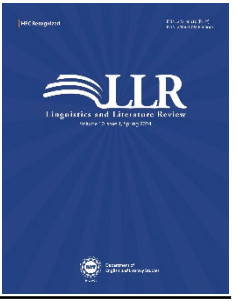
Linguistics and Literature Review (LLR)
Volume 10 Issue 1, Spring 2024
ISSN$_{(P)}$: 2221-6510 ISSN$_{(E)}$: 2409-109X
Homepage: http://journals.umt.edu.pk/llr/Home.aspx

Article QR



Title:	**Effectiveness of Technology-Enhanced Language Learning Tools for Phonics Instruction: Implications for Very Young Learners**
Author (s):	Sadia Malik[1], Muhammad Imdadullah[2], and Munaza Javed[3]
Affiliation (s):	[1]Bahauddin Zakariya University, Multan, Pakistan [2]Ghazi University, Dera Ghazi Khan, Pakistan [3]The Women University, Multan, Pakistan
DOI:	https://doi.org/10.32350/llr.101/01
History:	Received: March 20, 2023, Revised: September 11, 2023, Accepted: October 03, 2023, Published: March 31, 2024
Citation:	Malik, S., Imdadullah, M., & Javed, M. (2024). Effectiveness of technology-enhanced language learning tools for phonics instruction: Implications for very young learners. *Linguistics and Literature Review*, *10*(1), 01–24. https://doi.org/10.32350/llr.101/01
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Conflict of Interest:	Author(s) declared no conflict of interest

A publication of
Department of English and Literary Studies, School of Liberal Arts,
University of Management and Technology, Lahore, Pakistan

Effectiveness of Technology-Enhanced Language Learning Tools for Phonics Instruction: Implications for Very Young Learners

Sadia Malik[1]*, Muhammad Imdadullah[2], and Munaza Javed[3]

[1]Department of English, Bahauddin Zakariya University, Multan, Pakistan
[2]Department of Statistics, Ghazi University, Dera Ghazi Khan, Pakistan
[3]Department of English, The Women University, Multan, Pakistan

Abstract

Phonics, as a teaching method, helps the learners to establish a connection between graphemes and phonemes. Moreover, it also improves their reading and pronunciation skills alongside spelling and vocabulary. In this context, the current study attempts to investigate the effectiveness of using technology-enhanced language learning (TELL) tools as a supplementary resource to teach systematic synthetic phonics to a government school's KG- Grade 1 learners. For this purpose, 60 Grade KG-1 primary-level learners were selected through one group pretest-posttest design. After conducting the pretest, learners were taught phonics skills, that is A-Z letter-sound correspondence, blending, and segmenting of CVC words through digital tools for 27 weeks. Afterwards, a posttest was administered. The statistical analysis of pretest and posttest revealed a significant improvement in learning all three aspects of phonics instruction as the dependent paired sample t-test affirmed rather significant results, that is, $p = 0.000$ for all three categories. Furthermore, the analysis of gender, age, and interest variables exhibited the TELL intervention's positive impact on all the participants. Hence, TELL tools are proposed as supplementary materials for phonics instruction in government schools of Pakistan at the primary level to help the learners and teachers.

Keywords*:* government school learners, phonics teaching, systematic synthetic phonics, technology-enhanced language learning (TELL), young learners

Introduction

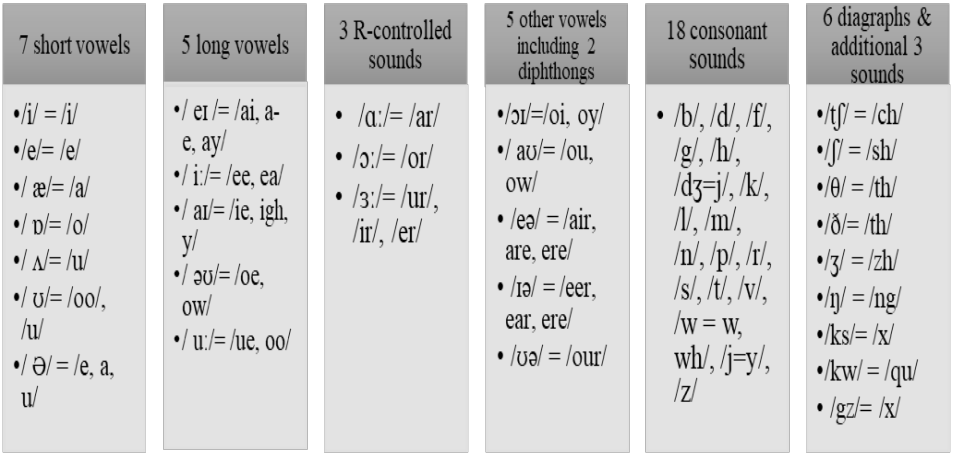
Phonics is the relationship between 26 letters of the English alphabet (graphemes). They represent approximately 44 speech sounds (phonemes) (Oxford Owl, 2016). Two additional sounds of letters, that is, 'x as /ks/' and

