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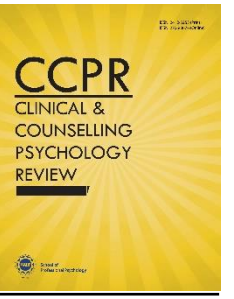

Title: **Developing Phoneme Performance Using ABA: A Case Study**

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Developing Phoneme Performance Using ABA: A Case Study

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Abstract

Phoneme awareness is vital for student development and academic success. It involves understanding sounds and patterns in spoken language, which is crucial for language proficiency and literacy acquisition. The child E. A 9-year-old girl was a student of 4th grade. She came with the presenting complaints of a lack of interest in studies and being unable to learn long questions (difficulty reading and writing in Urdu and English). The assessment was done and a management plan was formed. The assessment was conducted through behavioral observation, clinical interviews with the teacher and client, subjective ratings of the presenting complaints, Digit Span, Vocabulary tests from Cognitive Assessment Battery (CAB), and curriculum-based assessment. The result of the assessment showed that the child had academic issues like poor phoneme awareness (unable to identify a few phonemes, issue in blending letters, etc.) and a lack of interest in studies. For the current study, the ABA approach was used by employing basic alphabetic principles (syllables, rhymes), phonemic awareness strategies (identification, isolation, blending, segmentation), and motivation building (recognizing your achievement, building SMART goals) to overcome the child's difficulty in reading and writing in Urdu and English. A positive outcome was noted in the pre-and post-ratings where she was able to recognize letters and blend letters she missed, segment words into individual sounds.

Keywords: ABA method, blending, identification, phoneme awareness, reading, segmentation

Introduction

Having proficient reading skills is crucial for academic and lifelong success. It involves interpreting and understanding written text along with various sub-skills including decoding, fluency, vocabulary, comprehension, critical

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thinking, literacy skills, and academic success. Educators and parents have a vital role in nurturing and enhancing reading skills in children. (Desjardins & Ederer, 2015). Early literacy exposure and a reading-friendly environment greatly enhance lifelong learning and intellectual development. This improves academic performance, particularly in scholastic achievement, which is referred to as an individual's proficiency in a specific field of knowledge (Alramamneh et al., 2023). To achieve a certain level of performance, we may need to use complex cognitive tools. These mechanisms are explored about achievement, and there are alternative constructs that can be considered.

When examined specifically in terms of achievement, the changeable influences enable the diagnosis of educational or schooling programs, and the making of decisions based on the data (Lamb et al., 2018). There are different ways to measure students' achievement levels, in the first place, we assess students' learning progression which includes their development and learning (Herrmann-Abell & DeBoer, 2017). A wide range of assessment strategies are employed to observe the students in different situations (Atmatzidou & Demetriadis, 2016). Every student has different needs, so it is important to recognize those needs and to view learning as a continuum in which every child achieves developmental milestones in different, but appropriate, ways (Gestwicki, 2016). Observation and listening can help identify areas of learning where the students are particularly interested and stimulating experiences can reinforce or extend the learning (Yeh, 2014). First, students are tested in reading, writing, and mathematics to set achievement goals, measure progress over time, and identify areas for improvement or tutoring (Fien et al., 2018). In addition to the DIBELs reading assessment and the Voices Benchmark assessment, further reading tests are conducted throughout the school year for students in grades K-5 (Trainin et al., 2016). A student's portfolio is another method of providing evidence of progress, and this includes writing samples from each year, along with specific samples tied to each unit (Kloser et al., 2016).

If the students have low scores on these tests it may be due to poor phoneme development (Van De Sande et al., 2013). Phonemes are distinct sound units in languages, represented by one or two letters in written language. They are crucial for studying linguistics, analyzing language sound systems, and identifying distinctive sounds (Kazanina et al., 2018).

