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Evaluating Immersive Reader's Impact on Fourth Grade English Reading Comprehension: A CALL Approach in Context of Pakistan

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Abstract

The study aims to examine the effectiveness of using Immersive Reader (IR), created by Microsoft, in improving the reading comprehension ability of 4th-grade students of The Educators School, Islamabad, Pakistan. The research measures reading comprehension, vocabulary learning and pronunciation accuracy. The research design used in this research is pre-posttest with control and experimental design utilizing both quantitative and qualitative data collection methods. The results indicated that students who use Immersive Reader improve significantly in pronunciation correctness, comprehension, and vocabulary skill. Also, the students' feedback shows a positive attitude towards the integration of CALL. Overall, the study highlights the importance of integrating technology, such as Immersive Reader, into language learning to enhance reading skills effectively. English language proficiency is a critical issue in Pakistan, and innovative strategies such as Computer-Assisted Language Learning (CALL) are essential for its solution. Policymakers should focus on making technology a part of language education policies and providing resources and training for language teachers. Incorporation of CALL and policy adjustments can help improve the quality of language teaching in Pakistan, strengthen teachers, and prepare students for success in a globally interconnected world.

Keywords: CALL, Immersive Reader App by Microsoft, Reading skills, Comprehension skills, Vocabulary skills, Pakistan

Introduction

The present study attempts to discuss the application of Immersive Reader as model of the CALL in improving the English reading comprehension skills of the 4th grade students of The Educators school, Islamabad by analyzing the various issues in the conventional education. The use of computers in the learning and teaching of a second or foreign language is a relatively new and unexplored in Pakistan, but at the same time fast developing, area of research. Although English is taught in every grade level, the students are not proficient in the language after studying English for their entire school life. Researchers (Shafaei, 2012; Rashid, 2017) also hold that the traditional teaching methods which are teacher centered and where students are passive recipients of information, are responsible for this discrepancy. As teachers, it is crucial to give students resources that will not just make learning fun, but helpful in building their skills as readers, including reading comprehension. And this situation strongly suggests the need to change the currently implemented teaching methods and a shift to more contemporary and effective methods.

In learner centered reading learning activities, the learner is the active participant, while in teacher-centered model or the traditional teaching model, the learners are passive ones and thus

the encouraging procedures and guidelines by educators are not sufficient for everyone, because of the distinctions in individual learners and their reading capacities (Wang, Qian, Scott, Chen, Soong, 2012). It is significantly difficult to gauge students' learning potentials as there are plenty of complications in students' reading speed, basic knowledge and reading habits. It is just because traditional classroom teaching is not humorous nor innovative (Abufanas, 2013). Acquiring perusing abilities in developing reading skill is a very significant part of first language (L1); just as in second language (L2) or foreign language (FL) proficiency. In this process learners utilize a variety of skills and strategies along with background knowledge, L1-associated information, and practical knowledge to decode written material (Aebersold & Field, 1997). However, the reading fluency is of great significance in reading English. The language used by the writer must be understandable to the learner by providing a space in which he can activate several faculties of his mind to read and understand it, while not having to involve the brain in "merely" translating the complexities of word and language. CALL should be used to provide more engaging, motivating approaches to further students' development of reading skills.

In the last decade there were few experts who were concerned about the use of computers in the language classroom but since the advent of multimedia computing and the Internet, the use of computers in L2 learning has now become a significant topic that has caught the attention of many language learners around the globe. In recent years, however, computers have emerged as ubiquitous in schools, in homes, and in their use, and most language teachers are forced to think about the implications of the computer for language learning (Warschauer, 1996). Teachers and students employ the practice of computers as part of a language course and it is called CALL (Hardisty & Windeatt, 1989).

In this regard, the current study aims to evaluate the effectiveness of using Immersive Reader to enhance reading comprehension skills of 7th-grade students of Educator School, Ghouri Town, and Islamabad.