*Corresponding Author: sadiamalik@bzu.edu.pk

'qu as /kw/' and the realization of /w/ as 1 consonant sound and as a digraph 'wh' are also added to the list of the alphabet sounds from phonics perspective. In phonics, the distribution of letters into sounds is slightly different from the regular phonemic distribution of English sounds due to the order in which young learners are introduced to language in print. These 47 grapheme-phoneme representations have been elaborated in Figure 1, where each phonemic realization equals to its basic graphemic counterpart, however, not necessarily limited to these only.

Figure 1

Representation of 44 Grapheme-Phoneme Representations and 3 Additional Sounds



Grapheme-phoneme correspondences (GPCs) are represented by approximately 250 different spellings (Moats, 2020). These spelling combinations are indicated through simple to complex written alphabetic codes. Audio charts (Oxford Owl, 2016) are also available as the most convenient sources for teachers and learners to consult. All these sounds can be taught through four basic approaches of phonics teaching, that is, Analytic phonics, Embedded phonics, Systematic Synthetic phonics (SSP), and Analogy phonics. SSP is the most recommended approach (Get Reading Right, 2014; Henbest & Apel, 2017). Buckingham (2018) explains that with SSP, teachers build up phonics knowledge from the smallest sub-word units, that is, phonemes and graphemes. Phonemes and graphemes are taught in a carefully planned sequence. Phonics Hero (2020) further elaborates that instruction is explicit which means that children are first directly taught the letters and sounds which are then embedded in the

context of meaningful words and sentences. SSP does not start with the analysis of larger sub-word units, such as onset and rime in familiar words (for instance, in the word 'bike', /b/ is the onset and /ike/ is the rime). SSP instruction does not restrict children from learning about the letters, sounds, and spellings that they are taught in their phonics sequence. Similarly, incidental learning also follows the same approach when learners pick up information or skills incidentally while engaging in other activities. In this context of SSP, Phonics instruction with the phonics sequence is complemented by the words that children see in environmental print and books. The reason for a sequence is to ensure that students' phonics knowledge is secure and there are no gaps.

SSP can also accommodate students with different levels of reading ability by differentiating at the point of practice and independent work. For instance, in whole-class of SSP, all the children would progress through the phonics sequence, however, the tasks they are given to consolidate their learning may differ in complexity (Five from Five, 2018). Synthetic phonics is the compulsory mode of phonics teaching in England, Australia, Germany, and Austria (Machin et al., 2018).

Several investigations report why systematic synthetic phonics is essential to be taught at the primary level, establishing its relationship with reading skills (National Reading Panel, 2000; Rose, 2006). Similarly, Castles et al. (2018) put forward the notion of the science of learning to read, spanning from children's earliest alphabetic skills to the fluent word identification and skilled text comprehension characteristics of expert readers. They argue that systematic phonics instruction is not only central to reading instruction, however, it also has a neural basis. Four theories of reading, that is, the Four-Part Processing model for word identification (Moats & Tolman, 2019), Scarborough's Reading Rope (Scarborough, 2001), Ehri's Four Phases of Word Reading (Ehri, 1996; 2014), and the simple view of reading consider phonics as a foundational skill to develop reading abilities among young learners. Phonics approaches have been consistently found to be effective in supporting younger readers to master the basics of reading. A school that does not have a phonics program is doing its students a huge disservice (Pimentel, 2018).

In the Pakistani pedagogical landscape, one of the changes in the Punjab government school curriculum was the inclusion of phonics content in primary-grade English textbooks for the first time in 2016. Since then,

phonics and phonemic content is the part of the curriculum and has been stated as a part of reading, listening, and speaking skills in the official curriculum development documents. Recently, in 2020-2021, Single National Curriculum (National Curriculum Council, 2020), its competencies (C), benchmarks (BM), and Student Learning Outcomes (SLOs) were implemented in three provinces, namely Punjab, KPK, and Balochistan for all the government and private sector schools. However, this phonemic and phonic content has already been a part of elite/highly paid private schools as oral communication skills, pronunciation, and reading which are rather focused in private school setups. Hence, a stark difference can be seen in most elite-class schools' learners' basic proficiencies. However, it was usually ignored in low-cost private schools. Therefore, the alphabetic method was followed to teach the English language in government and low-cost private schools. Now, at least in documented form, it is a part of primary grade teaching, as mentioned in Figure 2.

