonological awareness, which serves as the foundation for literacy acquisition. Research indicates that explicit instruction in phonological awareness significantly enhances students' reading proficiency. Moreover, individuals with well-developed phonological skills tend to demonstrate stronger overall literacy performance.

### **Research problem:**

Traditional teaching practices are dominant and an overhaul is needed in the entire educational system. Such integration of research-based strategies like phoneme blending, the basis of phonological awareness, can cause appreciable improvement in literacy outcomes. In this transition lies the greatest potential for language instruction; here explicit phonemic instruction will build students' ability to decode unfamiliar

words, recognize sound patterns, form the very basis of reading skills needed for academic success.

### **Research aims:**

1. To ascertain the role and importance of phoneme blending in the acquisition of the English language.
2. To evaluate how the application of different strategies for blending phonemes is conducted in the teaching methods in English, and its effects on decoding, fluency, and comprehension.
3. To design and evaluate an interactive website-based tool to enhance phonemic awareness and language learning outcomes through guided, interactive exercises.

### **Research importance:**

The utilization of the website for enhancing language learning of primary students in a better and faster way.

Comparison between phoneme blending and other phonemic awareness skills:

<b>Basis of Difference</b>	<b>Phoneme Blending</b>	<b>Other Phonemic Awareness</b>
<b>Definition</b>	The ability to combine individual sounds (phonemes) to form complete words.	Includes skills like phoneme segmentation, deletion, substitution and isolation which focus on breaking down or manipulating sounds.

<b>Focus</b>	Help young learners understand how sounds work together to form words, a key step in reading	Develops awareness of individual sounds in spoken words, preparing children for reading and spelling.
<b>Importance in Reading</b>	Directly linked to early reading success, as it helps children decode new words by blending sounds.	Supports phonemic awareness but does not always lead directly to word reading like blending does.
<b>Examples</b>	Hearing the sounds /c/ /a/ /t/ and blending them into the word <i>cat</i> .	Identifying the first sound in <i>dog</i> (/d/), or replacing /c/ in <i>cat</i> with /h/ to make <i>hat</i> .
<b>Role in Literacy Development</b>	Essential for decoding words while reading. It is a strong predictor of reading fluency.	Helps with recognizing and manipulation g sounds but does not always directly contribute to reading fluency.

<b>Teaching Methods</b>	Games, digital tools and interactive activities that encourage children to listen and combine sounds into words.	Activities like clapping for each sound, rhyming games and sound deletion exercises.
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## 2. The Theoretical Framework

Incorporating technology into the process of learning to read at young represents a significant advancement in young learner's literacy education for such practice. It would certainly be a very entertaining method of learning through which young learners would be able to practice phoneme blending. The following section will discuss the fundamental theories and ideas that support the phoneme blending practice, the changing landscape of digital learning, and how such sites could assist children aged between six and nine in improving their reading skills.

### Key Ideas and Theories:

#### 1. Phonemic Awareness and Learning to Read:

Learning phonemes and their combination into words makes up reading skills for children. Phonemic awareness, as shown by research consistently, is a significant prerequisite with respect to reading fluently. Using a phoneme-blending website might allow children a chance to practice that vital bridge to developing stronger phonemic awareness through engagement without feeling overwhelmed.

## **2. Learning through Multiple Senses:**

Some children learn better with simple coordination of engagement from several senses. A good phoneme blending site then will therefore integrate great visual components, sounds with interactive activities at the same time so that it will be more immersive and user-friendly for different types of learners.

## **3. Learning with Support (Vygotsky's Theory):**

According to Vygotsky's theory of social learning, children do learn best from more knowledgeable others, be it a teacher, parent, or interfacing tool. One such tool is phoneme-blending website. Hints, feedback, and scaffolding can all support children step-by-step until they reach the point that they are independent.

## **4. Making Learning Engaging (Gamification):**

A few sources of entertainment enhance the learning experience even more. Websites that integrate gamification elements, like points, rewards, and challenges, can definitely afford to motivate students to keep practicing phoneme blending on a regular basis while providing them with a pleasant and rewarding learning experience.

