

# **IMPROVING PAKISTANI COLLEGE STUDENTS' ENGLISH LANGUAGE SKILLS USING AI-BASED APPLICATIONS: AN EXPERIMENTAL RESEARCH**

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**NATIONAL UNIVERSITY OF MODERN LANGUAGES  
ISLAMABAD**

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**NATIONAL UNIVERSITY OF MODERN LANGUAGES  
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## **THESIS AND DEFENSE APPROVAL FORM**

The undersigned certify that they have read the following thesis, examined the defense, are satisfied with the overall exam performance and recommend the thesis to the Faculty of Arts & Humanities for acceptance:

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Candidate of **Doctor of Philosophy** at the National University of Modern Languages do hereby declare that the thesis **Improving Pakistani College Students' English Language Skills Using AI-Based Applications: An Experimental Research** submitted by me in partial fulfillment of PhD degree, is my original work, and has not been submitted or published earlier. I also solemnly declare that it shall not, in future, be submitted by me for obtaining any other degree from this or any other university or institution.

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## ABSTRACT

### **Title: Improving Pakistani College Students' English Language Skills Using AI-Based Applications: An Experimental Research**

English language teaching/learning calls for innovations and modern teaching techniques. The penetration of Artificial Intelligence into human affairs has encouraged language teachers to step forward and experiment with teaching the English language through the use of AI-powered tools and techniques. The current study aimed at experimenting with the integration of AI-powered tools in English Language Teaching (ELT) within Pakistani college settings. The study implemented three AI-based Apps—'Readlee', 'Entelechy', and '@Voice Aloud Reader'—to enhance students' reading skills at one hand and speaking and writing skills on the other hand. The study was grounded in established theoretical frameworks to guide its design and interpretation. Grabe's (2009) theory of reading informed the strategies used to enhance reading skills, while Bachman and Palmer's (2010) model of language ability supported the development of writing and speaking competencies. Additionally, the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) framework was employed to understand students' interaction with the AI-based applications. 50 participants were divided into experimental and control groups. Quantitative data sought from pre and post-tests were analyzed using SPSS whereas qualitative insights from participants' interviews and observations were analysed through thematic analysis. The findings of the study revealed significant improvements in reading, writing, and speaking skills among the experimental group as compared to the control group. Moreover, the participants were found to have increased satisfaction and motivation for the application of AI tools in learning English. The study underscores AI's potential to overcome traditional barriers in ELT, offering automated feedback and consistent practice opportunities crucial for linguistic development. Ultimately, the findings advocate for the widespread adoption of AI-powered tools in Pakistani ESL education.

## TABLE OF CONTENTS

<b>THESIS AND DEFENSE APPROVAL FORM .....</b>	<b>iii</b>
<b>AUTHOR'S DECLARATION .....</b>	<b>iv</b>
<b>ABSTRACT .....</b>	<b>v</b>
<b>TABLE OF CONTENTS .....</b>	<b>vi</b>
<b>LIST OF TABLES .....</b>	<b>xiii</b>
<b>LIST OF FIGURES .....</b>	<b>xvi</b>
<b>LIST OF ABBREVIATIONS .....</b>	<b>xviii</b>
<b>ACKNOWLEDGEMENT.....</b>	<b>xx</b>
<b>1. INTRODUCTION.....</b>	<b>2</b>
1.1 Background of the Study .....	2
1.1.1 AI in Education .....	4
1.1.2 AI in Language Teaching.....	5
1.2 Statement of the Problem.....	6
1.3 Research Objectives.....	6
1.4 Research Questions.....	7
1.5 The Rationale of the Study .....	7
1.6 Introduction to the AI-Based Apps Used in the Current Study .....	8
1.6.1 Readlee App.....	8
1.6.2 @ Voice Aloud Reader .....	11
1.6.3 Entelechy.....	12
1.7 Significance of the Study .....	13
1.8 Organization of the Chapters .....	14
<b>2. LITERATURE REVIEW .....</b>	<b>15</b>
2.1 Introduction.....	15
2.2 Traditional Methods to Teach Language Skills .....	15
2.3 Technology in English Language Teaching. ....	18
2.4 Digital Platform for English Language Learning .....	23
2.5 ELT with ICT and CALL .....	26
2.5.1 Behaviouristic CALL.....	28
2.5.2 Communicative CALL.....	28
2.5.3 Integrative CALL.....	29
2.6 Artificial Intelligence in Education and Language Teaching .....	33
2.7 Mobile Assisted Language Learning (MALL) .....	48
2.8 Conclusion .....	64

<b>3. RESEARCH METHODOLOGY .....</b>	<b>67</b>
3.1 Introduction.....	67
3.2 Theoretical Framework.....	67
3.2.1 Grabe's (2009) Theory of Reading.....	67
3.2.2 Bachman and Palmer's (2010) Theory of Language Ability.....	70
3.2.3 The Extended Unified Theory of Acceptance and Use of Tech Model (2012) ..	73
3.3 Research Design.....	76
3.3.1 Study Plan and Syllabus Break-up.....	77
3.4 Site for the Research .....	79
3.5 Participants of the Study and Sampling .....	79
3.5.1 Experimental Group.....	80
3.5.2 Control Group .....	81
3.5.3 Demographic Details of the Participants .....	81
3.6 Research Procedure and Data Collection.....	84
3.6.1 First Phase.....	84
3.6.2 Advantages of a Pre-test .....	85
3.7 Data Regarding Learners' Reading, Writing and Speaking Skills .....	85
3.7.1 Lower Level Reading Skills.....	85
3.7.2 Word Processing/Recognition .....	86
3.7.3 Vocabulary .....	86
3.7.4 Grammar Knowledge.....	86
3.7.5 Inference .....	87
3.7.6 Higher Level Reading Skills .....	87
3.7.7 Writing and Speaking Skills .....	87
3.8 Second Phase .....	88
3.8.1 Experimentation.....	88
3.8.2 Home Assignments .....	90
3.8.3 Lesson Plan .....	90
3.9 Observation .....	93
3.10 Third Phase .....	94
3.11 Participants' Learning Experience.....	95
3.11.1 Questionnaire .....	95
3.11.2 Interviews.....	97
3.13 Reliability.....	98
3.14 Validity .....	99

3.15 Data Analysis .....	100
3.16 Ethical Considerations .....	102
3.17 Research Limitations .....	103
<b>4. DATA ANALYSIS .....</b>	<b>104</b>
4.1 Introduction.....	104
4.2 Students' Performance in the Pre-Test .....	104
4.2.1 Pre-Test of Reading Pace and Accuracy (Experimental Group) .....	105
4.2.2 Reading Pace in the Pre-Test (Experimental Group).....	107
4.2.3 Reading Accuracy in the Pre-Test (Experimental Group).....	107
4.2.4 Post-Test of Reading (Experimental Group) .....	108
4.2.5 Reading Pace and Accuracy Post-Test (Experimental Group) .....	108
4.2.6 Comparison of Tests of Reading Pace and Accuracy (Exp. Group).....	111
4.2.7 Improvement in the Reading Pace (Experimental Group).....	113
4.2.8 Improvement in the Reading Accuracy (Experimental Group).....	113
4.2.9 Pre-Test of Reading (Control Group) .....	113
4.2.10 Reading Pace in the Pre-Test (Control Group) .....	115
4.2.11 Reading Accuracy in the Pre-Test (Control Group) .....	116
4.2.12 Reading Pace and Accuracy in the Post-Test (Control Group) .....	117
4.2.13 Reading Accuracy in the Post-Test (Control Group).....	119
4.2.14 Comparison of Improvement in Reading Pace/Accuracy (Control Group)....	119
4.2.15 Improvement in the Reading Pace (Control Group) .....	120
4.2.16 Improvement in the Reading Accuracy (Control Group) .....	121
4.2.17 Comparison of Improvement in Reading Pace/Accuracy.....	122
4.3 Pre-Test of Inference.....	123
4.3.1 Inference Pre-Test (Experimental Group) .....	123
4.3.2 Post-Test of Inference (Experimental Group).....	125
4.3.3 Comparison of Pre and Post-Test of Inference (Experimental Group).....	127
4.3.4 Pre-Test of Inference (Control Group) .....	128
4.3.5 Post-Test of Inference (Control Group) .....	130
4.3.6 Comparison of Pre and Post-Test of Inference (Control Group).....	132
4.3.7 Comparison of Improvement in Inference Skills.....	134
4.4 Comprehension .....	135
4.4.1 Comprehension Pre-Test (Experimental Group) .....	135
4.4.2 Post-Test of Comprehension (Experimental Group) .....	137
4.4.3 Comparison of Pre and Post-Test of Comprehension (Experimental Group) ..	139