Figure 2

Representation of Phonics Component in Single National Curriculum (SNC) (2020)

C1: Oral Communication Skills (Listening and Speaking)

Standard – 1	Students understand and articulate widely acceptable pronunciation, stress and intonation patterns of the English language for improved communication. (C1,S1)	
BM 1	Grade I - II	Grade III - V
	Recognize and **articulate** the basic sounds and sound patterns of English language at word and sentence level.	**Recognize** and **articulate** sound patterns and stress in words, and basic intonation patterns in statements and questions as they occur in classroom texts.

C2: Reading and Critical Thinking Skills

Standard – 1	Students discover, understand and engage with a variety of text types through tasks which require multiple reading and thinking strategies for comprehension, fluency and enjoyment (C2, S1).	
BM 1	Grade I - II	Grade III - V
	Use reading readiness strategies and **recognize** words and sentences as meaningful units of expression. **Identify** and **articulate** digraphs. **Recognize** paragraphs as graphical units of expression.	**Identify** and **articulate** digraphs, tri-graphs, silent letters and inflections in words. **Comprehend** words, sentences and paragraphs as meaningful units of expression.

The progression matrix of these Benchmarks (BM) of the abovementioned two competencies (C1 & C2) has been realized in SLOs in SNC (2020) from Grade 1-V. The detail of each topic of primary level pronunciation, that is, phonemic awareness and phonics to be taught grade-wise, is synthesized and given in the textbooks. Although it was an excellent initiative taken in the last six years of Pakistani educational history, it is observed that no audio-visual or technology-enhanced language learning (TELL) tools accompany phonics pedagogy at the primary level in government schools. Apart from the textbooks, complete reliance is on the teacher as a source of listening sounds who being non-native instructors, may also not be proficient in pronunciation and phonics teaching or not adequately trained to have mastery of this letter-sound correspondence (Habib et al., 2018; Naseem et al., 2015; Syed et al., 2019). In this background, the impact of TELL tools to teach phonics as a supplementary resource for teachers and learners needs to be investigated.

Research Questions

The current study investigates the following questions keeping in mind the significance of SSP, its implementation in the government school system in the recent past, and the importance of technology-based instruction in modern times:

1. What is the effectiveness of using TELL tools/materials for Grade KG-1 learners of Pakistani government schools to improve their competencies in phonics as compared to traditional teacher-led instruction?
2. What role do learner differences as variables, that is, gender, age, family background, and interest-based motivation play in learning English segmental features using TELL tools to teach phonics to KG-Grade 1 learners?
3. What are the difficulties faced by Grade KG-1 learners in learning sound-letter relationships?

Literature Review

Many studies have been conducted recently in non-native contexts, such as Nemattabrizi and Karimzadeh (2016), Rahmah and Pandjaitan (2017), Alonge et al. (2017), Ren and Ma (2018), Mifsud and Agius (2018), Widyanaa et al. (2020), and Pinkett (2020) to determine the impact of

phonics intervention in order to improve reading skills, pronunciation skills, word blending skills, decoding skills, and literacy outcomes at primary level.

Despite the wake of modern times and the backdrop of COVID-19 pandemic, computer programs and digital technologies' usage, that is, projectors, Internet, mobile applications, and YouTube channels, the software is not quite widespread for phonics' pedagogy in government school language classrooms in Pakistan. Whereas, in the last two decades, various research projects have been conducted to determine the efficiency of technology-based pronunciation and phonics teaching and assessment around the globe (Mehrpour, et al., 2016; Pennington & Rogerson-Revell, 2018; Zechner & Evanini, 2019). This situation gives rise to the need to propose supplementary material not only for learners, but, for parents and teachers as well who they may consult anytime and integrate with the textbooks. The supplementary material must be creative, interactive, aligned with modern pedagogy, and based on the principles of communicative language teaching. Schools, institutes, and education departments should exploit these projects to integrate them into phonics instruction (Ellington et al., 1993; Oxford & Lin, 2011). In this regard, TELL tools have been proposed for school learners and teachers to solve the above-mentioned problems. Through these tools, learners can not only be provided with uniform ear training for the sound system of the target language, but, they may also self-assess themselves by recording, listening, and identifying their errors, making phonics learning and teaching a more realistic, rewarding, and fun experience (Chun, 2021; Saed et al., 2021; Zielinski & Yates, 2014). The assessments can be recorded regularly in a database through TELL tools to monitor their progress and identify weak areas. Based on this, students' screening checks can be carried out for each grade (Houston, 2021; Otterstedt, 2016)

Research Methodology

To probe into the above-mentioned research questions, 60 primary grade learners, that is, 25 boys and 35 KG girls (Age range: 3-7 years) were chosen from a local government school in district Multan, Punjab through convenient sampling in the middle of the academic year as participants for one group pretest-posttest design. Moreover, written permission was sought from the participants' parents to meet the ethical considerations before the pre-test and the intervention.