## **How Digital Phonics Learning Has Evolved:**

### **The use of technology in teaching phonics has evolved significantly over time:**

Pre-Computer Era (1950s–1970s): Teachers relied on books, flashcards, and auditory oral situations for teaching phonics.

Early Computer Era (1980s–1990s): (1980s–1990s) –Simple phonics games emerged on the computer and began to be available for children to interactively practice sound blending.

Internet Era (2000s): The advent of phonics – practice websites and online learning programs

brought Wider accessibility as children began to make phonics learning at their convenience.

Present Day: Present–Advanced websites today – use artificial intelligence (AI) for feedback, actual timing in correcting pronunciation errors, and customizing learning experiences based on each child's progress, thereby personalizing the phonics journey.

## **How Phoneme Blending Websites Facilitate Learning?**

**Phoneme blending websites play a significant role in enhancing children's phonological awareness and early literacy development.**

**Their effectiveness can be attributed to several key features:**

### **1. Interactive Phoneme Blending Activities:**

These platforms provide engaging and age-appropriate activities that support the development of phonemic skills by helping children blend individual sounds to form complete words

### **2. Real-time Feedback:**

Immediate, corrective feedback enables learners to assess their Pronunciation and make necessary adjustments, thereby promoting accurate and confident speech development

### **3. Gamification for Motivation:**

The integration of gamified elements—such as rewards, challenges, and progression systems—helps maintain children's interest and motivation throughout the learning process

### **4. Adaptive Learning Mechanisms:**

Numerous phoneme blending platforms incorporate adaptive learning mechanisms that dynamically adjust the level of difficulty based on a child's prior performance. This ensures a personalized and developmentally appropriate learning experience, maintaining an optimal

balance between challenge and support to promote continuous progress.

### **Importance of this research**

Phoneme-blending websites are widely recognized as beneficial; however, more inquiry into the following aspects is required:

- Their longitudinal impact on the reading skills and literacy development of young learners.
- Accuracy of the AI in identifying and rectifying pronunciation errors, especially for beginners.
- Improving the accessibility of these websites to children with learning disabilities such as dyslexia, whereby every learner can benefit from these digital tools.
- Evaluation of the effectiveness of a phoneme blending website to help children aged six to nine improve their reading skills will be the focus of this research, which is ultimately intended to better the phonics teaching methods through technology.

### **The Role of a Phoneme Blending Website in Enhancing Language Learning of Primary School Students**

Well-designed phoneme blending websites may therefore provide such primary students (6–9 years) with an interactive, structured, and adaptive learning environment that will successfully augment their language learning. Phoneme blending—the ability to string together individual sounds to create words—is an important skill in early literacy development. The platform would be one where phoneme blending can truly flourish, as there are certain benefits that directly engender a supportive environment for learning and reading fluency.

### **1. Interactive and Engaging Learning Experience**

Phoneme blending websites frequently incorporate elements of gamification, such as

interactive activities, engaging animations, and reward systems, to attract and maintain the attention of young learners. By integrating enjoyment and incentives into phonemic practice, these platforms foster a stimulating and supportive learning environment. According to Goswami (2002), gamified learning environments significantly enhance learner motivation and promote sustained participation—both of which are critical factors in the development of phonemic awareness.

### **2. Adaptive Learning and Personalized Instruction**

With the help of an AI engine, phoneme blending websites can adjust to the pace of individual students and provide them with exercises that are individually tailored to their present skill levels. This guarantee of personalization ensures that students needing extra assistance will not fall behind, while their more accomplished peers will be adequately challenged (Heri, 2005). Personalized phoneme blending websites, therefore enable learners to work at their own pace most effectively.