Immersive Reader is an application created by Microsoft that allows learners to experience the "no words" approach in a more immersive and interactive manner. This app is specially designed to meet the various learning needs, it comes with numerous features including picture dictionary, text-to-speech, language translation, and focus mode, making it a wonderful tool in the classroom. This application can be very fruitful to the students of 4th grade because of the autonomy it gives them to read and evaluate their reading without guidance, so that students learn to read without being saturated with their vocabulary, understanding and retention. Also through the customizable features of Immersive Reader the students with learning disabilities could also easily focus and read, which they otherwise find very difficult.

Research Questions:

How CALL with immersive reader app as tool is more effective in developing reading skill of 4th grade students than the conventional way?

What is the student's perception of CALL being used for developing reading skills?

Scope of the Study:

Firstly, in the scenario of Pakistan it is very important that policies are framed which address to the incorporation of new approaches to the CALL in the context of the second language skills with the aim of better understanding and learning of the second language skills.

Secondly Reading as the communicative approach is an active mental process which extends the role of a reader because it is not only the responsibility of the text to create meaning but it is also the reader to create meaning. Since the learners who have started using CALL are not subjected to anxiety and there is no peer pressure that can make it difficult for the learners to learn the language easily. Through CALL (Kern, 2014), a Brave New World, more focused on

learning can emerge. The use of computer-assisted education technique is quite evident that it can improve learners' reading comprehension.

Limitations of the study:

This limitation of the study is the relatively small number of students as well as the fact that this study was conducted in one school setting. This study was conducted with 20 students only from the 4th grade of The Educators School Islamabad which might not be representative in other educational settings in Pakistan.

Theoretical Framework and Literature Review:

In fact, many second language learning approaches have been used for many years; however, Schema Theory, which is a part of the Cognitive Theory, can be highly adoptable to the development of reading skills as it states that readers can use their prior knowledge and experiences to understand texts. This theory suggests that when one reads a text, the reader brings in the appropriate *schemas* or mental frameworks to help make sense out of the text. Schema activation also affects vocabulary acquisition because the acquisition of new words is linked to the learners' knowledge schema (Anderson & Pearson, 1984).

The Theory of Cognition used in many of the researches related to CALL is Dual-coding theory by Paivio (1986, 2008) which states that the formation of mental images aids in learning. When information is processed in the brain, activity occurs in two distinct subsystems – a verbal system specialized in processing language, and a nonverbal system specialized in non-linguistic imagery. (Kevin M. Wong & Preeti G. Samudra (2019)

In addition, the present study was guided by the principles of the Cognitive Theory of Multimedia Learning (CTML) and Computer-Assisted Vocabulary Learning (CAVL) applications. CTML has multiple assumptions (Mayer, 2005) first, the brain processes information according to two channels. One channel where verbal information is processed and the other where the visual information is processed. Second, there are capacity limits to each channel, based on the theory of Cognitive Load (CLT). Learning with instructional media was supported by the principles stated in the CTML is what Mayer called meaningful learning, which is the learning process that learners get to know or get to know, skills to solve problems effectively. Similarly the self-determination theory mentioned three BPNs, encompassing autonomy, competence, and relatedness, which can motivate learners to develop, change, and promote their learning (Deci & Ryan, 2000).

Many of our learners are so used to reading on a screen instead of using paper that it is invincible to use computer to learn language, particularly to develop reading skills. Distributed Cognition is a theory presented by Hutchins (1995) that is used as the foundation for human-computer interaction. It calls for the organization of a cognitive system, and suggests that a significant part of an activity that happens every day is a mix of processes between humans and their tools. Hutchins (2000) calls these tools cognitive artifacts as they amplify the user's cognition such as a calculator amplifies the user's ability to calculate. He treats memory as a distributed cognitive function and explains that several memory functions are external to people such as writing down things that one needs to remember. This will not enhance memory, it will "...organize functional skills to cognitive functional system" (p. 8). The example Stockwell (2012) provided was vocabulary learning via technology, where words are accessed via software or online dictionaries, which relates this theory to CALL. Specially designed software, computer-assisted language learning program, online lessons, animated texts, use of multimedia contexts, interactive multi-modal materials, online dictionaries, e-books and a hypertext/hypermedia environment have been used to teach L2 reading comprehension. It has been shown by a review of the reading comprehension literature. Most students in current days employ Wikipedia as