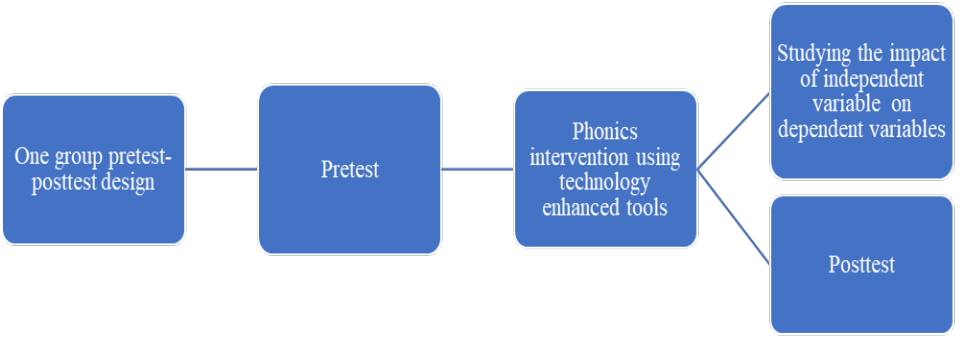
Research Framework/Conceptual Framework

A conceptual framework helps to facilitate the understanding of the relationship between concepts or variables pertaining to the real world. In accordance with the pragmatic research paradigm, a mixed-method study initially adopted an experimental approach rooted in action research for quantitative analysis. This was supplemented by qualitative analysis through participant observation.

Hence, a one-group pretest-posttest research design was chosen as a research framework. The relationship between the independent variable, that is, the impact of TELL tools on the performance of primary grade learners and dependent/predictor variables, that is, age, gender, and interest was explored.

Figure 3

Research Framework



The research tools for the analysis included quantitative methods of pre and post-tests to explore the gender variable and qualitative tools of participant observations (Creswell, 2013) for the analysis of age-based characteristics and motivation.

Procedure Based on Research Framework

Firstly, a pretest was conducted when learners were in KG. They were taught three basic phonics concepts through digital tools for 27 weeks and posttest was administered in the middle of the following academic year, that is Grade 1. The intervention was intentionally planned in the middle of the academic session because, by that time, students are usually well settled in

the classes and are expected to cover more than half of the syllabus. It would have been easier to administer a pretest based on concepts they are expected to have learned during their academic year and then compare it to their post-test results. The three basic concepts relevant for KG and Grade 1 a) A-Z consonant letter-sound correspondence (items=21), b) short vowels (items= 05), and c) blending and segmenting of CVC words (items= 14) according to grade-wise progression in phonics skill for primary learners (Oxford University Press, 2016; Phonics International, 2008) were included in a 40 marks test that was validated through content validity and inter-rater reliability. Each participant was individually called and asked to utter the sounds of letters/words at least three times to determine whether they had a clear and consistent concept of letter-sound correspondence. The responses of each participant were marked as correct or incorrect on the answer sheet for scoring, descriptive statistical analysis, and paired sample t-test. TELL intervention, used for teaching phonics, exploited the following websites and YouTube channels with hundreds and thousands of subscribers as digital resources, that is, Oxford Phonics World, Alphablocks, English4abc, EnglishAnyone, Epic Phonics, Jack Hartman Kids Music channel, Learning Blocks, and Patty Shukla Kids Tv. A-Z letters were taught with 1-14 weeks of intervention (two letters per week with regular revision), weeks 14-19 focused on digraphs, and weeks 20-27 were allotted for blending and segmenting of 3-4 letter words. During the first 10 minutes of the lesson, learners revised the already learned concepts through flashcards of letters. The participants watched the videos of letter-sound association, chanted these rhymes, and imitated the animated characters for 20 minutes each day. In the last 10 minutes, previous concepts and newly learned grapheme-phoneme associations were consolidated through verbal games and quizzes. It made each learner participate, interact, and engage in uttering the sounds representing letters with the correct movement of articulators. After the intervention, a post-test was conducted and results were compared through a paired-sample t-test. Different dependent variables, such as age, gender, and motivation were also analyzed to explain the impact of independent variables, that is, TELL tools on the learning of very young learners.