### **3. Multisensory Learning Approach**

Phoneme-blending sites can accommodate auditory, visual, and kinesthetic learning styles. Students would hear the phonemes pronounced, see the letters or images that represent what they are hearing, and be able to drag and drop objects, arrange the spelling, and form the word. Research indicates that multisensory Instruction greatly enhances phonemic awareness and reading fluency (Shanahan & Longan, 2010). This multisensory approach reinforces sound-letter connections, leading to profound learning.

### **4. Immediate Feedback and Progress Tracking**



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Real-time feedback is one of the greatest advantages of digital learning. A phoneme blending site would provide immediate feedback by correcting errors and giving reinforcement for correct responses, while also tracking student progress over time. It allows teachers and parents to adjust directions according to students' needs. Instant feedback translates to great improvement, as this encourages students to identify their mistakes better.

### **5. Accessibility and Flexibility**

Unlike conventional methods, the phoneme blending website gives the students the flexibility to practice at their own pace outside school hours. That is individualized pacing, additionally providing support for students who need extra reinforcement. The use of this platform allows students to learn anytime, anywhere, be it at home or at school, providing them with a chance to study continuously and at their own pace.

### **6. Data-Driven Insights for Educators**

A phoneme blending site deserves credit for gathering pertinent data on student performance for the teacher in interpreting trends, strengths, and weaknesses. Teachers would use such data to aid in refining teaching practices and also provide students with tiered assistance. This analysis provides essential information for understanding any aspect of a student's progress so no one is left behind and intervenes appropriately.

### **Previous Studies on Phoneme Blending and Digital Learning Tools:**

Williams (2013): The effectiveness of interactive phonics software on phoneme blending skill development in young readers was assessed. The study revealed that children learning through digital phonics programs showed remarkable

Improvement in blending sounds into words as against those taught through traditional means.

Anderson and Reed (2017) focused on a comparison between the more traditional phonics instruction and the uses of digital programs for phoneme blending. From the study, it emerged that children interacting with phonics digital tools showed greater attention and retention of phoneme awareness concepts.

AI-driven phonics programs were investigated for their relevance to literacy development by Martinez et al. (2020). They found that AI apps could give real-time pronunciation feedback while providing personalized learning pathways and therefore considerably augment children's blending of phonemes.

Clark and Simmons (2021) aimed to investigate gamification in phoneme-blending websites as motivation for young learners. They concluded that children using gamified phonics platforms demonstrated higher motivation, longer engagement periods, and improved accuracy in phoneme blending.

### **Commentary on previous studies:**

It has been shown in multiple ways, in past research, that digital blending with phonemes works as reinforcement for early literacy development. Studies suggest interactive phonics programs promote engagement, motivation, and the phonemic awareness abilities of learners.

However, there seems to exist a knowledge gap regarding what cumulative effects can be gained from one or another digital phonics tool when used for varying reading fluency and comprehension of young children.

This research aims at closing this gap by checking the effectiveness of phoneme-blending websites in nurturing the early literacy skills of 6- to 9-year-



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olds. It will regard all past literature with a view to consolidating perspectives from existing theoretical frameworks toward establishing empirical evidence for the contribution of digital phoneme blending tools to phonemic awareness, reading fluency, and prolonged literacy outcomes. This would contribute to a further understanding of research in technology-assisted phonics instructions while informing best practice for the integration of digital literacy tools in early childhood education.

#### **Site Design Overview:**

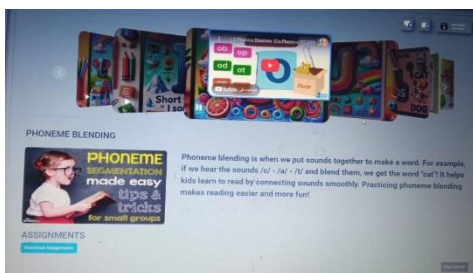
However, in order to fulfill the requirements of interesting and developmentally appropriate teaching-learning materials, a web-based platform has been created that enhances delivery of early literacy instructions and has a focus with regard to teaching phoneme blending and letter-sound correspondence. The platform is designed with priority given to visual mediation, that is, using colorful, thematically cohesive imagery that captures and sustains young learners' attention employing cognitive load theory and the dual-coding principle that posits that multimodal stimuli enhances memory retention. The platform provides demonstration videos contextualized by background visuals, for example, an ocean-themed backdrop for the letter "O" or vibrant illustrations for the letter "I." According to this, the visuals minimize text cue dependency, reduce cognitive barriers, and scaffold comprehension, especially for pre-literate or emergent readers. By matching the auditory material (e.g., phoneme pronunciation) against a visual referent, the platform promotes associative learning and thus actually binds spoken and written language together.