their only reading source, for instance (Godwin-Jones, 2015). With this end in view, the learner should be provided with an environment in which he can use several of the faculties of his mind for reading and understanding instead of with the brain in "exercises of no use" in which it might be engaged only in "dissection" and "translation" of the "exoticities of vocabulary and language. There have been numerous studies to compare the effectiveness of the various applications as a tool of CALL in the language teaching process. For instance, Ronalk A. Hamad (2001) in his experimental study explored the "Tense Buster" app for developing grammar skills of the elementary level students and his pre-post-tests indicated the effectiveness of the app. In one of the descriptive research Eragamreddy (2020) talked about integrating many apps like Fun with text, Ace Reader pro Deluxe, F Reader and Heaven and Hell for learning comprehensions and reading skills and there by showcased their importance. In the experimental study conducted by Donovan C Lawrence (2009) to the African students demonstrated the use of Word Wide Web as an effective tool in teaching reading skills. In her experimental study, Naureen Zaman (2022) carried out on 50 students of University students was found that teaching grammar using Web Based Instruction is highly effective. Inda Indrawati in her experimental research, also showed that Word Wall Media contribute greatly to the students' vocabulary learning. When we look at it in the context of COVID- 19 pandemic Bareq Raad Raheem and Mohammad Danish Mahmood (2022) in their study demonstrate the significant role played by smartphone applications in online teaching and learning. They are like a private tutor who is on duty all day, every day. Luz Castillo-Cuesta in his experimental study underlined digital comics as an effective tool to improve the vocabulary achievement and reading proficiency of the experimental group, especially in the COVID- 19 era when a creative approach for EFL vocabulary instruction is demanding to improve students' learning. Fitriya (2023) in her study suggest that the online scrabble game has a considerable impact on students' vocabulary knowledge, it is advised that it be used to help students learn vocabulary. Also, Yanjie Song a, Yun Wen b, Yin Yang a and Jiaxin Cao (2021) in their experimental study explored the impact of the Virtual Go Mode for enhancing students' engagement to practice vocabulary and consolidate their newly learned words via virtual location-based tasks. This is an exploratory study which involved 15 primary students in Hong Kong for 1 week. Both quantitative and qualitative data were collected and analyzed results indicated that students' engagement in learning vocabulary was high by using the Virtual Go Mode. A lot of apps such as Hello English app, Duolingo, Bussuu and many more are used for acquiring language skills and many researches are being conducted in this field.

All of the above-mentioned researches demonstrate CALL effectiveness on ESL teaching. But still if the use of technology is not relevant, it may hamper learning, instead of enhancing it. Hence, designing the syllabus and the lecture is needed to be well designed to achieve the purpose successfully. For this, the teacher as well as the syllabus developer should be well versed in identifying and utilizing technology as per need.

Research Gap:

As we can see that in the scenario of Pakistan not much work is done in incorporating CALL for improving all four language skills in general and reading skills in particular and the researches are much needed. Therefore, the present study will throw light on Immersive Reader app's role in building up Reading skills for the 4th standards of The Educator school of Islamabad.

Methodology:

The study area was in Educators School, Ghouri town, Islamabad. Data was collected through random sampling technique where 20 students of grade 4 were taken for the period of 40 days. The same sample served as a pre-test/post-test control and experimental group. Both Quantitative and Qualitative research methods were used for the data collection and SPSS as

inferential statistical test was used to determine if there is a significant difference between the means of two groups and how they are related.

Resources were taken from British Council website LearnEnglishKids; where initially simple stories were taken and gradually more difficult comprehension passages from the Level 3 reading resources as well British Council Magazine were taken. The experimental study was conducted two sets of pre-tests and post tests for the control and experimental group. In the controlled group 20 sessions were held with the reading materials presented in the paper version. After pretest result, the experimental group was exposed to the CALL resource Immersive Reader by Microsoft for developing reading skills and 20 sessions were conducted. The Reading Couch by Immersive Reader was used for getting reading reports of each participant in both controlled and experimental groups. Then the average of the results of the various sub-groups in the both the controlled and experimental groups were taken as well as the results of the two main groups were analyzed using SPSS. Also, the feedback about the efficacy of incorporating CALL resource was taken from the students through interviews and then the qualitative data was thematically being analyzed and results were created.