For the analysis of gender as a variable, a paired sample t-test was conducted. For the analysis of motivation/interest, the researchers used chronicles of observations (for instance, continuous or ongoing records, such as written/field notes or questioning) and descriptive analysis of facial expressions and engagement proposed by Renninger and Hidi (2016). These

observations and written/field notes also helped the researchers to identify the difficulties faced by participants during the intervention and potential practice areas were highlighted consequently. Moreover, a simple three-scale inventory of 'smilegram' (Dorneyei & Taguchi, 2009) was added with a posttest to compare their interest in technology-based pedagogy. In smilegram, happy, neutral, and sad emoji faces were given and participants were asked to tick one of these as their response to TELL-based instruction of phonics.

Age, as a variable, was studied in terms of age-based characteristics of very young learners (Er, 2014; Pinter, 2011) because intervention lasted for almost 6 months during which they would not have grown enough to realize any significant statistical difference for the comparison. Hence, based on participants' observations, age-based characteristics of these very young learners were noted as their response to the intervention. At this age, learners' attention/memory span, the need for revision and repetition, the impact of a break on their memory, and the response to the audio-visual mode of teaching were studied.

Theoretical Framework for Interest as a Variable

After measuring the learning gains resulting from the intervention, interest as a variable was also discussed. Hidi and Renninger (2006) explained four phases of interest development, such as (a) a triggered situational interest, (b) a maintained situational interest, (c) an emerging individual interest, and (d) a well-developed individual interest. Affective and cognitive features were indicated alongside educational inferences of the suggested model.

In the earliest phases, the environment (others, tasks, etc.) triggers and maintains interest; in the subsequent stages, self-regulation governs the interest. After the development of interest, engagement is initiated from the participants when they generate and find responses to inquisitive questions about the content (Renninger, 2000). An important aspect of interest is that it is not entirely extrinsically or intrinsically motivated, instead, interest reflects how participants view the tasks, what is the requirement of the environment, and how the participants handle it.

Findings and Discussion

The descriptive statistics of pretest and posttest results revealed notable difference between the two datasets, as can be seen in Table 1.

Table 1

A Comparison of Descriptive Statistics Analysis of Phonics Variables in Pretest and Posttest of Grade KG-1 Learners

Test	Variable	*N*	Min	Max	Mean	*SD*	Std. Error
Pre Test	Consonants	60	0	4	0.59	1.019	0.133
	Vowels	60	0	2	0.10	0.354	0.046
	CVC blending	60	0	0	0.00	0.000	0.000
	Pretest Marks	60	0	5	0.68	1.172	0.151
Post Test	Consonants	60	7	21	14.92	3.007	0.392
	Vowels	60	2	5	3.65	1.005	0.130
	CVC blending	60	6	13	9.58	1.670	0.216
	Posttest Marks	60	15	37	28.08	4.167	0.538

For the total participants (*N*=60), the minimum-maximum marks in consonants were 0-4 out of 21 (*M*=0.59, *SD*=1.019), 0-2 out of 5 for vowels (*M*=0.10, *SD*=0.354), 0-0 out of 14 for CVC blending (*M*=0.00, *SD*=0.000), and 0-5 out of total 40 marks in pretest (*M*=0.68, *SD*=1.172). Whereas, in the posttest, the minimum-maximum scores increased in consonants to 7-21 out of 21, 2-5 out of 5 for vowels, 6 -13 out of 14 for CVC blending, and 1-37out of 40 for total obtained marks of posttest, respectively.

Table 2

Paired Sample t-test Between Pre-test and Post-test of Grade KG-1 Participants

Test	Mean Difference	*SD*	*SE*	*df*	*t*	95% *CI*	*p*-value
Consonants	-14.322	2.776	.361	58	-39.632	[-15.04, -13.60]	0.00
Vowels	-3.550	0.999	.129	59	27.533	[-3.81, -3.29]	0.00
CVC Blending	-9.583	1.67	0.216	59	-44.445	[--10.02, -9.15]	0.00
Obtained marks	-27.400	3.863	.499	59	-54.943	[-28.40, -26.40]	0.00

A dependent sample t-test (paired sample t-test) is used to compare the pre-and post-test performances of Grade KG-1 class students. Results indicate that the intervention improved students' performance for consonants, vowels, CVC blending, and obtained marks. It can be seen that in all of the cases, the results are statistically significant as the p-value is smaller than 0.05 (level of significance).