Active learning mode of the platform is further provided through progressive interactive activities.

Hereafter, learners would be expected to go through exercises that had modeled answers, right after discussing their lesson content. Such exercises would help them self-administer correction since the answers would serve as their instant feedback on whether they are right while allowing them to proceed towards skill automatization. This also corresponds to Vygotsky's scaffolding theory: aided practice acting as a bridge linking independent practice with assisted performance. The platform would gamify the experience through plays borrowed from outside platforms, such as Balloon Phonics, a listening development game based on auditory discrimination. In this way, intrinsic learning is made practical, wherein the outcome leaves the degrees of freedom in the use of play-based activities embedded in tools that are constructionist, enabling learners to actively carry knowledge instead of just being subjected to it in a motivating, low-stakes environment.

The design of the platform has composed various elements including visual scaffolding, interactive practice, and gamification that together are directed towards a holistic development of literacy. Foundational skills—phonemic awareness, decoding, and encoding—essential for reading fluency are taught in the program.

Informal observations suggest that the presence of sensory stimuli works to diminish drifting, which continues to pose significant challenges for the digital pedagogy of young children. This approach not only supports universal access to systematic phonics instruction but also enhances the possibility for multimedia technology-supported tools to work in convergence with traditional literacy curricula in settings with diverse backgrounds or limited resources.



## 1. Research Design

In this research project, a mixed-methods of research design is applied in order to assess the ability of a phoneme-blending website to improve language learning amongst elementary school students (6 through 9 years) thoroughly.

Quantitative in nature, experimental research aims to measure, through testing, the gains made in

students' phonemic awareness and reading skills due to the phoneme-blending website. The qualitative approach emphasizing teacher and student feedback includes the assessment of user experience, engagement, and effectiveness.

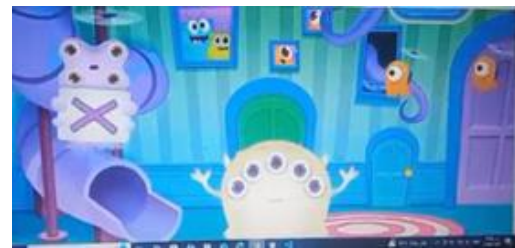
## 2. Participants and Sampling

–Participants include elementary students (6 –9 years old) on all levels of learning (beginner, intermediate, and advanced in phoneme-blending skill). Moreover, teachers with literacy specialists evaluate the website in terms of instructional value.

–Randomized controlled trials will take place, where students will be classified into the following:

– Experimental Group: Students using the phoneme blending website

–Control Group: Students receiving phoneme blending lessons through conventional methods.



### 3. Research Instruments

#### A. Pre-and Post-Tests (Quantitative)

Standardized tests assessing the students' phonemic awareness and the phonics elements of early reading ability will assess the students prior to and after the experiment. The tests will consist of phoneme blending, word recognition, and reading fluency skills.

#### B. Web Analytics and AI Tracking (Quantitative)

The website will track the interactions of the student: student engagement, right or wrong answers, time taken to complete tasks, and patterns of errors. Based on AI-generated analytics, individual student progress can be tracked, allowing lesson planning to be adapted.

#### C. Observational Studies and Interactive Classroom Observation (Qualitative)

Engagement, behavior, and involvement will be noted by teachers during student use of the website. Field notes will capture student interaction with the digital learning environment as opposed to the traditional method.

#### D. Surveys and Interviews (Qualitative)

Student Surveys: Collecting feedback on ease of use, engagement, and motivation.