The beginning stories are generally less complex in terms of the vocabulary and words used, and students helped by language translation, using the Immersive Reader App's Focus Mode and reading with the text-to-speech feature were assisted in developing reading skills with ease. The more difficult comprehension passages from the above-mentioned sources were presented to the experimental group after the development of their focus and attention and there skimming, scanning and contextual meaning derivation occurred. The results achieved and evaluations were provided after each reading session and after the end of the study, respectively, by the app for the single learner/assessor and by the end of the study.

Results and Discussion:

In the experimental study pre post tests were conducted on the control and experimental group. Initially the controlled group was exposed to the four simple short stories taken from British Council website LearnEnglishKids, it has simple vocabulary as well as easy comprehension questions, and the traditional reading method of reading from the paper was incorporated over the period of 20 days. The short stories featured were little Red Riding hood, Jack and the Beanstalk, Goldilocks and the Three Bears, Erric the Engine and Isaac Newton and Hamlet. Later on, challenging comprehensions passages, along with articles from the magazine of British Council website LearnEnglishKids were taken; which were written on the topics of the children's interests like Pancake Day, Ramadan, Anti bullying day and Universal children day, etc. In pretest the feature of the Reading Coach in Immersive Reader was incorporated as the participants were told to read out loud and their reading report was created which, tapped their native like accuracy in pronunciation, correct words per minute as well and time taken while reading the text. The word knowledge and comprehension of the text were assessed by questions at end of the stories and comprehension passages.

During the experiment on controlled group, it was noted that all the students does not have the same proficiency level. So, after going through the results these 20 participants were divided into the groups of four. The division of the groups was carried out in the following way:

The rest of the participants were comparatively a bit worse in reading, there were 6 of them in Group1.

- Group2 has 5 participants who has comparatively average reading skills.
- Group3 has 6 participants who has comparatively poor reading skills.
- Group4 has 3 participants who has little autistic features and has great difficulty in focusing and comprehending the text.

The table below presents the mean for the frequency of the results from the Reading reports of the above-mentioned groups of participants.

Table: 4.1

Participants	Accuracy of pronunciation	Time taken	Comprehension/Vocabulary
Group1	40%	10min	30%
Group2	20%	15min	20%
Group3	15%	18min	10%
Group4	10%	20to25min	10%

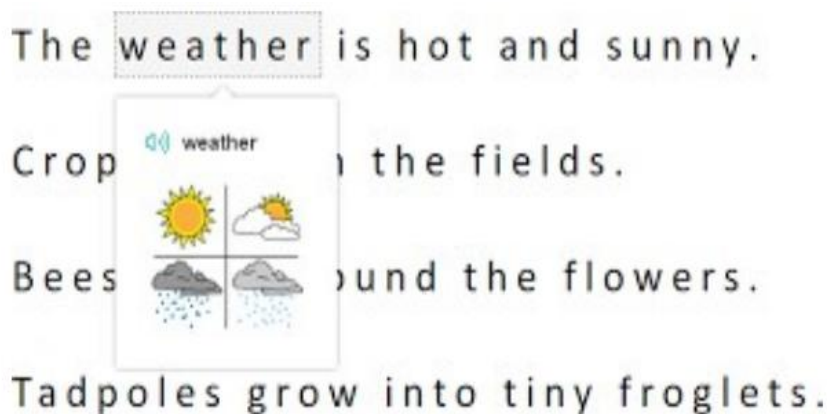
In the above Table 4.1 groups were mentioned in vertical direction and the variable were judged in the horizontal direction. First variable was Accuracy of the pronunciation, the average of Group1 was 40%, this meant that they read 40% of the text well and the rest they did not read well. Similarly Group 2,3 and 4 has 20%, 15% and 10% of accuracy rate respectively. The second variable was the Time taken by the participants to read the passages and the average of the different groups follows as such; Group1 took the average of 10min whereas Group 2,3 and 4 took 15min, 18min, and 20min to 25min respectively to read the given passages. The third variable was the understanding of Comprehension and vocabulary of the given passages. Group1 was able to understand the vocabulary and the average of group 1 comprehended the text by 30% while group 2,3 and 4 could do so by 20%,10% and 10% respectively.