Phonological awareness is crucial for recognizing words as phonemes, or individual sounds. Children who don't understand speech sounds at school entry are at higher risk of reading and spelling difficulties (Goswami & Bryant, 2016; Tunmer & Hoover, 2019). There is even a link between early speech sound perception and later reading development (Tambyraja et al., 2020). Indeed, preschool activities that direct children's attention to individual speech sounds are beneficial to both normal children and children at risk of reading failure in their early reading development (Ozernov-Palchik & Gaab, 2016). Gains in phoneme awareness appear to be particularly crucial for learning to read using phonological recoding (Milankov et al., 2021). Decoding, comprehension, and speed concerns are the most typical reading obstacles pupils confront (Torppa et al., 2019). Poor reading performance and feelings of failure can discourage children and lead to disinterest in learning. It can also cause disruptive behavior and low self-esteem. Emphasizing the importance of phoneme awareness is critical for improving reading and emotional/behavioral outcomes.

Case Study

The child E. A 9-year-old girl was a student of 4th grade. The child was referred by her teacher for assessment and management of lack of interest in studies and being unable to learn long questions (difficulty in reading and writing in Urdu and English). Before informing the anonymous psychotherapy process, an ethical consideration was made. The interview was held with a teacher, who stated that the child did not pay attention in class and did not take studying seriously. Most of the time child got low grades on her tests and exams and did not complete her homework. The child's problems in academics specifically were rooted back in her childhood. The child struggled to learn after changing schools and jumped from 2nd to 4th grade, she had poor performance in the class, which led to adjustment issues in the class making new friends and understanding the teacher's teaching strategies. Because of poor basic skills developed in the previous school due to many factors like parents were not too much educated. The child also faced difficulty in the present class curriculum due to a lack of basic skills like recognition of letters and sounds produced from them and the complexity level of the course affects child performance.

The child had trouble reading words and learning long questions from the start of a new class. Poor reading skills and parents' attitudes worsened the issue. The mother wrote her homework, so the child couldn't complete

tasks in class. Now, the child has little interest in studies and struggles to comprehend lessons due to a lack of phoneme awareness.

ABA Method

A single case withdrawal design in which a second baseline phase is introduced. The baseline behavior (difficulty in reading) was assessed; the treatment was provided (phoneme awareness) and then withdrawn, and the baseline behavior was reassessed (Cho, 2018).

Pre-assessment

To assess the child's performance, different modalities were used - behavioral observation and a clinical interview with the teacher. The child showed a non-serious attitude towards studies, as demonstrated by low grades on tests and exams and failure to complete homework. The Subjective Ratings of the problem were taken and Cognitive Assessment Battery (CAB) subtests like the Vocabulary Test, and Digit Span Test were used.

Table 1

Subjective Pre-Rating of Complaints as Reported by the Child

Presenting Complaints	Operational Definitions	Ratings
Unable to learn long questions	Unable to understand long questions because of reading and writing difficulty	7
Lack of interest in the studies	Did not complete her classwork on time and just wrote two or three lines	9

Cognitive Assessment Battery (CAB). The CAB is based on different tests to identify the learning abilities and disabilities of a child of 7 years and older. This test was applied to the child to identify the learning difficulties of the child to understand the child's current cognitive status, strengths, and weaknesses (Naeem & Mehmood, 2011). In this battery, different tests were used with the child including Digit Span, and Vocabulary Test.

Digit Span. It was an attention test to assess how many numbers a person was able to retain. There was a forward and backward counting

assessment. Forward measures immediate memory and backward measures working memory. The child performed better in reading test of Urdu so there was need to assess that child had issue in memorized things.

Table 2

Client's Score on the Digit Span Test

Forward Digits Score	Backward Digits Score	Total Score
5	3	8

The child had difficulty concentrating during the forward digit span task and took 30 seconds to recall items. She could recall four-digit items but missed one word and changed the sequence in the first trial of a five-digit item. The child had poor attention and concentration, which may have caused her to forget things during classwork. In the backward digit span task, the child only recalled a simple four-digit item. She had difficulty reversing the order of numbers due to poor attention and concentration. The child reported that this activity was different and challenging for her due to poor basic learning skills.

Vocabulary Test. Assessing vocabulary is crucial for a child's language development, as it supports reading, writing, listening, and speaking skills. Knowing one's performance on vocabulary assessments can help identify knowledge gaps and set future learning goals. It was used to assess that there was a gap left due to the jump from class 2 to 4 in vocabulary (Naeem & Mehmood, 2011).