4.4.4 Pre-Test of Comprehension (Control Group) .....	140
4.4.5 Post-Test of Comprehension (Control Group).....	142
4.4.6 Comparison of Pre and Post-Test of Comprehension (Control Group).....	144
4.4.7 Comparison of Improvement in Comprehension Skills b/w both Group .....	146
4.5 Word Processing/Recognition .....	147
4.5.1 Word Processing/Recognition Pre-Test Experimental Group .....	147
4.5.2 Word Processing/Recognition Post-Test (Experimental Group).....	150
4.5.3 Word Processing/Recognition Pre and Post-Test Comparison (Exp. Group) ..	152
4.5.4 Word Processing/Recognition Pretest (Control Group) .....	153
4.5.5 Word Processing/Recognition Post-Test (Control Group) .....	155
4.5.6 Word Processing/Recognition Pre and Post-Test Comparison (Cont. Group) .	157
4.5.7 Comparison of Improvement in Word Processing b/w Exp. and Cont. Group	159
4.6 Vocabulary .....	160
4.6.1 Vocabulary Pre-Test (Experimental Group).....	160
4.6.2 Vocabulary Post-Test Experimental Group .....	162
4.7.3 Vocabulary Pre and Post-Test Comparison (Experimental Group).....	164
4.6.4 Vocabulary Pre-Test (Control Group) .....	165
4.6.5 Vocabulary Post-Test (Control Group).....	167
4.6.6 Vocabulary Pre and Post-Test Comparison (Control Group) .....	169
4.6.7 Comparison of Improvement in Vocabulary b/w Exp and Cont. Group .....	170
4.7 Sentence Correction .....	171
4.7.1 Sentence Correction Pre-Test (Experimental Group) .....	171
4.7.2 Sentence Correction Post-Test (Experimental Group) .....	173
4.7.3 Comparison of Sentence Correction Pre and Post-Test (Exp. Group).....	175
4.7.4 Sentence Correction Pre-Test (Control Group) .....	177
4.7. 5 Sentence Correction Post-Test (Control Group).....	179
4.7.6 Comparison of Sentence Correction Pre and Post-Test (Control Group).....	181
4.7.7 Comparison of Improvement in Sentence Correction b/w both Groups.....	182
4.8 Discourse Completion Tasks (DCTs) .....	183
4.8.1 Discourse Completion Tasks (DCTs) Pre-Test (Experimental Group) .....	183
4.8.2 Discourse Completion Tasks (DCTs) Post-Test (Experimental Group).....	185
4.8.3 Comparison of Participants' Score in DCTs Pre and Post-Tests (Exp Group).	187
4.8.4 Discourse Completion Tasks (DCTs) Pre-Test (Control Group) .....	189
4.8.5 Discourse Completions Tasks Post-Test (Control Group).....	190
4.8.6 Comparison of Participants' Score in DCTs Pre and Post-Tests (Cont Group)	192
4.8.7 Comparison of Improvement in DCTs b/w both Groups.....	194

4.9 Paragraph Writing Pre-Test .....	194
4.9.1 Paragraph Writing Pre-Test (Experimental Group) .....	194
4.9.2 Paragraph Writing Post-Test (Experimental Group) .....	196
4.9.3 Comparison of Paragraph Writing Pre and Post-Test (Exp. Group) .....	198
4.9.4 Paragraph Writing Pre-Test (Control Group) .....	200
4.9.5 Paragraph Writing Post-Test (Control Group).....	202
4.9.6 Comparison of Paragraph Writing Pre and Post-Test (Control Group).....	203
4.9.7 Comparison of Improvement in Paragraph Writing b/w both Groups .....	205
4.10 Speaking Skills.....	205
4.10.1 Pre-test Short-Speeches (Experimental Group) .....	206
4.10.2 Pronunciation Pre-Test (Experimental Group) .....	206
4.10.3 Pronunciation Post-Test (Experimental Group).....	208
4.10.4 Comparison of Pronunciation Pre and Post-Test (Experimental Group).....	211
4.10.5 Pronunciation Pre-Test (Control Group) .....	212
4.10.6 Pronunciation Post-Test (Control Group).....	214
4.10.7 Comparison of Pronunciation Pre and Post-Test (Control Group).....	216
4.10. 8 Comparison of Improvement in Pronunciation b/w both the Groups.....	217
4.10. 9 Speaking Accuracy Pre-Test (Experimental Group) .....	217
4.10.10 Speaking Accuracy Post-Test (Experimental Group).....	219
4.10.11 Comparison of Speaking Accuracy Pre and Post-Test (Exp. Group).....	221
4.10.12 Speaking Accuracy Pre-Test (Control Group).....	222
4.10.13 Speaking Accuracy Post-Test (Control Group) .....	224
4.10.14 Comparison of Accuracy Pre and Post-Test (Control Group).....	226
4.10.15 Comparison of Improvement in Speaking Accuracy b/w both the Groups ..	228
4.11 Dialogue.....	228
4.11.1 Dialogue Pre-Test (Experimental group).....	228
4. 11.2 Dialogue Post-Test (Experimental Group) .....	230
4.11.3 Comparison of Participants' Performance in Dialogue (Exp. Group) .....	232
4.11.4 Dialogue Pre-Test (Control group) .....	234
4.11.5 Dialogue Post-Test (Control Group).....	235
4.11.6 Comparison of Dialogue Pre and Post-Test Results (Control Group).....	237
4.11.7 Comparison of Improvement in Dialogue b/w both the Groups.....	238
4.12 t-Tests Analysis for the Pre and Post-Tests .....	239
4.12.1 t-Test Analysis of Comprehension Improvement (Experimental Group).....	240
4.12.2 t-Test Analysis of Comprehension Improvement (Control Group).....	241
4.12.3 t-Test Analysis of inference Improvement (Experimental Group) .....	242

4.12.4 t-Test Analysis of Inference Improvement (Control group) .....	243
4.12.9 t-Test Analysis of Grammar Knowledge Improvement (Exp. Group) .....	247
4.12.10 t-Test Analysis of Grammar Knowledge Improvement (Control Group) ....	248
4.12.11 t-Test Analysis of Speaking Improvement (Experimental Group) .....	249
4.12.12 t-Test Analysis of Speaking Improvement (Control Group) .....	250
4.13 Observation .....	251
4.13.1 Participants' Behaviours towards Learning .....	251
4.13.2 Difficulties Faced by the Participants .....	252
4.13.3 Problem-Solving .....	252
4.13.4 Motivation.....	252
4.13.5 Level of Acceptance of Task .....	253
4.13.6 Training for Future Studies .....	253
4.13.7 Improvement .....	253
<b>5. LEARNERS' VIEWS ON AI IN ELT .....</b>	<b>254</b>
5.1 Students' Perception on the Use of AI Apps in ELL .....	254
5.1.1 Students' Learning Experience with 'Readlee' App .....	260
5.1.2 Students' Perceptions of the Impact of Readlee App on Language Skills .....	262
5.1.3 Students' Perceptions Regarding the Use of Three Selected Apps .....	264
5.1.4 Overall Impact of AI-Based Apps on English Language Learning .....	265
5.1.5 Limitations on Incorporating AI-based Apps in English Language Learning..	268
5.2 Interviews.....	270
5.2.1 Students' Satisfaction Level .....	271
5.2.2 Students' Intentions to Use AI-based Apps in Future .....	271
5.2.3 The Most Striking Feature in AI-Based Apps .....	271
5.2.4 Challenges the Participants Faced .....	272
5.2.5 Students' Preference for the Teaching Method .....	272
5.2.6 Students Views about the Retention of the Use of AI-Powered App .....	273
5.2.7 Students' Opinions about the Increase in their Interest Level .....	273
5.2.8 Recommending the Use of AI-Based Apps to other Teachers .....	273
5.2.9 The Most Effective App Indicated by the Participants .....	273
<b>6. DISCUSSION .....</b>	<b>274</b>
<b>7. FINDINGS &amp; CONCLUSION.....</b>	<b>280</b>
7.1 Improvement in English Language Skills.....	282
7.1.1 Improvement in Reading Skills .....	282
7.1.2 Improvement in Writing and Speaking Skills.....	284

7.1.3 Participants' Views about AI Apps to improve Overall English Skills .....	289
7.2 Achievement of Teaching Targets .....	291
7.3 Conclusion .....	292
7.4 Recommendations.....	295
7.5 Implications.....	297
7.6 Limitations .....	301
7.7 Future Research .....	301
<b>REFERENCES.....</b>	<b>302</b>
<b>APPENDICES .....</b>	<b>330</b>
<b>Appendix A: Demographic Details.....</b>	<b>330</b>
<b>Appendix B: Pre &amp; Post-Tests .....</b>	<b>331</b>
<b>Appendix C: Questionnaire on Students' Perceptions about AI-Based Apps ...</b>	<b>358</b>
<b>Appendix D: Interview Questions .....</b>	<b>362</b>
<b>Appendix E: Permission Letter .....</b>	<b>363</b>
<b>Appendix F: Informed Consent Form .....</b>	<b>364</b>
<b>Appendix G: Lesson Plans .....</b>	<b>367</b>