The findings of the control group indicate that even those students of Group1 who were a little ahead of the others, were not very proficient in the above areas. The students who were Autistic were behind everyone else and there was not much hope of them improving at all as they were not able to focus, read and understand the text according to their mental condition.

The same group was given as the Experimental Group and presented with the Immersive Reader app of Microsoft using the above-mentioned resources. The short stories, comprehension passages and news articles were not the same but were replaced by the other set from the same resources of British Council website LearnEnglishKids. These stories were pasted in the Immersive Reader app and participants were told to read text on screen while incorporating the different features of the application.

The participants were introduced to the different features of the app, such as:

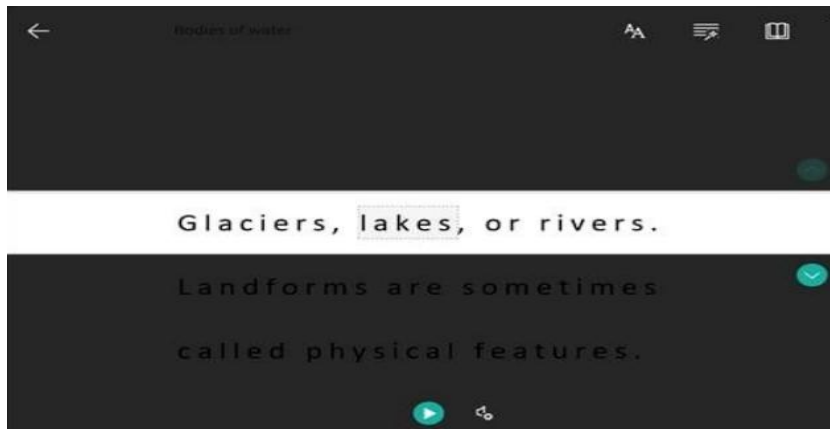
- Picture dictionary which enable the learner to read the word and quickly check its meaning without disrupting his/her comprehension of the words. As shown in the picture bellow;



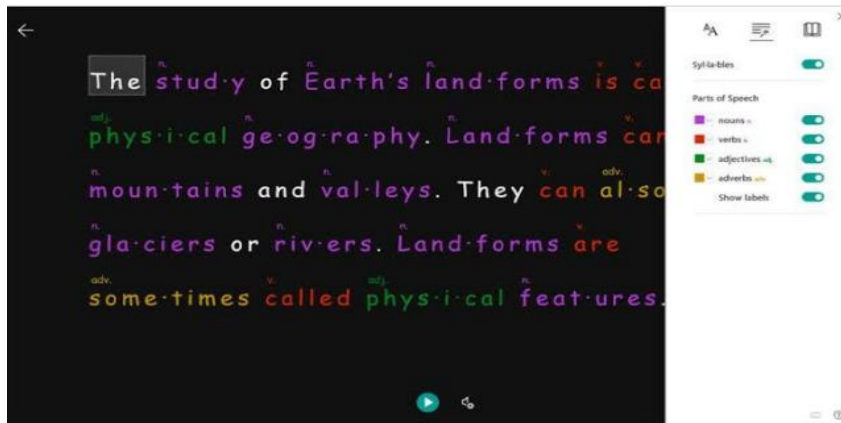
- Text-to-Speech which allowed the learner to listen to the correct way of pronunciation of a particular word.

- Language translation, this feature allows the text to be translated to the multiple languages word by word or as whole.

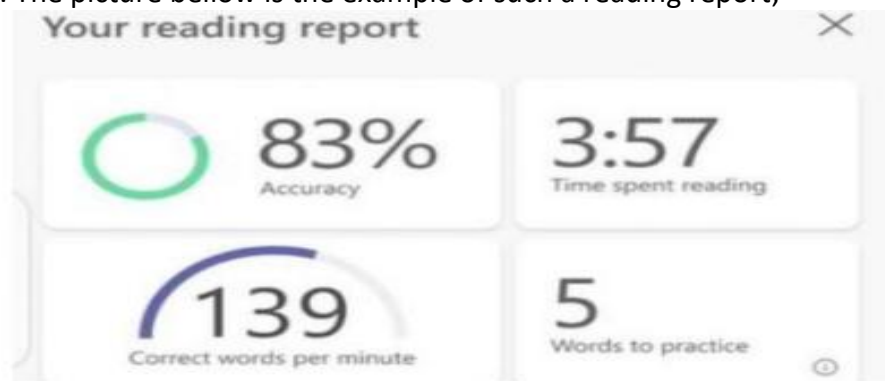
- Focus mode for enabling the low focus participants to read the more highlighted lines of the text, so that the learner with attention deficit can focus on individual lines or words. As shown in the picture bellow;