Teacher Survey and Interview: Measure its effectiveness in instruction and integrated into classroom activities.

### 4. Data Collection and Analysis

Quantitative Data Analysis: Pre- and post-test scores will be statistically analyzed (t-tests, ANOVA, etc.) to determine the significance of

improvement in phoneme blending skills achieved.

Qualitative Data Analysis: Observation, surveys, and interviews will be thematically analyzed looking for key patterns concerning students' engagement and teachers' perceptions.

### 5. Ethical Considerations

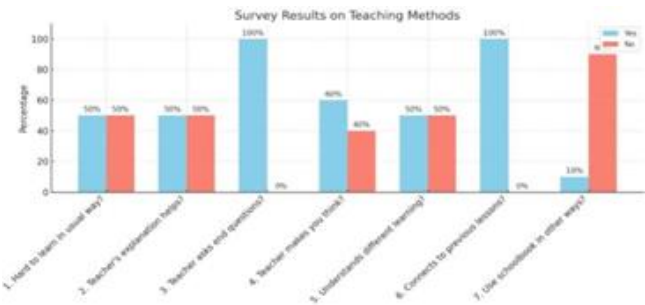
Parental consent will be acquired for the students' participation. Data privacy and confidentiality mechanisms will be in place for all participants. The website must be child-friendly and free from distractions or harmful contents.

### 4. Results of Research

A variety of challenges confronted students in learning English, particularly in regard to pronunciation and phoneme blending. The major feature of difficulty on their part was that they could hardly blend sounds accurately.

Question	Yes	No
1. Is it hard for you to learn in the usual way at school?	50%	50%
2. Does the way your teacher explains things help you get better at learning?	50%	50%
3. Does your teacher ask questions at the end to help you understand the lesson better?	100%	-
4. While teaching, does your teacher make you think and try new things?	60%	40%

5. Does your teacher understand that students learn in different ways?	50%	50%
6. Does your teacher connect the new lesson to what you learned before?	100%	-
7. Is your schoolbook only used to explain lessons, or do you do other things with it too?	10%	90%

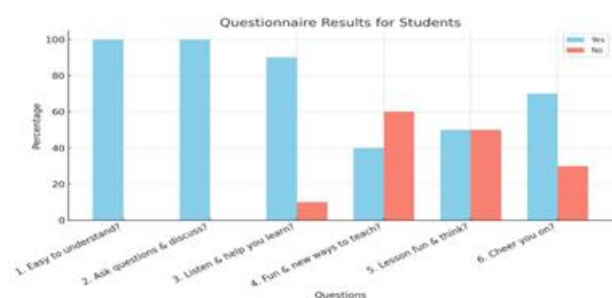


They gained direct experience of using an actual phoneme blending website where they encountered a wide variety of valuable resources for enhancing not only their pronunciation but also reading skills. The website allowed them to practice blending between individual sounds to construct complete words thereby enhancing their phonemic awareness. Such was dramatically effective during the lessons of phonics as well as drills on their pronunciation. Students who were earlier not able to recognize and blend the sounds could now learn through the facilitated activities and sound-based games. This was also helpful for the students that had difficulty recalling the correct pronunciation, as the repetitive listening and practice facilitated by the site seemed to help their memory of the sounds. Their memory acoustically got stronger and made recalling and pronouncing words correctly easier.

The students faced several problems related to pronunciation and decoding skills, particularly in blending phonemes into complete words. They needed more interactive and practical activities to guide them in understanding how these skills support learning. After implementing the phoneme blending website, which offered a variety of interactive exercises and auditory support, the students showed significant improvement. Students were now able to listen to sounds, practice blending them, and receive immediate feedback to evaluate their pronunciation and reading skills before making further attempts. As a result, access to effective learning resources became easier and more targeted. The phoneme blending website encouraged students to become active participants in the learning process rather than passive recipients. Through engaging games, sound-matching, and word-building activities, students developed a clearer understanding of how English words are constructed. The learning experience also became more individualized, allowing students to work at their own pace and focus on the sounds they found most challenging. This approach fostered more personalized and student-centered learning, reinforcing their active role in the process.