## LIST OF TABLES

Table: 1	Timeline for the Implementation of the Action-Plan .....	78
Table: 2	Demographic Details .....	82
Table: 3	Reliability Statistics .....	99
Table: 4	Validity Test .....	99
Table: 5	Reading Pace and Accuracy Pre-Test (Exp. Group).....	106
Table: 6	Reading pace and Accuracy Post-Test (Exp. Group) .....	109
Table: 7	Comparison b/w Pre and Post-Test (Exp. Group) .....	112
Table: 8	Reading Pace and Acc. in Pre-Test (Cont. Group) .....	114
Table: 9	Reading Pace and Acc. in the Post-Test (Cont. Group) .....	117
Table: 10	Comparison b/w Pre and Post-Test Perf. (Cont. Group) .....	120
Table: 11	Comparison of Improvement in Reading Pace and Acc b/w both the Groups .....	122
Table: 12	Participants' Score in Inference Pre-Test (Exp. Group) .....	123
Table: 13	Participants' Score in Inference Post-Test (Exp. Group) .....	124
Table: 14	Comparison of Pre and Post- Test of Inf. (Exp. Group) .....	127
Table: 15	Participants' Performance in the Pre-Test of Inference (Control Group) .....	128
Table: 16	Participants' Performance in Inference Post-Test (Control Group).....	130
Table: 17	Comparison of Pre and Post-test Perf. (Cont. Group) .....	133
Table: 18	Comparison of Participants' Improvement in Inf. Skills from both Groups .....	134
Table: 19	Pre-Test of Comprehension Exp. Group .....	135
Table: 20	Post-Test of Comprehension (Exp. Group) .....	137
Table: 21	Comparison of Pre and Post-Test of Comp. (Exp. Group) .....	141
Table: 22	Pre-Test of Comprehension (Control Group) .....	139
Table: 23	Post-Test of Comprehension (Control Group) .....	143
Table: 24	Comparison of Pre and Post-Test of Compr. (Cont. Group) ...	145
Table: 25	Comparison of Improvement b/w both the Groups .....	146
Table: 26	Participants Score in Pre-Test of WP (Exp. Group) .....	148
Table: 27	Participants Score in Post-Test of WP (Exp. Group) .....	150
Table: 28	Comparison of WP Pre and Post-Test Score (Exp. Group)....	152
Table: 29	Participants Score in Pre-Test of WP (Control Group).....	153
Table: 30	Participants Score in Post-Test of WP (Cont. Group) .....	156
Table: 31	Comparison of WP Pre and Post-Test (Exp. Group) .....	158
Table: 32	Comparison of Imp. in WP b/w Exp. and Cont. Groups .....	159
Table: 33	Vocabulary Pre-Test (Exp. Group) .....	160
Table: 34	Vocabulary Post-Test (Exp. Group) .....	162
Table: 35	Vocabulary Pre and Post-Test Comparison (Exp. Group) .....	164
Table: 36	Vocabulary Pretest (Control Group) .....	165
Table: 37	Vocabulary Post-Test (Control Group) .....	167
Table: 38	Comparison of Participants' Scores in Vocabulary Pre and Post-test (Control Group) .....	169
Table: 39	Comparison of Improvement in Voc. b/w both Groups .....	171
Table: 40	Sentence Correction Pre-Test (Exp. Group) .....	171
Table: 41	Sentence Correction Post-Test (Exp. Group) .....	174
Table: 42	Comparison of Sentence Correction Pre and Post-Test (Experimental Group) .....	176

Table: 43	Sentence Correction Pre-Test (Control Group) .....	177
Table: 44	Sentence Correction Post-Test (Control Group) .....	179
Table: 45	Comparison of Sentence Correction Pre and Post-Test (Control Group) .....	181
Table: 46	Comparison of Improvement in Sentence Correction b/w both Groups .....	182
Table: 47	DCTs Pre-Test (Experimental Group) .....	183
Table: 48	DCTs Post-Test (Experimental Group) .....	185
Table: 49	Comparison of Participants' Score in DCTs (Exp. Group).....	187
Table: 50	DCTs Pre-Test (Control Group) .....	189
Table: 51	Participants' Perf. in DCTs Post-Test (Cont. Group) .....	191
Table: 52	Comparison of Participants' Score in DCTs Pre and Post-Tests (Control Group) .....	193
Table: 53	Comparison of Imp. in DCTs b/w both Groups .....	194
Table: 54	Paragraph Writing Pre-Test (Exp. Group) .....	195
Table: 55	Paragraph Writing Post-Test (Exp Group) .....	197
Table: 56	Comp. of Para Writing Pre and Post-Test (Exp. Group) .....	199
Table: 57	Paragraph Writing Pre-Test (Control Group) .....	200
Table: 58	Paragraph Writing Post-Test (Control Group) .....	202
Table: 59	Comparison of Paragraph Writing Pre and Post-Test (Control Group) .....	203
Table: 60	Comparison of Improvement in Paragraph Writing b/w both Groups .....	205
Table: 61	Pronunciation Pre-Test (Experimental Group) .....	207
Table: 62	Pronunciation Post-Test (Experimental Group) .....	209
Table: 63	Comp. of Pronunciation Pre and Post-Test (Exp. Group) .....	211
Table: 64	Pronunciation Pre-Test (Control Group) .....	212
Table: 65	Pronunciation Post-Test (Control Group) .....	214
Table: 66	Comp. of Pronunciation Pre and Post-Test (Cont. Group) ....	216
Table: 67	Comparison of improvement in Pronunciation b/w Groups ...	217
Table: 68	Speaking Acc. in Short Speech Pre-Test (Exp. Group) .....	218
Table: 69	Speaking Accuracy in Short Speech Post-Test (Exp. Group).....	220
Table: 70	Comparison of Speaking Accuracy Pre and Post-Test (Experimental Group) .....	221
Table: 71	Speaking Accuracy Pre-Test (Control Group) .....	223
Table: 72	Speaking Accuracy Post-Test (Control Group) .....	225
Table: 73	Comp. of Pronunciation Pre and Post-Test (Cont. Group) ....	226
Table: 74	Comparison of improvement in Acc. b/w both the Groups ...	228
Table: 75	Dialogue Pre-Test (Experimental group) .....	229
Table: 76	Dialogue Post-Test (Experimental Group) .....	231
Table: 77	Comp. of Pre and Post-Test Results Dialogue (Exp. Group).....	232
Table: 78	Dialogue Pre-Test (Control group) .....	234
Table: 79	Dialogue Post-Test (Control Group) .....	236
Table: 80	Comparison of Pre and Post-Test Results Dialogue (Control Group) .....	237
Table: 81	Comp. of improvement in Dialogue b/w both the Groups .....	239
Table: 82	Paired Sample Test for Comprehension (Exp. Group) .....	240
Table: 83	Paired Samples Test for Compr. (Control Group) .....	241
Table: 84	Paired Samples Test for Inference (Exp. Group) .....	242
Table: 85	Paired Samples Test for Inference (Control Group) .....	243
Table: 86	Paired Samples Test for Reading Pace (Exp. Group) .....	244

Table: 87	Paired Samples Test for Reading Pace (Cont. Group) .....245
Table: 88	Paired Samples Test for Paragraph Writing (Exp. Group) .....246
Table: 89	Paired Samples Test for Paragraph Writing (Cont. Group) ....247
Table: 90	Paired Samples Test for Sent. Correction (Exp. Group) .....248
Table: 91	Paired Samples Test for Sent. Correction (Cont. Group) .....248
Table: 92	Paired Samples Test for Overall Comm. (Exp. Group) .....249
Table: 93	Paired Samples Test for Overall Comm. (Control Group).....250
Table: 94	Improvement in English Language Skills .....254