Figure 4

A Comparative Representation of Pre-Test and Post-Test of Grade KG-1 Participants

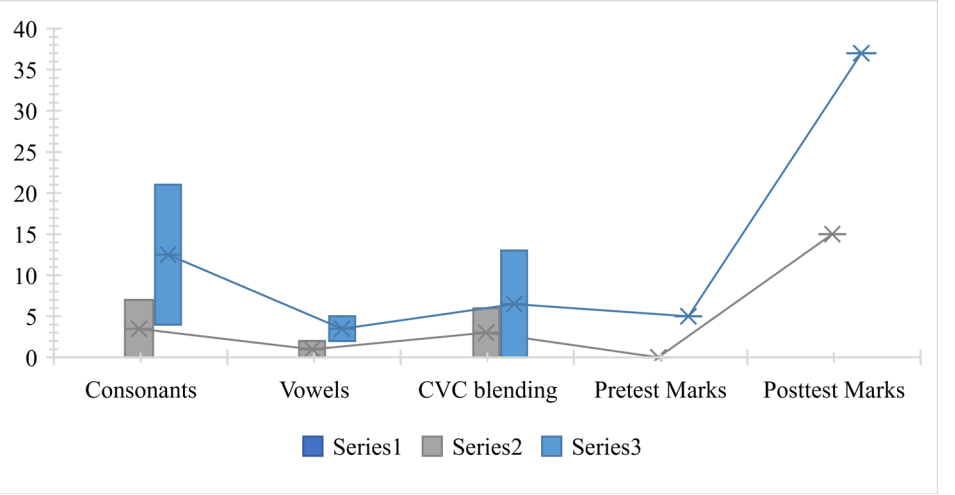


Figure 4 shows the comparison of two datasets in all three basic phonics concepts and total obtained marks in the pretest and posttest. Significant improvement can be seen in learners' performances, as there is a high spike in consonants, vowels, CVC blending skills, and total obtained posttest marks. The positive impact of this TELL-based intervention aligned with the findings of Ayala and O'Connor (2013) who reported the usefulness of video modeling for phonics instruction. This is because according to Lin et al. (2016) and Chen (2018), these technologies increase the attention and learning to enhance the pedagogic process. Similarly, Patel et al. (2022) also stressed the positive impact of using digital gaming for phonics instruction for Grade 1 and 2 learners. Additionally, Ritchey and Goeke (2006) and Warnick and Caldarella (2015) supported the integration of multisensory elements with reading instruction, especially to develop a connection between visual and auditory images of letter sounds and blending sounds to form words.

Gender-wise Comparison of Grade KG-1 Learners

Gender as a variable highlighted how male and female participants responded to the intervention showing better performance. Hence, the performance of male and female participants was compared through an independent sample t-test before and after the intervention.

Table 3

Independent Sample t-test: Gender-wise Comparison for Pretest

Test	Gender	*N*	Mean	*SD*	*df*	*t*	95% CI
Consonants	Male	25	0.000	0.000	58	-4.288*	[-1.467, -0.533]
	Female	35	1.000	1.163			
Vowels	Male	25	0.000	0.000	58	-1.888	[-0.353, 0.010]
	Female	35	0.170	0.453			
CVC Blending	Male	25	0.000	0.000	Cannot computed		
	Female	35	0.000	0.000			
Obtained marks	Male	25	0.000	0.000	58	-4.363*	[-1.709, -0.634]
	Female	35	1.170	1.339			

Note. *$p<0.05$.

When male and female students' performance was compared before the intervention, the results indicated that males (*M*=0.00, *SD*=0.00) and females (*M*=1.00, *SD*=1.16) obtained statistically significant marks for 'consonants.' However, a non-significant difference was found for vowels and CVC blending. Based on statistically significant differences in consonants, obtained marks also revealed significant difference between the groups, that is, males (*M*=0.00, *SD*=0.00) and females (*M*=1.17, *SD*=1.33).

Table 4

Independent Sample t-test: Gender-wise Comparison for Post-test

Test	Test	*N*	Mean	*SD*	*df*	*t*	95% CI
Consonants	Male	25	12.800	2.363	58	-5.390*	[-4.819, -2.209]
	Female	35	16.310	2.576			
Vowels	Male	25	3.360	0.907	58	-1.931*	[-1.012, 0.018]
	Female	35	3.860	1.033			
CVC Blending	Male	25	9.800	1.581	58	0.847	[-0.506, 1.249]
	Female	35	9.430	1.737			
Obtained marks	Male	25	25.960	3.506	58	-3.672*	[-5.625, -1.655]
	Female	35	29.600	3.972			

Note. *$p<0.05$.