Question	Yes	No
1. Does your teacher talk in a way that is easy to hear and understand?	100%	-
2. Does your teacher let you ask questions and talk about the lesson?	100%	-

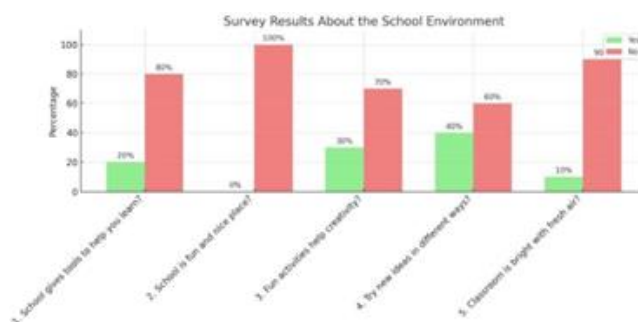
3. Does your teacher listen to your ideas and help you learn by yourself?	90%	10%
4. Does your teacher use fun and new ways to teach the lesson?	40%	60%
5. Does your teacher make the lesson fun and help you think about it?	50%	50%
6. Does your teacher cheer you on to do your best?	70%	30%



#### Questionnaire about the teacher:

Question	Yes	No
1. Does your school give you different tools or things to help you learn?	20%	80%
2. Is your school a fun and nice place that makes you want to come every day?	-	100%
3. Do you do fun activities at school that help you be more creative?	30%	70%
4. Does your school let you try new ideas and	40%	60%

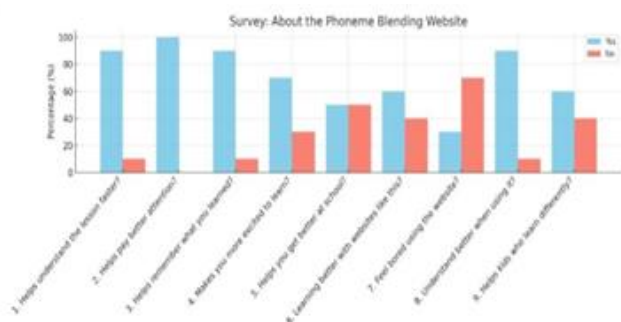
learn in different ways?		
5. Is your classroom bright and has fresh air?	10%	90%



#### Questionnaire model:

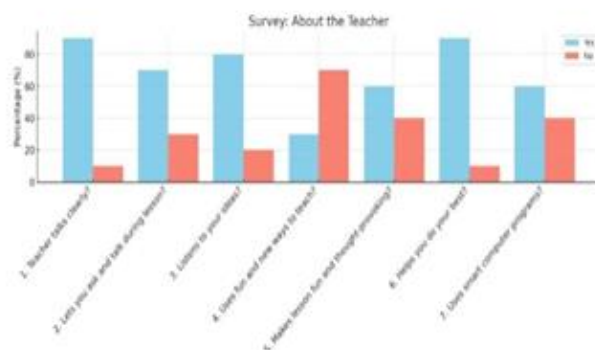
Question	Yes	No
1.Does the website help you understand the lesson faster?	%90	%10
2.Does the website help you pay better attention while learning?	%100	-
3.Does the website help you remember what you learned?	%90	%10
4.Does the website make you more excited to learn?	%70	%30
5.Does the website help you get better at school?	%50	%50
6.Do you think learning will be better if we use more websites like this?	%60	%40
7.Do you sometimes feel bored when using the website?	%30	%70
8.Do you understand the lesson better when you learn this way?	%90	%10
9.Does the website help you learn in different ways?	%60	%40