## LIST OF FIGURES

Figure: 1 Screenshot of Readlee Library Contents .....	9
Figure: 2 Screenshot of Readlee Assignment .....	10
Figure: 3 Screenshot of Readlee Assignment Submissions .....	10
Figure: 4 Screenshot of Questions Assigned .....	11
Figure: 5 (a) Screenshot of @Voice aloud reader Interface .....	11
Figure: 5 (b) Screenshot of Entelechy Interface .....	13
Figure: 6 Multi-model Teaching-Learning Program .....	47
Figure: 7 Model of Language Proficiency .....	71
Figure: 8 Model UTAUT2 .....	74
Figure: 9 Research Procedure .....	84
Figure: 10 (a) Screenshot of Lesson 1 .....	91
Figure: 10 (b) Screenshot of Lesson 1 .....	91
Figure: 11 Screenshot of Readlee Feedback .....	101
Figure: 12 Range of Words Read per Minute (Experimental Group) .....	107
Figure: 13 Range of Reading Accuracy in Pre-Test (Experimental Group) .....	108
Figure: 14 Range of Words Read per Minute (Experimental Group) .....	110
Figure: 15 Range of Reading Accuracy in Post-Test (Experimental Group) .....	111
Figure: 16 Range of Words Read per Minute in the Pre-Test (Cont. Group) .....	115
Figure: 17 Range of Reading Accuracy in Pre-Test (Control Group) .....	116
Figure: 18 Range of Words Read per Minute Post-Test (Control Group) .....	118
Figure: 19 Range of Reading Accuracy in the Post-Test (Control Group) .....	119
Figure: 20 Participants' Performance in Inference Pre-Test (Exp. Group) .....	124
Figure: 21 Participants' Performance in Inference Post-Test (Exp. Group) .....	126
Figure: 22 Participants' Performance in Inference Pre-Test (Cont. Group) .....	130
Figure: 23 Participants' Perf. in Inference Post-Test (Cont. Group) .....	132
Figure: 24 Participants' Performance in Compr. Pre-Test (Exp. Group) .....	136
Figure: 25 Participants' Performance in Compr. Post-Test (Exp. Group) .....	138
Figure: 26 Participants' Performance in Compr. Pre-Test (Cont. Group) .....	142
Figure: 27 Participants' Performance in Compr. Post-Test (Control Group) .....	144
Figure: 28 Participants' Range of Score in Pre-Test of WP (Exp. Group) .....	149
Figure: 29 Participants' Range of Score in Post-Test of WP (Exp. Group) .....	151
Figure: 30 Participants' Range of Score in Pre-Test of WP (Control Group) .....	155
Figure: 31 Participants' Range of Score in Post-Test of WP (Cont. Group) .....	157
Figure: 32 Participants' Range of Score in Pre-Test of Voc. (Exp. Group) .....	160
Figure: 33 Participants' Range of Score in the Post-Test of Vocabulary (Experimental Group) .....	163
Figure: 34 Participants' Range of Score in Pre-Test of Vocabulary (Control Group) .....	167
Figure: 35 Participants' Range of Score in Post-Test of Vocabulary (Control Group) .....	168
Figure: 36 Participants' Range of Score in Post-Test of Sentence Correction (Experimental Group) .....	171
Figure: 37 Participants' Range of Score in Post-Test of Sentence Correction (Experimental Group) .....	175
Figure: 38 Participants' Range of Score in Pre-Test of Sentence Correction (Control Group) .....	178
Figure: 39 Participants' Range of Score in Post-Test of Sentence Correction	

(Control Group) .....	180
Figure: 40 Participants' Range of Score in Pre-Test of DCTs	
(Experimental Group) .....	183
Figure: 41 Participants' Range of Score in Post-Test of DCTs (Exp. Group) ....	187
Figure: 42 Participants' Range of Score in Pre-Test of DCTs	
(Control Group) .....	190
Figure: 43 Participants' Range of Score in Post-Test of DCTs (Cont. Group) ...	192
Figure: 44 Participants' Range of Score in Pre-Test of Paragraph Writing	
(Experimental Group) .....	196
Figure: 45 Participants' Range of Score in Post-Test of Paragraph Writing	
(Experimental Group) .....	198
Figure: 46 Participants' Range of Score in Pre-Test of PW	
(Control Group) .....	201
Figure: 47 Participants' Range of Score in the Post-Test of Paragraph Writing	
(Control Group) .....	203
Figure: 48 Model of Language Ability .....	206
Figure: 49 Participants' Perf. in Pronunciation Pre-Test (Exp. Group) .....	208
Figure: 50 Participants' Perf. in Pronunciation Post-Test (Exp. Group) .....	210
Figure: 51 Participants' Perf. in Pronunciation Pre-Test (Cont. Group) .....	214
Figure: 52 Participants' Performance in Pronunciation Post-Test	
(Control Group) .....	215
Figure: 53 Participants' Performance in Speaking Accuracy Pre-Test	
(Experimental Group) .....	219
Figure: 54 Participants' Performance in Speaking Accuracy Post-Test	
(Experimental Group) .....	221
Figure: 55 Participants' Performance in Speaking Accuracy Pre-Test	
(Control Group) .....	224
Figure: 56 Participants' Performance in Speaking Accuracy Post-Test	
(Control Group) .....	226
Figure: 57 Participants' Performance in Dialogue Pre-Test (Exp. Group) .....	230
Figure: 58 Participants' Performance in Dialogue Post-Test (Exp. Group) .....	232
Figure: 59 Participants' Performance in Dialogue Pre-Test (Control Group) ....	235
Figure: 60 Participants' Perf. in Dialogue Post-Test (Cont. Group) .....	237
Figure: 61 Students' Perception Regarding the Use of AI-Based Apps to	
English Improve Language Skills .....	256
Figure: 62 Students' Learning Experience with AI-Powered Apps .....	258
Figure: 63 Students' Learning Experience with 'Readlee' App .....	260
Figure: 64 Impact of 'Readlee' on Writing and Speaking Skills .....	262
Figure: 65 Students' Learning Experience with '@ Voice Aloud Reader' and	
'Entelechy' .....	264
Figure: 66 Students' Opinions on the Overall Impact of AI-Based Apps on	
English Language Learning .....	266
Figure: 67 Students' Perceptions Regarding the Limitations on Using AI-Based	
App for learning English .....	268

## LIST OF ABBREVIATIONS

ELT:	English Language Teaching
EFL:	English as a Foreign Language
ESL:	English as Second Language
ELL:	English Language Learners
ESP:	English for a specific purpose
EAP:	English for Academic Purposes
EAS:	English for Academic Studies
L1:	Language One
L2:	Language Two
NLP:	Natural Language Process
DL:	Deep Learning
AI:	Artificial Intelligence
App/s:	Application(s)
Tab:	Tablet
GTM:	Grammar Translation Method
ALM:	Audio-Lingual Method
TBA:	Task Based
TBLT:	Task Based Language Teaching
TPR:	Total Physical Response
CBI:	Content-Based Instruction
CLT:	Communicative Language Teaching
CAI:	Computer-aided Instruction
TELL:	Technology Enhanced Language Learning
CALL:	Computer Assisted Language Learning
MALL:	Mobile Assisted Language Learning
M-Learning	Mobile Learning
SRA:	Science Research Associate
RE:	Reading Eggspress
RCPs:	Reading Comprehension Probes

GO:	Graphic Organizer
LSA:	Latent Semantic Analysis
LCR:	Learning Content Representation
PPMH:	Push-Pull Mooring-Habit
ANN:	Artificial Neural Network
PDA:	Personal Digital Assistant
LCM:	Learners Cognitive Model
CLT:	Cognitive Load Theory
MMS:	Multimedia Messaging Sending
SMS:	Short Message Service
WAP:	Wireless Application Protocol
SPSS:	Statistical Program for Social Sciences
AV Aids:	Audio Visual Aids
Exp.:	Experimental
Cont.:	Control
WP:	Word Processing
WCPM:	Word Count per Minute
PDF:	Portable Document Format
TXT:	Text only
RFT:	Rational Functional Tester
EPUB:	Electronic Publication
MOBI:	Message Oriented Broker Interface
PRC:	Precision Response Corporation
FB	FictionBook
<i>eBook</i>	Electronic Book
PC:	Personal Computer
CD:	Compact Disc
LCD:	liquid crystal display
ICT:	Information and communication technology
WWW:	World Wide Web
GPS:	Global Positioning System

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May Allah reward each and every one of you abundantly!

## **DEDICATION**

This thesis is dedicated to my dear students whose enthusiasms for learning and resilience in overcoming challenges have been a constant source of inspiration. Their eagerness to explore new horizons in education motivates me to strive for excellence and innovation in teaching. May this research contribute to enhancing their English language skills and pave the way for a brighter academic future.

I also dedicate this work to the Higher Education Department Punjab, whose commitment to advancing educational opportunities in Pakistan is commendable. The department's support and initiatives are pivotal in fostering a conducive learning environment for students across the province. May this thesis serve as a testament to our shared goal of leveraging AI-based applications to empower Pakistani students and elevate the standards of education in our country.