Table 3

Child's Scores on Vocabulary Test

Age	Obtained Scores	Actual Class	Class Equivalency
8-9	10	4	1

The student's vocabulary test score of 10 indicates poor performance relative to her grade level. Upon analyzing the results, it was observed that despite being in fourth grade, she performed at the level of a first-grader. The child faced difficulty in many items like she did not know about the word دن،غزا،مویشی،پختہ،ایسار. The child's inadequate vocabulary can be attributed to the fact that she had skipped second grade, consequently missing out on crucial language lessons.

Curriculum-Based Assessment. For the Curriculum based assessment child was asked to bring her bag with her so the school psychologist checked the copies and books. It seemed that the copies were bound and in a good state but the books were torn. The child wrote the class work very neatly but incomplete and most of the work was written by her mother to facilitate her in the study. The homework was mostly checked and copied from board and books. It included reading to assess the fluency and recognition of, letters, and words.

Reading Assessment (Urdu & English). For the English reading, the student selected the page of the book that she read in class also. The child read the paragraph of five lines in which she had difficulty pronouncing words like *during, early, preaching, torture, whenever, tolerated, and harassment*. The most of errors are related to omission, and phonemes, i.e. she was unable to blend letters and missed the sound of some letters in the word while blending which affected her fluency. Therefore, the child had poor recognition of letters and phonemes, appeared nervous, and tried many times but failed to recognize words and took many pauses during reading.

For Urdu same instructions were given to the child and she was unable to read a few words as کھڑ کی and متعلق. She read متعلق as مطا بق and کھڑ کی as کڑکی. The child's performance in Urdu reading was much better than her performance in English reading. It was noted that in English, the child did not have the basic knowledge of which letter produces which sound wrong.

Table 4

Child's Scores on Reading Assessment (Urdu & English)

Subjects	Total Words	Wrong Words	Correct Words
English	35	9	26
Urdu	40	10	30

Dictation. For written assessment dictation is used to assess the child's ability to recall the correct spelling of the word and recognition of letters and to test the child's visual perception as well as her punctuation, syntax, and sentence construction.

Table 5

Response of Child in Urdu Dictation

Correct Words	Respond by Child	Errors
چراغ	چڑاغ	Phoneme
ویرانہ	ورانا	Omission
نابینا	---------	---------
محمل	----------	----------
ماحول	ماھول	Phoneme
رائیگاں	رائےگا	Omission
ہامی بھر نا	ھامی بڑنا	Phoneme/omission
مصوری	----------	----------
راحت	راھت	Phoneme
عہد	----------	----------

Note. --------- showed that the child did not write these words.

The child struggled with a 15-word dictation exercise from a book she had read in class. She was unable to write 10 words correctly due to poor recognition of Urdu letters and their phonemes, and had difficulty blending the letters. She also lacked knowledge of how to write different forms of the letter "ح," and could only write three to four-letter words. The child made various errors, such as addition, omission, phonetic, replacement, and bizarre errors, which could have been due to difficulty in blending phonemes and imperfect hearing.

Table 6

Response of Child in English Dictation

Words	Response of Child	Errors
Travel	Travele	Addition
Scissors	Sezir	Phoneme
Double	Debal	Phoneme / Omission
Agree	Aggry	Phoneme/ Addition
Freedom	Freedem	Phoneme
Break	Brack	Omission/ Addition
Listen	Lisen	Omission

The child did not know about the same letter sounds which is why she wrote “z “instead of “ss” and “bal” instead of “ble”. The child had no information about the silent sounds of letters in the word.

Coping. For copying, a child was asked to write the same paragraph that she read. In Urdu copying, the child made many mistakes in punctuation like missing the commas and full stops at the end of sentences. The child did not write the proper words “زمین” and پہ. In English coping, the child performed well and just gave no space between some words. The child's visual perception was good but due to haphazardness or nervousness, he made mistakes in coping.