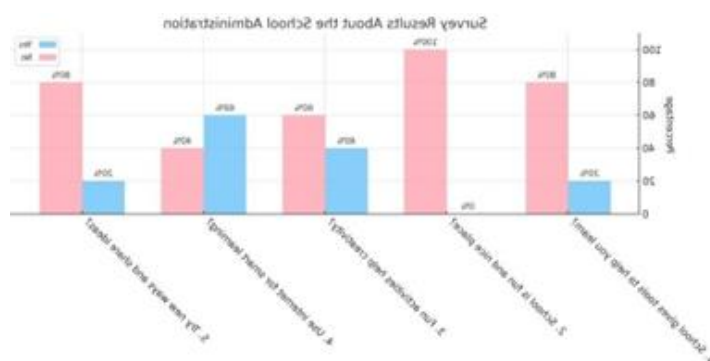
(1) Questionnaire about the teacher:

Question	Yes	No
1.Does your teacher talk clearly so you can hear and understand?	%90	%10
2.Does your teacher let you ask questions and talk during the lesson?	%70	%30
3.Does your teacher listen to your ideas and help you learn on your own?	%80	%20
4.Does your teacher use fun and new ways to teach the lesson?	%30	%70
5.Does your teacher make the lesson fun and help you think about it?	%60	%40
6.Does your teacher help you do your best?	%90	%10
7.Does your teacher use smart computer programs (like websites and games) to help you learn?	%60	%40



(3) Questionnaire about the school administration:

Question	Yes	No
1. Does your school give you different tools or things to help you learn?	%20	%80
2. Is your school a fun and nice place that makes you want to come every day?	–	%100
3. Do you do fun activities at school that help you be creative?	%40	%60
4. Can you use the internet at school to help with smart learning programs?	%60	%40
5. Does your school let you try new ways to learn and share your ideas?	%20	%80



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## 5. Interpretation of Results:

Through comparative interrogation of the questionnaire data, student perceptions and outcomes were significantly differentiated between the traditional modes of instruction and the ones enhanced by incorporating a phoneme-blending website, interactive applications, and gamified learning tools. The presented results show that the primary shift is in learner appreciation: a considerable percentage of participants changed their view from negative to positive regarding comprehension and skill mastery. This change in attitude indicates that digital intervention tools are effective in promoting enhanced understanding, especially in phonemic awareness and formation of words; the students favor use of the web-based platform over conventional ways of teaching, with interactivity, videos, and games among the cited attractions to stay engaged and learn.

The phoneme blending website, which has been integrated into classroom instruction, focuses on two aspects in support of literacy development. Firstly, the instructional videos give explicit, multimodal demonstrations of sound blending processes. These resources incorporate auditory and visual modeling of how phonemes coalesce into words and thereby develop listening accuracy, pronunciation, and decoding skills. Co-occurring auditory examples with dynamic visual representations, such as the animated merging of letters into words, lower cognitive load and aid memory retention. Secondly, interactive games transform phoneme practice into a fun goal-directed activity. These modules require learners to

independently manipulate sounds, receive immediate corrective feedback, and navigate through scaffolded challenges. Gamification design elements like rewards and adjustable levels of difficulty sustain motivation and encourage metacognitive reflection, allowing the students to internalize the blending strategies through repeated, low-stakes practice.

During implementation, the platform was seen to bring observable benefits across various areas within the range of literacy. The students were becoming more actively engaged in class discussions, showed more self-confidence with reading tasks, and improved even further in phonics-based activities. The multimodal design proved to work quite well for kinesthetic and visual learners, who benefited from the hands-on, experiential approach. Post-intervention assessments showed increased oral language production skills, greater accuracy in spelling, and enhanced higher-level thinking as learners began to use blending techniques in new contexts. The fact that students received immediate feedback also allowed teachers to identify and fill individual learning gaps at the moment.

Feedback grounded in empirical studies carried out in the classroom speaks to the real value of the platform. Students' enthusiasm for literacy activities increased, crediting their success to the platform's engaging and visually appealing interface. This result within the case study site corroborated the wider literature that supports technology-driven pedagogical principles to complement traditional teaching practices, especially when blended into the traditional curriculum.