# CHAPTER 1

## INTRODUCTION

English is taught in far and wide of Pakistan as a compulsory subject because of its international scope. A wide array of techniques help teachers to encompass ever-evolving and dynamic English language teaching (Peng, 2024). As far as college English language learners are concerned, they are taught English language through the grammar-translation or direct method, which are now considered traditional methods (Warsi, 2004; Aziz et al., 2024). These methods have their own place in English Language Teaching (ELT), and they definitely have their impact on teaching-learning activities, but recent advancement in technology in the form of artificial intelligence invites language teachers to revisit their teaching methods and techniques to equip English language learners with better and more effective learning. Thus, the current study follows AI-based apps to improve college students' English language skills.

### 1.1 Background of the Study

Nations are coming closer and developing relations with neighbouring and distant countries due to globalisation. English as a lingua franca is vital in developing international relations. English is used worldwide as a communication tool, which makes it a prominent and widely spoken language. Crystal (2003) and Prodromou (1997) also posit that 80% of international communication is made through the English language by non-native speakers in majority. So, English language learning has become an important need of every individual. According to Nordquist (2020), English is a medium of instruction in several educational institutes, and fields like technology, business, media, medicine, and so on cannot be thought of without the English language because it is a key source of communication.

So, it is because of the scope of the English language that an ordinary student learns English as a language for fourteen to seventeen years in the Pakistani educational setting. Usually, a student spends three years in kindergarten and 14 years in primary, elementary, secondary, higher secondary, and graduation levels. According to Gillani (2004), many students fail their exams after learning the English language for a specific

time period. The definitive target and aim of teaching English at different levels is to prepare learners with English language skills (Patil, 2008). Unfortunately, all the efforts prove futile when the results of teaching English fail to meet general expectations. The learners cannot develop linguistic and communicative competence and proficiency in English. Jabeen and Akhtar (2013) point out that many English language learners in Pakistan cannot communicate in the English language though they are taught it for a specific period as a compulsory subject.

Of all the skills, reading has a significant role in language education, and it has been emphasised by several scholars (Elley & Mangubhai, 1983). Woudenberg (2021) asserts that we can't deny the critical role of reading in our daily concerns because reading is a vital source through which we reach the knowledge storehouse. According to Muhammad (2013), individuals must be fluent and skilled readers to achieve their educational and professional goals. ESL readers face severe problems in reading English texts. Grabe and Stoller (2002) argue that L2 learners are not given the opportunities to develop reading skills and are neglected in the classroom and at home. Grabe (2009) postulates that reading is a convoluted phenomenon that consists of more complex processes, which are subdivided into further procedures, and thus the development of reading skills requires special attention from language teachers.

Warsi (2004) indicates that Pakistani educators use textbooks to teach the English language at varying levels, and reading plays a significant role in language learning. Research demonstrates that English language readers face many difficulties in reading. These troubles cause hindrances in their reading pace and comprehension. According to Chawwang (2008), a struggling reader faces specific problems with background knowledge, cultural knowledge, sentence structure knowledge, text type, and vocabulary.

Reading is taught in Pakistan using traditional teaching methods, resulting in poor learning outcomes (Muhammad, 2013). Seventy-five percent of Pakistani ESL learners cannot read English text reasonably well (Naviwala, 2016). Poor reading skills cause students to fail in writing and speaking, which are the ultimate goals of language teaching in any context. The common cause of students' inability to read English is that the teacher reads the text himself during the class through traditional methods and assigns the students to read and revise the exact text at home. Still, most of them don't

follow the instructions. Moreover, the teacher also cannot make students read the text one by one in the class because of large classes and time constraints.

### 1.1.1 AI in Education

Artificial Intelligence (AI) has recently penetrated human affairs, and this technological revolution has given birth to mechanisation and digitisation. According to Tai (2020), AI is a technology that involves machines and computers that perform different functions based on intelligence. These may be the machines that function to replace human labour to work more efficiently with better results. It is an intelligence that humans design, but machines demonstrate it. After the advent of AI, human history has witnessed marvels in various fields like communication, transportation, medical, business, education, etc. It is not difficult to surmise how human affairs are being influenced by AI (Marr, 2019). The world's developed countries are not only controlling many human affairs through AI but also promoting the use of AI in many vital fields. Though AI has penetrated almost every field of life, it has revolutionised the area of language and communication more than other domains (Bryson, 2018). Emslie (2020) indicates that “Apple's Siri, for example, supports 21 languages, Amazon Alexa 08, Google Home 13 and Google Translate supports 108 languages; five new languages namely Kinyarwanda, Odia, Tatar, Turkmen, and Uyghur were added in February 2020”. Thus, the situation indicates that many AI-based features have improved internet and mobile communication. The inclusion of AI-based technology has solved even communication issues among people with diverse linguistic backgrounds. The remarkable advances in AI indicate that mankind will be entirely under the influence of AI in the future.

Since AI influences many fields, its prevalence in the educational sector is no longer an exception, though it is yet to be followed in underdeveloped countries like Pakistan. Shabakah (2012) indicates that AI simulates how humans learn, think, and communicate to share and transmit knowledge. Al-Ghayyar (2013) also asserts that the application of AI programs is a part of the intelligent teaching-learning activity that significantly benefits learners and teachers. So, AI applications allow learners to interact with open sources and tools in the most suitable way because they merge virtual and real-life reality by making their learning interactive (Kamel, Al-Jazzar & Mahmoud, 2010). While counting the benefits of the application of AI to education,

Borge (2016) indicates that incorporating AI into teaching is highly advantageous for the teacher in teaching as well as assessment and evaluation. Thus, teachers can quickly identify deficiencies in students' learning. He further points out that quick feedback to students through AI applications is also a remarkable change from the traditional way of assessing and giving feedback.

### 1.1.2 AI in Language Teaching

The application of AI to language teaching is becoming vital because it has solved many chronic problems of language teaching by simulating human intelligence in teaching-learning activities, individualised learning, personalised and immediate feedback, and scaffolding (Fitria, 2021). Walker et al. (2007) assert that the use of AI applications is very effective in enhancing learners' language skills like reading, writing, and speaking. They are quite helpful in sentence construction, writing texts, and writing practice. Moreover, Lotze (2016) also opines that applying AI systems to language teaching helps teachers by enabling them to develop systems through which all the learning requirements are fulfilled. Thus, learners' language skills can be acquired through AI dialogue boxes, processors that develop language, and several programmes that can generate texts for reading and provide the required knowledge from the text. It has been primarily acknowledged that AI is exceedingly helpful in education (Srinivasan & Murthy, 2021), so its application to language teaching has also produced encouraging results. Ahmadi (2018) also favours the idea of using new technology in language teaching because it is fruitful in developing language skills. Radwan (2017) posits that AI can solve many issues in teaching/learning English.

AI has opened newer gateways for language teachers to improve learners' language skills. So, taking advantage of technology and AI-based applications, the current study incorporates AI into teaching reading to enhance the overall reading skills of college-level ESL learners. For this, the present study follows an action research design by conducting an experiment. Moreover, the study explores how other language skills like speaking and writing are influenced by reading, as reading is an effective source of language input through which learners develop a complete semantic, syntactic, pragmatic, and stylistic repertoire.

The benefits of applying AI to language teaching have been universally acknowledged by various scholars worldwide (Radwan, 2017; Marr, 2019; Tai, 2020; Ghoneim & Elghotmy, 2021). The current study uses AI-based applications named **Readlee** and **@Voice Aloud Reader**—the former provides automated and personalised feedback to the teachers and students simultaneously, whereas the latter reads any assigned text automatically and models the reading. Moreover, one more app, ‘**Entelechy**’, has also been used for learning and assessment purposes. This app can be used to upload reading tasks followed by MCQs, true/false/blanks, and short questions/answers. The app automatically generates a questionnaire based on the assigned text, which helps monitor learners’ progress. The students get their scores right after the submission of their task. All these apps are mobile/tab/computer-friendly, and ESL readers can use them conveniently.

## 1.2 Statement of the Problem

Reading plays a vital role in language learning. In Pakistan, reading is taught using traditional methods, and no feedback system exists to inform the teachers about the learners' tasks. Moreover, time constraints and large-sized classes also hamper the teacher in evaluating students’ reading and giving them quick feedback. Thus, the lack of regular practice by the students and the teacher’s inability to provide feedback to the learners hinder the improvement of reading skills. ESL learners' writing and speaking skills are negatively influenced because linguistic input through compelling reading is compromised. Thus, the current study attempts to use three AI-based apps—‘Readlee’, ‘@Voice Aloud Reader’, and ‘Entelechy’—to help Pakistani college students improve their reading skills. Moreover, this study analyses how far the writing and speaking skills of college students are impacted if reading is practiced using AI-based applications.

## 1.3 Research Objectives

The objectives of the study are:

1. To assess the impact of using AI-based apps on the development of reading skills in college-level English language learners.
2. To evaluate the effectiveness of AI-based tools for teaching speaking and writing skills.

3. To explore the perceptions of students in the experimental group regarding the usability and pedagogical value of the selected AI-based tools through Likert-scale questionnaires and semi-structured interviews.