Phoneme Assessment. Phoneme assessment figures out which sound of the letters the youngster couldn't make so that management could be implemented (Houston, 2017). It comprised identification and letter writing from Aa –Zz and alif –ya. The results showed that the child did not make any errors in writing alphabets but in Urdu, the child wrote alphabets in sequence but forgot to write two alphabets like ژ and ہ. The child identified the Urdu alphabet but missed two letters because she had not explored the alphabet for a long period. Furthermore, the child did not have phoneme awareness of a few letters like s/z, e/y, etc.

The child's birth order (firstborn), temperament, and uneducated parents were the predisposing factors of the problem. A change of school, lack of supervision from parents, low motivation, and procrastination were the precipitating and maintaining factors. Passive attitudes like procrastination affect self-regulation and academic achievement. Deferring academic work leads to stress, poor academic performance, and anxiety (Abbasi & Alghamdi, 2015). Several studies have linked student movement to decreased school involvement, lower reading (especially math) grades, and a higher likelihood of dropping out of high school (Sparks, 2016).

The child lacked interest in studies, which led to a lack of motivation. The unfavorable learning environment at home worsened the situation. The child did not receive proper attention and support from her parents. As a result, she ended up procrastinating. Research has shown that procrastination is linked to a lack of self-motivation (Vij & Lomash, 2014). The familial issues contributing to the child’s problem were a lack of supervision from parents. Lack of parental supervision led to a lack of interest in the child which ultimately led to academic problems in the child.

In addition to the impact on a child's intelligence, there was a statistically significant link between parental involvement and academic success (Tan et al., 2019). The lack of parental monitoring hampered the child's ability to receive good educational training. There was a poor conducive learning environment in the classroom and at home for the youngster, which resulted in less learning. As a result, the child was unable to meet the demands of the class.

The maintaining factors were inappropriate teaching strategies, lack of need-based activities, lack of rehearsal or revision at home, low motivation level, and non-conducive home environment for learning. The teacher's attitude, awareness of the problem, and compliance behavior were all protective factors. A teacher's attitude affected a student's academic achievement and personality and the teacher's upbeat attitude aided the students' academic success (Patra et al., 2022).

Therapeutic Plan/ Treatment

Rapport Building. Rapport is a natural process that allows people to communicate more effortlessly (Gulati, 2022). It aided in getting to know individuals by sharing common interests with them to establish a rapport with the child, the school psychologist played different games with the child and asked the child to teach joining writing to her. The child was asked to talk about her likes and dislikes. She was provided with the color sheets to draw the things of her choice. As the rapport was established with the child, the child was more open.

Psychoeducation. It consists of educating and training family members of mentally ill persons as part of their overall clinical treatment plan for their loved ones (Kay et al., 2021). Psychoeducation was provided to the child to help her understand the nature and course of her problem. The child was also told that she was facing problems with a lack of interest in studies, and academic issues with the help of understanding the child's perspective (asking open-ended questions to encourage her to express herself), normalizing the lack of interest, identifying the root causes, explore interests, and provide positive reinforcement.

Phoneme Awareness. It is the ability to hear and control the sounds in spoken words and the knowledge that spoken words and syllables are made up of spoken sound sequences (Vazeux et al., 2020). It was used to overcome the child's problem of learning the spelling of English and Urdu.

Phoneme Identification. It is concerned with the recognition of the same sound in several words (Vazeux et al., 2020). It assisted the child in discovering notions of those words in human speech that are made up of distinct sounds and learning how to connect these sounds, allowing the child to properly decode and read. The school psychologist used the worksheet on phoneme identification in which the child identified the same sounds in different pictures like "at "in the bat, hat, and cat.

Isolation. Individual sounds in a word can be recognized. In three phonemes (consonant-vowel-consonant) syllables, isolate and enunciate the start, medial vowel, and final sounds (phonemes) (Ehri, 2022). The psychologist asked the child to replicate the sounds of the alphabet. The Phoneme Isolation Sort activity was done by collecting several pictures of 3 to 4 phoneme words. Create a three-column sheet and place a picture at the top of each column. Instructed the child to sort words by beginning, middle, or ending sounds and also directed her to place pictures in the column with the same beginning/middle/ending sounds. She was enjoying the activity and responded well.

Blending. Letter blends were defined as combinations of two or more consonant letters. To make specific sounds, letter blends emerge at the beginning or end of words (Ehri, 2022).