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## 6. Conclusion:

The development and implementation of a phoneme-blending website represent a pedagogical innovation in addressing foundational literacy challenges among primary school students. This study demonstrates the transformative potential of digital tools in language education, particularly when grounded in interactive, multisensory design principles and adaptive learning frameworks. By integrating audiovisual demonstrations, gamified practice modules, and scaffolded feedback mechanisms, the platform enhances engagement, personalization, and efficacy in phonemic instruction—key factors in overcoming barriers to pronunciation and reading fluency. Empirical feedback from both learners and educators highlights the platform’s success in fostering inclusive, differentiated learning environments that accommodate diverse cognitive and linguistic needs.

Future research directions include expanding the platform’s applicability to multilingual contexts, incorporating speech recognition algorithms for real-time articulation analysis, and optimizing accessibility features for neurodiverse learners. Such advancements align with global educational imperatives to harness technology in democratizing literacy instruction. As digital literacy becomes integral to 21st-century competencies, tools of this nature exemplify the synergy between evidence-based pedagogy and technological innovation, ensuring equitable access to essential foundational.

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## Bibliography:

- Adams, M. J. (1990). *Beginning to read: Thinking and learning about print*. Cambridge, MA: MIT Press.
- Anderson, S., & Reed, M. (2017). A comparative study of traditional phonics instruction and digital phoneme blending applications. *Literacy Research and Instruction*, 56(3), 207–226.  
<https://doi.org/10.1080/19388071.2017.1294184>
- Castles, A., Rastle, K., & Nation, K. (2018). Ending the reading wars: Reading acquisition from novice to expert. *Psychological Science in*

---

the Public Interest, 19(1), 5–51.

<https://doi.org/10.1177/1529100618772271>

Clark, D., & Simmons, J. (2021). Gamification in phoneme blending websites: Impacts on young learners' motivation and skill acquisition.

Educational Technology Research and Development, 69, 189–210.

<https://doi.org/10.1007/s11423-020-09795-8>

Ehri, L. C. (2005). Learning to read words: Theory, findings, and issues. *Scientific Studies of Reading*, 9(2), 167–188.

[https://doi.org/10.1207/s1532799xssr0902\\_4](https://doi.org/10.1207/s1532799xssr0902_4)

Goswami, U. (2002). Phonology, reading development, and dyslexia: A cross-linguistic perspective. *Annals of Dyslexia*, 52(1), 141–163.

<https://doi.org/10.1007/s11881-002-0010-0>

Liberman, I. Y., Shankweiler, D., & Liberman, A. M. (1989). The alphabetic principle and learning to read. *Phonology and reading disability*, 1–33.

Martinez, L., Clark, D., & Simmons, J. (2020). The role of AI-driven phonics programs in early literacy development. *Computers & Education*, 148, 103807.

<https://doi.org/10.1016/j.compedu.2019.103807>.

National Reading Panel. (2000). Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction. (NIH Publication No. 00-4769). Washington, DC: National Institute of Child Health and Human Development.

Read, D. P. (1971). Children's difficulties in learning to read: Phonemic awareness and the alphabetic principle. *Educational Review*, 23(3), 201–210.

<https://doi.org/10.1080/0013191710230301>.

Shanahan, T., & Lonigan, C. J. (2010). The National Early Literacy Panel: A summary of the process and the report. *Educational Researcher*, 39(4), 279–285.

<https://doi.org/10.3102/0013189X10369172>.

Torgesen, J. K., Wagner, R. K., Rashotte, C. A., Alexander, A. W., & Conway, T. (2001).

Preventing reading failure in young children with phonological processing disabilities: Group and individual responses to instruction. *Journal of Educational Psychology*, 93(4), 579–593.

<https://doi.org/10.1037/0022-0663.93.4.579>.

---

Williams, J. (2013). The effectiveness of interactive phonics software in improving phoneme blending skills. *Journal of Early Childhood Literacy*, 13(1), 34–50.  
<https://doi.org/10.1177/1468798411430095>.