An independent sample t-test was conducted to compare male and female students' performance after the intervention. The results indicated that males (*M*=12.8, *SD*=0.577) and females (*M*=16.3, *SD*=0.631) obtained statistically significant different marks for 'consonants'. Similarly, male participants (*M*=3.3, *SD*= 0.9) and female (*M*=3.8, *SD*= 1.0) participants

achieved statistically significant different marks for 'vowels' as well. Based on statistically significant differences in consonants and vowels, obtained marks also indicated significant difference between both groups. No significant difference was found in the marks of CVC blending. It can be seen that females performed better than males on average. However, there was more variation in the performance of females as compared to males. Hence, female participants were more positively impacted by the intervention.

Age

In phonics teaching, age is considered as an important variable as Lenneberg (1967) and Newton and Nation (2009) consider the critical period hypothesis significant for L2 learning. Very young learners of age 3-7 are highly motivated and actively indulge in activities which are of their interest, since their age-based characteristics affect their academic performance and interests. Learners tend to learn quickly since they have a short concentration span, however, forget easily (Er, 2014; Pinter, 2011), the same was genuinely determined for KG-Grade participants in the current research. Although learners were highly motivated and showed consistent engagement during the intervention, they initially needed a lot of repetition and revision to understand the concepts. As the learners grew older through the intervention period, their understanding of concepts improved even after the break of exams and winter vacation. Many of them retained the phonics concepts in their memory for a more extended period and required lesser revision in the last quarter of the intervention. In this respect, this study corresponded to the investigations of Birdsong (1999), Singleton (2001), and Scovel (2000), who challenged the notion of CPH for younger and older learners. One of the possible explanations for increasing the knowledge of phonics concepts with growing age can be the cognitive maturity of learners to understand the rationale behind sound-letter association due to increased reading practice of English.

Motivation

The development of interest as an intrinsic motivational variable assists the learners to engage in any activity more frequently and voluntarily, as mentioned by Krapp, Hidi and Renninger (1992) and Hidi and Renninger (2006). Four phases of interest development include a triggered situational interest, a maintained situational interest, an emerging individual interest,

and a well-developed individual interest (Renninger & Hidi, 2006). In the current study, a triggered situational interest was developed by providing learners with the experience of technology-enhanced teaching which used audio-visual mode through a projector in terms of animations, music, and rhymes to teach phonics concepts, as shown in Figure 5 below.

Figure 5

Two Screenshots from Alphablocks and PattyShukla Kids TV

In the second phase, focused attention and persistence over some time for specific relevant and meaningful content/tasks has been shown on the part of learners that a learning conducive environment may externally support. Once the intervention started, this triggered interest converted into maintained situational interest, as learners were rather regular and did not want to miss the opportunity to engage in computer-based activity. Their attendance record showed none or only a few absentees daily throughout the intervention period reported by the class teachers. The participants asked their class teachers, "When computer teacher would come" and waited anxiously for the session, moreover, they were fascinated by digital tools and tried to sit near the computer. They often requested to prolong the session, shouted every time due to excitement when the researcher entered the class, and chanted the phonics songs/rhymes. Even the naughtiest students behaved well and the large class size was easily manageable.

All these attitudes pointed towards a consistently maintained interest in the intervention. Emerging individual interest showed enduring traces of positive attitudes to reengage in a task voluntarily, attaching value to it over time. A few parents who visited the classroom gave positive feedback regarding the emerging individual interest of learners in digital tools in their homes as well. This emerging interest converts into well-developed individual interest when learners no longer depend on external factors to sustain the interest and autonomously engage in the activity. As the participants were very young learners, the first two phases of interest could be identified, paving the way for the third and fourth phases that could have been measured in this study and had been longitudinal.

All the learners unanimously agreed that they enjoyed studying phonics through computers irrespective of gender differences and reflected that they did not enjoy studying phonics through textbooks. In this regard, this study extended the findings of Howorth et al. (2019) and Ok et al. (2020) as they endorsed boosting motivation, attention, and involvement while using interactive apps for teaching phonics and reading to young learners.