It started with the two letters blending into four letters done with the help of Echo Reading (reading a word aloud and then having her repeat) and segmented word cards (create cards that segment words into individual sounds). The child was able to blind two-letter words then the school psychologist went to the next level of three-letter blending in which the child did not blend three-letter words like the "ate" word.

Segmentation. Segmentation is the ability to break down words into their constituent speech sounds (phonemes). Segmentation is an important skill in learning to spell because the ability to break words down into their speech sounds aids pupils in encoding unfamiliar words, providing them an edge in learning to spell (Yang, 2014). The child was asked to split words into separate speech sounds and also numbers, the letters in the words. The child was unable to identify the spate sounds of word speech; she identified a single "e" in the spoken word. The child was unable to segment the sounds of many words like character, for example, decided, special, horrible, shopkeeper, and needle.

Alphabetic Principles. Alphabetic principles are the foundation of reading and writing. They involve using letters to represent sounds and form words to understand morphology and etymology, decoding, and encoding.

Syllable. A syllable is a unit of rhythm in a speech that is visible in English pronunciation and is made up of a vowel, a syllable consonant, or a vowel plus consonant combination (Alison, 2019). Syllables are vital for a child learning English because they influence how a child pronounces words and assist her in reading English. They also assisted the child in comprehending the concept of stress. The school psychologist taught how to identify syllables in the words with the help of a worksheet in which the child identifies the number of syllables. The child performed well on it, she easily identified one to three syllables in the words.

Rhyme. A rhyme is a word sequence (poem or verse) in which comparable sounds, especially end sounds of words, recur regularly (Kid Sense Child Development, 2013). The child was able to read aloud with greater excitement after learning about rhyming words. Rhymes also assist a youngster in making predictions about what will occur next. Rhyme Generation was employed by the school psychologist for rhyming. It is a teaching method that focuses on developing explicit phonemic awareness skills. On numerous levels, the child was isolating, combining, and manipulating sounds during this play and implemented primarily to enable the child to develop crucial phonemic awareness abilities such as onset and rime manipulation (Ehri & Roberts, 2006). The starting sound/letter, such as /c/ in arrived, was the onset. The stem of the word, such as "ame" in came, was the rime. The child was instructed by the school psychologist to make rhyme words with came, fan, and hen. The child composed a lot of rhymes, and the school psychologist requested her to recite them like poetry or song at the end. This was a fun activity for the child.

Inconsistencies in Sound and Spelling. It covered many areas of the English language like the same letter did not always represent the same sound, the same sound did not always represent the same letter, some letters were not uttered at all and there are plural and past tense morpheme variations which were utilized to improve the phonemic awareness of the children (Bauer & Nation, 2020). It was done to increase reading comprehension and improve spelling skills, and vocabulary expansion.

Same Letter Different Sounds. In English, the same letter may not always indicate the same sound (Bauer & Nation, 2020). For example

1. The letter c didn't have a sound that was similar to c.

   K was realized in cup, cat, cotton, etc

   S receives, accents, access, as in the cellar

2. The letter g was sounded as

   G in words like a guess, guy, got, guide, gross, and so on.

   J as in age, agenda, big, etc

3. The letters became

   S as in sat, sing, socks, and so on.

   Z as in busy, cousin, simple, and so on.

Silent Letters. Many English words contain silent letters, which are not supposed to be pronounced even though they are printed (Bauer & Nation, 2020). It's possible that writing words as one hears them spoken will result in incorrect spellings. They are as follows:

- Silent B as in limb, thumb, comb
- Silent C as in muscle, scene, science,
- Silent D as in width, handsome, handkerchief, Wednesday.
- Silent G as in gnash, gnaw, gnat, gnome, sign, hang, tongue, reign, thing,
- Silent H as in an hour, honest, honor, heir, exhaust, exhibit, vehicle, shepherd
- Silent K as in know, knock, knee, knife, knowledge,
- Silent L as in could, would, should, calf, chalk, palm, walk, half will be used.