- Syllabic partition of the words for easy pronunciation as shown in the picture bellow;



Different color highlighting of the various parts of speech for understanding text and so on. After explaining the features in detail, the participants were given guided reading tasks whereas towards the end the learners were given the autonomy to read by themselves. At the end of each reading session the reading report was designed and so the gradual development of each learner was being followed and at the end of all reading sessions a final report of each learner was supplied. The picture bellow is the example of such a reading report;



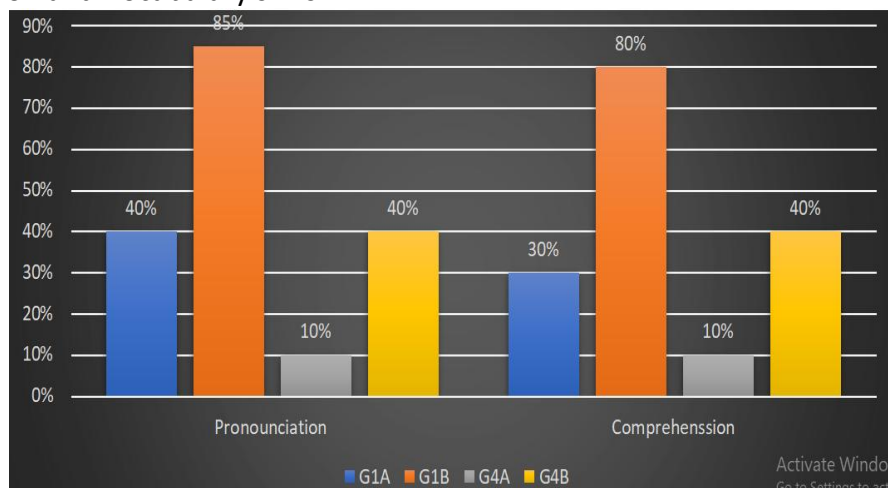
The average of all the four groups' participants was taken and the results are shown below in the table.

Table 4.2

Participants	Accuracy of pronunciation	Time taken	Comprehension/Vocabulary
Group1	85%	5min	80%
Group2	70%	10min	70%
Group3	60%	10min	70%
Group4	40%	15min	40%

From the results of the Table 4.2, it can be observed that there has been a significant improvement for all the four above mentioned groups in the skills of reading comprehension. In the above table the mentioned groups were placed vertically whereas the variables were judged horizontally. The first variable was the Accuracy of the pronunciation, the average for the Group1 was 85%. Similarly Group 2,3 and 4 has 70%, 60% and 40% of accuracy rate respectively. The second variable was the Time taken by the participants to read the passages and the average of the different groups follows as such; Group1 took the average of 5min whereas Group 2, 3 and 4 took 10min, 10min, and 15min respectively to read the given passages. The third variable was the comprehension of the passages, and their meaning by the students in terms of words. Group1 was able to understand the vocabulary and comprehend the passage by the average of 80% whereas, Group 2,3 and 4 could do so by the average of 70%, 70% and 40%.

The graph below presents the comparative study between both groups Control and Experimental by considering Group1 and Group4 in the aspects of Accuracy of Pronunciations and Comprehension and Vocabulary skills.