## **1.4 Research Questions**

The following research questions are addressed in the present study:

1. To what extent can the reading skills of Pakistani college students be improved using AI-based applications?
2. How far does using artificial intelligence in teaching reading impact college ESL learners' writing and speaking skills?
3. What are the students' perceptions regarding the use of artificial intelligence in teaching reading?

## **1.5 The Rationale of the Study**

Numerous studies have been conducted to find solutions for Pakistani ESL students' incompetence in developing English language skills appropriately, but still, the results are not very encouraging, and English language teaching in Pakistan does not meet expectations at various levels (Kiran, 2010). This persistent problem highlights not only the inadequacy of traditional pedagogical approaches but also the urgent need for innovative solutions tailored to learners' evolving needs. Previous research has extensively covered traditional teaching methods, yet it fails to effectively address the existing gaps such as insufficient individualised feedback, learners' engagement, and inadequate exposure to the required linguistic input. Furthermore, obstacles such as large-sized classes, outdated syllabi, and limited teacher training also contribute to ineffective instruction. All these limitations emphasise the need for alternate approaches that can supplement traditional methods and meet such challenges.

Exploration of technology, particularly artificial intelligence (AI)-based applications as a tool for improving English language skills among college students in Pakistan, is a significant gap with limited research. Some of the previous studies have incorporated technology in English language teaching, but they could not prove persistently successful. So, the current study addresses the gap by investigating the impact of AI-based applications specifically on reading skills, which serve as a

foundational component of overall language proficiency. By enhancing reading comprehension, vocabulary acquisition, and critical engagement with texts through AI-powered feedback, the study posits that students can achieve larger gains in writing and speaking skills as well. Thus, this research not only fills a methodological and contextual void but also contributes to a more comprehensive understanding of how digital innovations can reshape ESL pedagogy in Pakistan.

## **1.6 Introduction to the AI-Based Apps Used in the Current Study**

Reading is the source of linguistic input, which enables learners to develop other language skills, especially writing and speaking, so it is crucial to improve their reading skills. The current study, therefore, aims to target the reading skills of Pakistani college students to resolve the issue of students' inability to read English text effectively. For this, the present study incorporates AI-based apps to improve college students' reading skills at the first level, and writing and speaking at the second level.

The study uses three different AI-powered apps to improve college students' English language skills:

- **Readlee**
- **@Voice Aloud Reader**
- **Entelechy**

### **1.6.1 Readlee App**

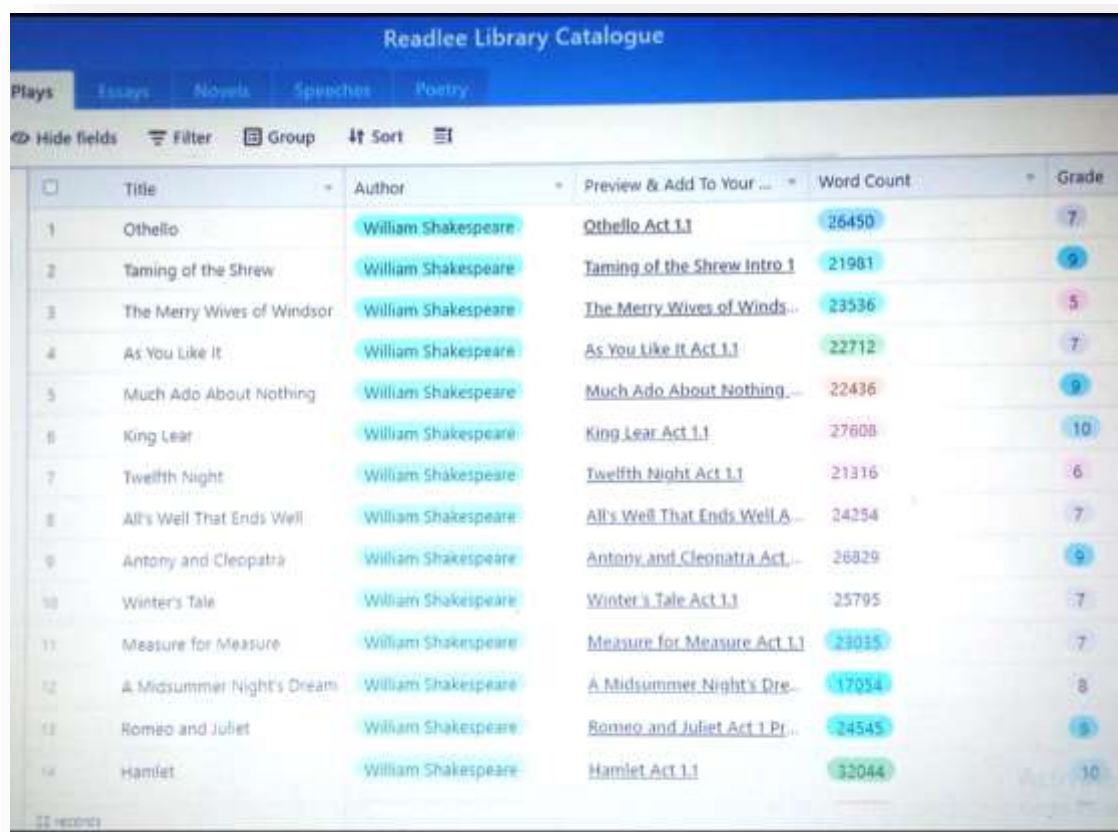
Readlee is a new application for mobiles, tablets, laptops, and computers, and it uses artificial intelligence to improve literacy. It is a co-designed software launched by two teachers, Steve Askar and Drew Madson. Their aim was to personalise reading instructions for learners; the software listens to students reading any text aloud and immediately provides them with personalised feedback. Learners use smartphones, tablets, laptops, or computers to read aloud to the app, and the app traces reading pace and accuracy while the learners read. Then, the app provides real-time feedback to the readers, whereas the teacher also gets the statistics when the reading task is submitted by the student. It was because of the utility and effectiveness of the Readlee App that it was warmly welcomed by educationists and students throughout the U.S., and the

creators of the app were awarded the Harvard Innovation Lab Social Impact Award in 2020. Readlee provides automated and personalised feedback not only to the teachers, but the students also receive it right after the submission of the assigned task. The app is mobile/tab/computer-friendly, and ESL readers can use it according to the means they have. Readlee has certain important features which are as follows:

a) It has a rich inbuilt library, which has ample literary books consisting of texts on poetry, essays, plays, short stories, novels, and speeches as per the needs and tastes of the ESL readers. The screenshot of the content library is as follows:

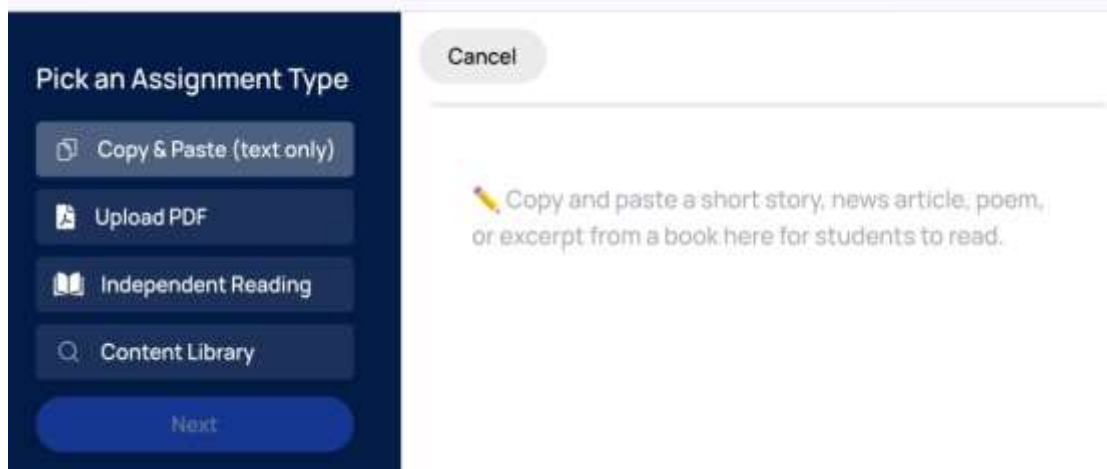
**Figure: 1**

*Screenshot of Readlee Library Contents*



Readlee Library Catalogue					
Plays   Essays   Novels   Speeches   Poetry					
Hide fields   Filter   Group   Sort   List					
	Title	Author	Preview & Add To Your ...	Word Count	Grade
1	Othello	William Shakespeare	Othello Act 1.1	26450	7
2	Taming of the Shrew	William Shakespeare	Taming of the Shrew Intro 1	21981	9
3	The Merry Wives of Windsor	William Shakespeare	The Merry Wives of Winds...	23536	5
4	As You Like It	William Shakespeare	As You Like It Act 1.1	22712	7
5	Much Ado About Nothing	William Shakespeare	Much Ado About Nothing...	22436	9
6	King Lear	William Shakespeare	King Lear Act 1.1	27608	10
7	Twelfth Night	William Shakespeare	Twelfth Night Act 1.1	21316	6
8	All's Well That Ends Well	William Shakespeare	All's Well That Ends Well A...	24254	7
9	Antony and Cleopatra	William Shakespeare	Antony and Cleopatra Act...	26829	9
10	Winter's Tale	William Shakespeare	Winter's Tale Act 1.1	25795	7
11	Measure for Measure	William Shakespeare	Measure for Measure Act 1.1	23035	7
12	A Midsummer Night's Dream	William Shakespeare	A Midsummer Night's Dre...	17054	8
13	Romeo and Juliet	William Shakespeare	Romeo and Juliet Act 1 Pr...	24545	9
14	Hamlet	William Shakespeare	Hamlet Act 1.1	32044	10