Motivation Building. Motivation building was done with the child to develop her interest in the study as the child reported a lack of study. Motivation is one of the key determinants of academic performance (Liu et

al., 2022). Recognize the child's achievement to build her motivation to study by appreciating her little achievements. The child was being instructed to celebrate her little achievement by reinforcing herself with an extra hour to play etc. at her achievement. The child got a perfect score of 10/10 on her quiz and received sticky notes as a reward from the school psychologist. This recognition motivated her to achieve more in her academics (Sumiati et al., 2019).

SMART Goals (Morrison, 2022). To build the child's motivation towards study child was asked to set specific, measurable, achievable, relevant, and timely goals. The child was instructed to set the goals that are specific to her study. The goal should be measurable and achievable i.e. not beyond her stamina. The child was being asked to give 30 minutes to each subject without any distraction which was given by the teacher. The goal should be relevant and timely. The child was asked to set a time limit in which she was required to achieve the goals. Weekly goals were set for this purpose. The child reported that she wanted to become a doctor in the future.

Pre and Post-Subjective Ratings

Subjective ratings that were taken during the initial assessment were compared with the post ratings that were taken at the end of sessions before termination.

Table 7

The Child Pre and Post Rating on Goals Achieved by Child

Goals	Pre-Rating	Post Rating
Recognition of alphabets of English and Urdu	The child was able to recognize all letters in English. In Urdu child, missed some letters.	He was able to write and identify which letters she missed.
Teach blending of letters	The child was able to blend two to four-letter words but faced difficulty in some words like ate.	The child was able to blend three and four-letter words correctly.
Teach segmentation	The child was able to break the word into letter sounds but faced	The child was now able to segment words into separate sounds which enabled her to analyze

Goals	Pre-Rating	Post Rating
	difficulty in some words like speech, example, etc.	unfamiliar words and determine their pronunciation and meaning.
Lack of interest in studies	The child did not complete her classwork on time and missed lessons. Have very low motivation.	The importance of time was told to the child so that she could fulfill her goals. She's intrinsically motivated, finding joy in learning rather than rewards, establishing goals for herself, and strive with dedication towards accomplishing them like as a doctor"

Table 8

*Pre and Post Management Ratings of the Client (*1= least, 10= most)

Presenting Complaints	Pre-Ratings	Post Ratings
Unable to learn long question (difficulty in reading and writing)	7	4
Lack of interest in studies	9	7

Discussion

The child has come with reading problems in Urdu and English, she was assessed with different modalities like behavioral observation, clinical interview, subjective rating of the problems, subtests of CAB, curriculum-based assessment and Phoneme assessment which relate to the child had difficulty in reading and unable to blend the letters. The case formulation was based on predisposing, precipitating, maintaining, and protective factors. These factors led to understanding the complaints and their intervention plan. For management, phoneme awareness was taught which includes identification, blending, and segmentation. The child was terminated after eleven numbers of sessions.

There was a predominant and noticeable change in the child's reading skills by employing phoneme awareness that helps a child to understand the relationships between letters and sounds, making it easier for them to

decode and recognize words. Her academic problems were lessened e.g. she was able to manage her time and use the strategies for effective reading which helped her to comprehend the Science subject. She was satisfied with the therapeutic relationship and its outcomes. At the end post, subjective ratings were taken from the child. All the goals were revised in the termination session. There were several limitations, which caused hindrances in the management of the child's problem like the unavailability of the teacher and parents for the Clinical Interview which can create hindrances in the process of identifying the cause of the problem of the child's poor academic problem. It was also recommended to psycho-educate the parents regarding the child's studies so that parents had checks and balances on the child's studies.

Conclusion

The Current study on interventions using the ABA research method to enhance phonemic awareness highlights its significant impact on promoting essential pre-reading skills. Using structured and systematic techniques, ABA is a valuable tool in fostering phonemic awareness, which is critical for successful literacy development. The positive outcomes observed in increased reading proficiency, spelling abilities, vocabulary enhancement, and overall language development demonstrate the effectiveness of ABA strategies in addressing phonemic awareness deficits. Integrating ABA principles into phonemic awareness instruction can aid in developing strong communication and literacy skills. This aligns to equip learners with essential tools for successful language acquisition.

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