Bar graph for the Comparative study of the Control and Experimental groups:

G1A= Group1 of Control group

G1B= Group1 of Experimental Group

G4A= Group4 of Control Group

G4B= Group4 of Experimental Group

In the same way that, as the same group acted as both Control and Experimental group, it was easy to trace the development of them from not very proficient in reading skills into the expert in the same skill. If we cross compare and analyze the results taken from the above Bar graph, we can see that both the Control and Experimental groups has their highest and lowest average Accuracy in pronunciation scale 40% and 10% in the case of controlled group which improved to 85% and 40% respectively after the use of the app in the case of experimental group. Similarly, the average Comprehension and Vocabulary understanding in case of the former was 30% of the highest and 10% of the lowest, where as a marked improvement was seen in the case of experimental group as it was 80% of the highest and 40% of the lowest. The same improvement was found for the Time taken scale.

Apart from the other features it was noted that the learners with little autistic features, who were unable to read and comprehend, has shown marked improvement on the focus mode feature of the app. The words that they saw in front of them were on focus mode, that is, they had been written a bit larger, as well as each line in focus and making it stand out so that they could read it easily. In the beginning sessions they were reluctant to read on screen as well as they had mental blocks stopping them to read in the light of their previous unsuccessful attempts. Thanks to its wide variety of features and ease of use, however, they began to gradually become involved in the app. At later stages, they also began to look at the picture dictionary to develop a better understanding of the text and used the text to speech function to correct pronunciation.

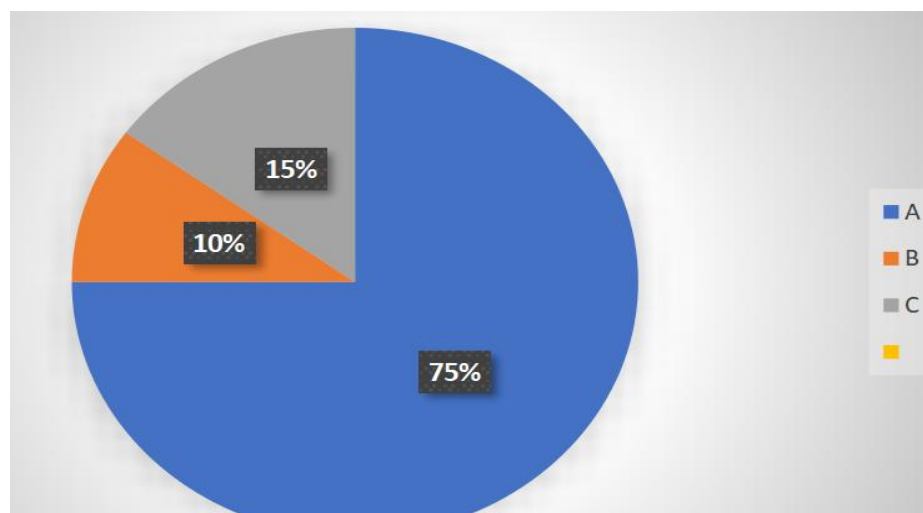
It was also noted that as the learners were given autonomy to read and comprehend by themselves so they took the responsibility on themselves and learnt the skills unconsciously. The idea of autonomy to the learners was borrowed from the self-determination theory and it yielded the fruitful results. The self-determination theory mentioned three BPNs, encompassing autonomy, competence, and relatedness, which can motivate learners to develop, change, and promote their learning (Deci & Ryan, 2000). One of the psychological needs in any learning environment is that of autonomy, or learners' freedom and agency to participate in learning (Niemi & Ryan, 2009). Activities, materials, and tasks must be created in any learning environments that engage learners in the learning process (Ryan & Deci, 2000). CALL apps need to address the learners' autonomy to take ownership of their learning by practicing their agency in choosing materials, the preferred modes of interaction and communication, etc. Competence is also referred to as another BPN in the SDT. Competence was defined by Ryan and Deci (2000) as learners' ability to participate in learning activities and tasks. The prerequisites that lead to the sense of mastery, ability, and effectiveness (Ryan & Deci, 2017) should be taken into consideration in learning environments. For instance, involving learners in accomplishing tasks and activities to experience their mastery over them help to develop learners' competence (Faye & Sharpe, 2008). Furthermore, continued feedback and awareness of the materials can create competence in the learners (Bachman & Stewart, 2011). Competence is thus a psychological need that needs to be addressed in CALL. Relatedness is the third psychological need. The learning environments should allow the learners to feel belongingness to the members of the learning environment (Klassen et al., 2012). By doing so, it is possible to spread learners' values, thoughts and beliefs within the community they interact with (Bachman & Stewart, 2011). Learners' motivation is strengthened when they recognise that others value their values. Therefore, the most suitable application in teaching reading skill in particular and other language skills in general should be able to meet the Basic Psychological Needs of the learners. Numerous studies have taken place on this topic.