English language teachers can also assign reading tasks to the learners by either giving the learners an option to read and record their reading independently, uploading a pdf file/pdf book to read and record or pasting a text on the inbuilt board offered by the app to read and record. The screenshot of the assignment format is as follows:

**Figure: 2***Screenshot of Readlee Assignment*

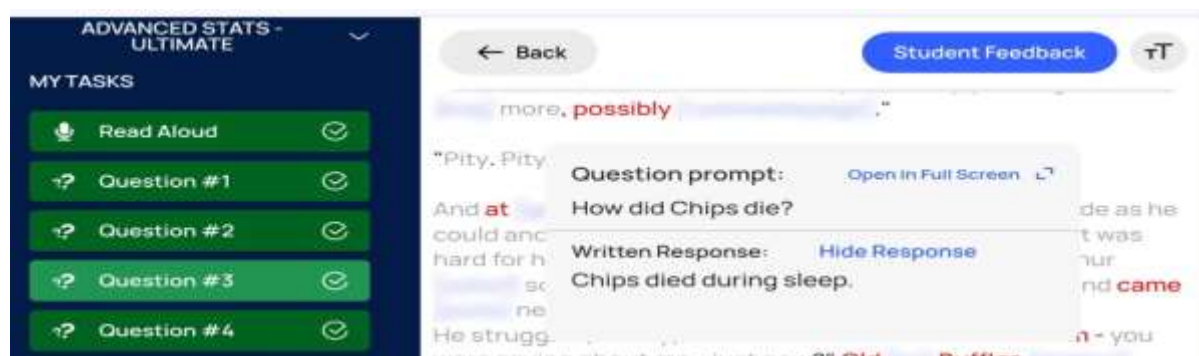
b) The app gives quick and personalised feedback to learners and the teacher by indicating word count per minute, accuracy, reading time and details about login. The screenshot of the feedback by the app is as follows:

**Figure: 3***Screenshot of Readlee Assignment Submissions*

The screenshot shows a table titled "Readlee" with a hamburger menu icon on the left. The table lists four submissions with the following data:

Initials	Name	Status	Stars	Accuracy	Words	Characters	Time	Attempts	Date	More
HN	Nisar, Hussnain	Submitted	★★★★★	98%	130	521	3m 19s	1/1	Apr 11, 9:47am	⋮
DS	satti, danish	Submitted	★★★★★	99%	160	528	3m 7s	1/1	Apr 11, 12:05pm	⋮
WH	Hussain Satti, Wajahat	Submitted	-	59%	97	311	2m 35s	1/1	Jun 24, 3:55pm	⋮
HM	Malik, Hasham	Submitted	-	100%	148	561	3m 13s	1/1	Apr 10, 6:24pm	⋮

The teacher can add questions to assess the learners' level of comprehension whereas the students have the option to either speak and record the answer or type the answer on the given screen. The screenshot of the comprehension questions is as follows:

**Figure: 4***Screenshot of Questions*

All the features of the Readlee app are practical and seem worth using to improve college students' English language skills.

### 1.6.2 @ Voice Aloud Reader

The second app used during the current research is '@Voice Aloud Reader.' It is designed to read any text in emails, articles, web pages, and open office documents aloud. The files are read aloud in PDF, DOCX, TXT, and RFT formats. Moreover, it can read files in EPUB, MOBI, PRC, AZW, and FB2 eBooks aloud. It allows the audience to read the text on screen or listen to it if their eyes are occupied. Thus, the app is versatile as it caters to our needs. The App has distinguished features, which are as follows:

- It reads various files aloud for the convenience of the people working in different scenarios.

The following screenshot explain how this App actually works:

**Figure: 5 (a)***Screenshot of @Voice Aloud Reader Interface*

- The users can enjoy web pages that are clutter free. There are no menus, advertisements and other sources of distraction.
- It offers the users the option of OCR (Optical Character Recognition) to extract text from PDFs where standard text extraction fails.
- It allows users to share any content from other apps via text. The text can be copied and pasted into the @Voice Aloud Reader dashboard for seamless listening.
- WhatsApp chat can be exported and listened to effortlessly through this app.
- It helps the users create and customize a list of the material that has been listened to.
- eBooks can also be read and listened to with original images and formatting.
- The app supports any text written from right-to-left (vertical) and (horizontal) modes like Chinese and Japanese languages.
- The app also records the spoken texts as sound files for later usage.
- It can consult dictionaries, Wikipedia, translation and other web searches by long-pressing on different words and phrases.
- The users ' choice adjusts speech volume, pitch, and rate.
- Users can skip, resume, and pause using Bluetooth or wired headset buttons.

The features of this app are quite useful for ESL learners as well. The current study follows this app specifically for college English language learners so that they may have an option of model reading which they can listen to have an idea about reading style and pronunciation.

### 1.6.3 Entelechy

The third AI-based app used in the current study is 'Entelechy'. It is an AI-powered personal tutor that generates multiple-choice questions (MCQs), fill-in-the-blanks, true/false, and Wh questions from the text and content provided. It further allows reading and learning the material through its dashboard. It allows the users to download the questionnaire it generates. The entire questionnaire can be imported as an MS Word file, and the teacher can further utilize it for classroom purposes. This app is helpful for teachers, learners, parents, test developers and corporate trainers. The following figure presents the prominent features of the app:

**Figure: 5 (b)***Screenshot of Entelechy Interface*

The current study used this app for two reasons. Firstly, the teacher used it to generate quizzes for students to assess their reading comprehension. The quizzes generated by the app were a part of every lesson plan implemented through the Readlee app. Secondly, the participants were required to create the quizzes through the 'Entelechy app' to assess their learning and reading comprehension after completing the reading task.

## 1.7 Significance of the Study

The present study introduces an innovative approach to English language teaching that produces encouraging results and paves the way for other English language teachers and students in the Pakistani ELT context. Creativity and learning have long been critical concerns in English language teaching, as they are often neglected in favour of rote learning, which merely helps ESL learners pass examinations. Since the examination system favours rote memorisation, creativity and

skill development remain at stake. The current study is significant because it ensures the transmission of linguistic input through systematic reading exercises while still using the prescribed textbooks from the syllabus. It also enables college-level English language learners to develop reading, writing, and speaking skills in a balanced manner. Thus, students not only succeed in their examinations but also significantly improve their overall English language proficiency. Therefore, this study is important because it contributes positively to the field of English Language Teaching (ELT).

## **1.8 Organization of the Chapters**

The study is divided into five chapters. **Chapter One** presents the introduction and background of the study. It outlines the problem statement and provides the rationale for the research. **Chapter Two** reviews existing literature in the field of English language teaching and identifies the research gap. **Chapter Three** describes the research methodology adopted for the current study. **Chapter Four** presents and analyses the data. **Chapter Five** includes the findings, discussion, conclusion, and recommendations. It also outlines the significance of the study, its contribution to society, the limitations encountered, and suggestions for future research.

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

The current chapter contains information about the previous studies conducted in English Language Teaching, primarily through technology, computers, digital forums, smartphones and Artificial Intelligence-Based applications. This chapter includes detailed information about the traditional modes of English language teaching and the use of technology, computers, digital platforms, AI-based applications, etc., in English language teaching. The literature review indicates the research gap and encourages to conduct the present research.