Difficulties Faced by Grade KG-1 Learners in Learning Sound-Letter Relationship

Apart from statistical data analysis, it is necessary to report the difficulties that the learners encountered while studying the phonics concepts. For this, participants were monitored regularly and provided extensive practice to overcome the hindrances. The results of pretest showed that both male and female learners did not have any idea about the sound-letter relationship. Once they were introduced to the concepts of letter names and letter sounds, they started identifying the sound of letters and tried to match the sound of each letter with its respective name. Some consonant sounds were easy to identify, learn, and practice, for instance, B says /b/, D says /d/, K says /k/, P says /p/, T says /t/, and Z says /z/. The most difficult consonant letters to be learned and practice their sounds belonged to different types. These include a) sounds having distinct/dissimilar letter-sound relationships, for instance, they made the following errors repeatedly C says /s instead of k/, G says /ʤ instead of g/, Q says /k instead of kwa/, X says/s instead of ks/, and Y says /w instead of j/. b) difficulty in different places and manner of articulation, for instance, F says /fe/ more like Urdu alphabet ف instead of making contact between upper teeth and lower lip and then pushing air through this partial blockage;

M says /me/ producing it more like oral sound instead of nasal one; N /ne/ produced like oral sound. c) producing distinct sounds similarly, for instance, V and W were pronounced alike /we/; and d) adding a vowel /e/ with almost each letter sound, such as /be/, .de/, /le/, /se/, /me/, and /pe/.

In terms of five vowels, the most difficult ones were O and U. Most pf the learners always produced U says /j instead of ʌ/; O was always produced /o/ with close-rounded lips instead of open-rounded lips. A, E, and I letters were initially tricky, however, when they were taught that these three vowels differed in length and spreading of lips, most participants mastered these sounds quite well. The participants who faced difficulties producing the abovementioned letters tried to apply the same letter sound combination while blending the CVC letters to form words.

They were asked to focus on the lips, teeth, and sound produced by the phonics singer/animated character while watching the video to help them understand their errors. Afterwards, the teacher-researcher used to produce the same sound and they were supposed to imitate and chant along. The problematic letters were written on the whiteboard/shown through flashcards in the last five minutes of the session daily. Moreover, participants were either randomly picked to produce their sounds or they nominated themselves to produce the sounds. Active participants and those who produced correct sounds were given candies to motivate them and others to engage in letter-sound recognition activity voluntarily. All the learners had developed a good command of all the letter-sound correspondence by the end of the intervention. Moreover, they were trained to read the whole word alphabetically earlier. This approach and practice of learning the whole word impacted their learning progress of phonics blending skills, making it slower. As the learners were learning English simultaneously in the traditional style of whole language/word, they were applying the same knowledge to learn phonics skills.

A comparison of two datasets in all three basic phonics concepts, and obtained marks in the pretest and posttest, revealed a significant improvement in learners' performance as there was a high spike in consonants, vowels, blending of CVC words, and total obtained marks in the posttest. These findings testify to a positive impact of the independent variable, that is, using digital tools to teach phonics. Hence, the current study corroborated the findings of Rahmah and Pandjaitan (2017), Mifsud and Agius (2018), Widyanaa et al. (2020), and Pinkett (2020), who

established the positive impact of phonics teaching in production and identification of letter-sound relationship and blending skills among preschoolers, kindergarten, and 1st Grade learners. Additionally, the variables of gender, age, and interest-based intrinsic motivation established a uniform tendency of being positively impacted by digital tools for phonics instruction among all the participants. As it is grounded in the cognitions of very young learners (Peng & Goodrich, 2020), it also strengthens the motivating atmosphere and harmonious relationship with the teacher (Putra, 2015), resulting in the improved proficiency of learners in phonics skills.

Conclusion

To conclude, it can be inferred that TELL materials play a positive role in learning phonics concepts at the primary level. This is because the presentation of content is not just through monotonous drilling of sounds or print letters through the textbook and oral input from the teachers. Instead, it becomes an interactive and appealing process to promote visual and auditory learning styles (Imaniah & Nargis, 2017). Therefore, the utilization of TELL materials is highly recommended in government schools' pedagogic context for Pakistan and other non-native contexts as a cost-and-time efficient resource. It ensures the provision of correct input in terms of letter-sound relationships and reduces the burden on teachers as well. However, certain limitations may have affected this study, for instance, the learners′ sampling procedure was based on already formed sections of male and female students and the restriction to teaching the whole class instead of choosing the sample from each class. Furthermore, the outbreak of the COVID-19 pandemic during the intervention from October 2019 to February 2022, the attendance and drop-out of students was quite an uncontrollable phenomenon. Finally, to determine the reliability of the pretest-posttest, only interrater reliability could be applied due to very low scores obtained in the pre-test of the learners that were statistically not analyzable.

Conflict of Interest

The author of the manuscript has no financial or non-financial conflict of interest in the subject matter or materials discussed in this manuscript.

Data Availability Statement

The data associated with this study will be provided by the corresponding author upon request.

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