Although the above mentioned results clearly indicate the significance of the use of Immersive Reader App, a small survey was also carried out in the class to observe the response of the learners towards the use of technology in the class.

Quick interviews were held and basic questions were asked such as:

- How was their experience of using Immersive Reader App for developing reading skills?
- To what extent did it improve their targeted skills?

The pie chart below reflects the results of the thematic analysis done on their tapped answers.



A= participants who liked the use of CALL

B= participants who were neutral about use of CALL C= participants who preferred reading from the paper

In the above Pie Chart, the participants preferred the use of Immersive Reader App in improving reading and comprehension. 75% of the participants were of the view that their experience of using the app really helped them to go through the reading tasks and only 10% of the participants were neutral about it where as 15% of the participants preferred reading from the paper. The results support the theoretical framework given by Hutchins (1995) in the Distributed Cognition theory. It is undeniable that the use of computers in language learning, especially to improve learners' reading ability has become a necessity due to the fact that most of the learners prefer screen-based reading rather than reading using paper. Distributed Cognition theory, which originated in Hutchins (1995), is the basis for Human-Computer Interaction, which focuses on inter-human and inter-technology collaborative cognition. In addition, Stockwell (2012) suggests that technology can be used to access words via software or via online dictionary, which is in line with Computer-Assisted Language Learning (CALL). And in the present age, when children spend most of their day on the screen, the reading will be easy and interesting for them.

Conclusion:

The use of Immersive Reader as a model of Computer Assisted Language Learning (CALL) has been shown to be effective in improving the students' reading comprehension in English at The Educators School in Islamabad, Pakistan in 7th grade. The conventional teaching methods which are usually teacher-centred and passive have proved to be ineffective in the teaching of English as a compulsory subject in education. It is clear that the use of new and innovative methods of instruction, including the use of technology such as Immersive Reader, is necessary.

The study was theoretically grounded in theories such as cognitive theory, dual coding theory, and self-determination theory, to find a balance between traditional teaching and contemporary technology. Immersive Reader is designed to promote prior knowledge activation and to support vocabulary development, which is based on cognitive theories of learning and multimedia learning principles. Use of the Immersive Reader resulted in better pronunciation, less time spent reading, and better comprehension and vocabulary. Specifically, the app's focus mode was beneficial to those with ASD, suggesting that it is user-friendly for different learning styles. Furthermore, learners' autonomy in using Immersive Reader enabled them to be autonomous in learning so it would be more in line with the principles of self-determination theory. The positive feedback that was obtained from the participants further confirmed the effectiveness of the Immersive Reader in helping them develop reading skills.

Overall, the research highlights the significance of the incorporation of technology, such as Immersive Reader, in language learning scenarios to address the changing needs of learners in the digital age. With the use of innovative tools and pedagogical strategies, teachers can design more interesting and effective learning processes, which promotes language learning and autonomy among learners.

The need of the hour in the context of Pakistan is that policies are formulated based on research conclusions to include new approaches of Computer-Assisted Language Learning (CALL) to improve the second language skills. English is of paramount importance as a compulsory subject in the educational system of Pakistan but still there are some problems in this regard. The current pedagogical practices are ineffective with the different learning styles of learners, therefore there is a need for innovative pedagogy practices. Research that takes place within the country's context can offer some insights into the effectiveness of CALL in promoting language skills. Policymakers in Pakistan need to focus on the use of technology in language learning policies to take advantage of the potentials of CALL. This means access to the appropriate resources and training for educators and the integration of digital literacy skills into the curriculum.

In addition, policies should be in favour of research projects to assess the effect of CALL on language learning outcomes and to guide evidence-based practice. CALL resources can help improve language education practices; policies can be adapted to support them; and students can benefit in acquiring the skills required to cope in a more globalized world.

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