#### **2.2 Traditional Methods to Teach Language Skills**

English language teachers and researchers have been applying different techniques and methods for teaching the English language. Richards, & Rodgers (2014), Brown (2000), & Freeman & Anderson (2011) informed that different methods and techniques have been tried to teach the English language to non-native English language learners. These methods include:

- Grammar-Translation Method-GTM (19th century- early 20th century)
- Direct Method (Late 19th century – early 20th century)
- Audio-Lingual Method-ALM (1940s-1960s)
- Communicative Language Teaching (1970s- present)
- Task-Based Language Teaching (1980s-present)
- Content-Based Instruction (CBI) (1990s-present)
- Total Physical Response (TPR) (1970s- present)
- Sociocultural Theory and Constructivism (1980s- present)
- Technology-Enhanced Language Learning (1990s- present)

All these methods and techniques have contributed to English language teaching in one or the other way and different linguists have counted the advantages and disadvantages of these methods based on their experimentation and observation.

Traditional and modern English language teaching methods largely draw upon Chomsky's concept of universal and generative grammar. Chomsky (1965, 1981) posits

that humans are born with a universal set of grammatical principles that enable them to acquire any natural language. In this view, learning a second language entails mapping new linguistic input onto this innate system through various tools and techniques. Chomsky et al. (2023) argue that though AI can be useful for many tasks in language learning, it cannot model human thinking. They believe that AI is limited to areas that require real understanding, deep reasoning, and moral judgment. So, AI systems use language models that do not understand natural language rather they rely on the data provided by human beings. AI models work through statistical data and algorithms which have no connection with natural language processing in human beings. They further explain that AI has ability to predict and process language but it is not comparable to the cognitive and mental processes that are involved in natural language processing in human beings. However, AI tools can support language learning with positive results. AI-based applications provide abundant and diverse language input alongside interactive tasks. These tools create opportunities for learners to internalize underlying grammatical rules, consistent with Chomsky's assertion that exposure to structured input activates the innate grammar faculty. Accordingly, the present study integrates AI-based tools to enhance Pakistani college students' English language skills.

A central issue in second language acquisition (SLA) theory is how learners acquire language through exposure to input that is sufficiently comprehensible yet slightly beyond their current competence (Krashen's Input Hypothesis). In traditional settings, input may be limited in quantity or poorly aligned with learner level. AI-facilitated systems, such as adaptive reading and generative chatbots, provide rich and tailored input (Ridayani, Badri & Susyla, 2025).

Moreover, sociocultural Theory (Vygotsky) provides another lens: learning as mediated by tools, scaffolding, and social interaction. In AI-assisted environments, the tool itself becomes a source which provides scaffolding, often aligned with the zone of proximal development (Panhwar et al., 2016). Empirical research shows that AI tools can lower learner anxiety, increase motivation, and provide constant availability, all factors relevant to the affective dimension of SLA. For example, a study of Japanese EFL learners found that self-regulated use of machine translation and generative AI tools improved writing outcomes, though learners still valued human guidance and peer interaction (Wang, 2024).

According to Bhatti et al. (2021), Grammar-Translation Method, Direct Method and Audio-visual method are used most commonly. Grammar-translation method and direct methods are most commonly followed in Pakistan based on the level of English language teaching (Gull, Dad, & Ali, 2022). Abdullah (2018) indicates that in Pakistan, the grammar-grammar translation method is generally followed at secondary and higher secondary level to develop vocabulary and teach grammar knowledge among the ESL learners. Rosi, (2024) also informs that GTM is still followed for English language teaching around the world. The direct method is also still followed because it is effective in enhancing students' oral and listening skills (Dakhlan, & Tanucan, 2024). According to Al-Ajmin (2020), the direct method has questions on its long-term effectiveness as it ignores important aspects like vocabulary and grammar. Apart from these traditional methods, technological language teaching is also in vogue around the globe though it has numerous challenges in Pakistan including lack of trained English language teachers and resources (Razzaq, 2023). According to Bugti, Sarhandi & Bugti (2024), technology-based language teaching has institutional and infrastructural encounters which hamper language teachers to integrate technology to language classes. So, some of the methods are no more in vogue whereas others are still practiced because they have been proven to be effective in English language teaching.

Apart from the methods discussed above, some researchers have tried different techniques to develop specific language skills. For instance, Cornthwaite (2012) compared the methods of teaching reading skills to young readers. It was experimental research that aimed at finding a suitable method for developing effective reading skills in young readers. The research participants were elementary students who were divided into two different groups so that the learning progress of the learners might be assessed. One group was taught using SRA Reading Mastery whereas the other group was taught through Guided Reading. SRA Reading Mastery is a direct instruction program that provides systematic instructions to the readers. This program includes features like placement tests, assessment and monitoring. Conversely, Guided Reading is a teaching technique through which a teacher supports the readers in developing strategies to deal with the issues about reading. The research findings indicated that both the methods proved effective and there was no significant difference in the learning growth of the young readers though both the groups showed improvement when the learning outcomes were compared.

Marcos (2015) conducted a study to analyze the errors committed by the intermediate level English language learners. According to the researcher, errors were taken as negative responses in language learning previously but the advent of error analysis and frameworks about it indicated that mistakes and errors on the part of the learner do not mean failure in language learning rather errors indicate the development of language skills. Errors lead to learning when they are corrected so they lead to the success in language learning. The researcher did an error analysis of 25 intermediate English essays written by the students of the University of the Basque Country. The focus of the analysis was on the lexical and grammatical errors while determining whether or not L1 influenced the error occurrences. The researcher found that most of the errors were influenced by L2, though L1 also played a vital role in terms of influence. In contrast to lexical errors, grammatical errors seemed to occur more frequently. The researcher suggested that the teachers should give more importance to lexis and grammar. They should also highlight errors and give proper feedback to students so that they may learn from their own mistakes. The study covers the area of ELT while focusing on the writing skills of the learners of English as L2. This study has focused on learners' errors mainly, though teacher and teaching methods are also interlinked with the title because teacher, student and learning are the variables of the same mainstream of English language teaching and learning.

The literature on the traditional methods of teaching English informs that different methods have been applied to teach the English language and with the passage of time, the methods were replaced with new ones as per the needs and requirements of English language learners.

### **2.3 Technology in English Language Teaching**

English language teaching has been undergoing an evolutionary process since its beginning, and many methods have been adopted to teach the English language, especially to non-natives. The use of technology in English language teaching became a trend when language teachers recognised its significance. Different scholars have defined the term “technology” differently. İŞMAN (2012) defines technology as “the practical use of knowledge particularly in a specific area which involves the use of technical processes and methods.” Thus, teaching involves using machines, computers, instruments, and technology to teach and transfer knowledge.

Moreover, Hennessy, Ruthven, Brindley (2005), and Gilakjani (2017) indicate that integrating technology in teaching can be defined by its function, as it helps a teacher achieve his teaching objectives by performing different activities effectively. According to Dockstader (2008), using technology helps improve the environment in which a teacher attempts to teach. Thus, many scholars, such as Murphy, De Pasquale, and McNamara (2003), indicate that the use of technology in English language teaching is effective. Ahmadi and Reza (2018) postulate that technology plays a significant role in improving language learning. Moreover, technology supports the teacher and enables him to adopt teaching and learning activities that encourage language acquisition.

According to Chinnery (2006), integrating technology in language teaching is not new; its roots can be found in earlier teaching and learning practices. Duman et al. (2015) indicate that even in the 1960s, new teaching methods were employed that went beyond routine classroom learning. In the 1970s, CD players were introduced with the “Moving Picture Expert Group Layer-3 Audio” feature, commonly known as MP3. Consequently, cassettes were replaced with CDs to store audio lectures on language learning. These CDs were used through personal computers (Carrier, 2006). Tabatabaei and Goojani (2012) report that in the 1980s, distance learners were given feedback through the “Twarog and Pereszlenyi-Printer” system.

In the 1990s, a distance education English course was taught to language learners through telephone and computer while the instructors were in Hawaii and the learners were in Tonga (Green, Coolier & Evans, 2001). Later, in the 2000s, Dicky (2001) set an example of integrating technology into language teaching by using teleconferencing to teach English to South Korean students. Moreover, different language courses were taught using wireless computers at the University of Wisconsin-Madison (Samuels, 2003). These developments indicate that technological tools for language teaching have been evolving throughout history, with new tools gradually replacing traditional ones (O’Brien & Hegelheimer, 2007).

Many research studies indicate that technology is widely accepted in language teaching worldwide. The available literature shows that language teachers are willing to incorporate technology into language instruction. For instance, Desjardin and Peters (2007) investigated whether a single-course approach would be suitable for pre-service language teachers to develop technological competence. The experiment revealed that

teachers could use technology in their classrooms successfully but lacked confidence. The participants attended a 45-hour training session, which improved their technological skills, though they still required more practice and support. Other scholars, such as Peters (2006), Wong and Benson (2006), and Lambert, Gong, and Cuper (2008), also reported similar findings. Their studies indicated that a single-course approach and short in-service training positively changed participants' attitudes, though more training was still needed. On the other hand, Thiemann (2008) conducted a longitudinal study and found that 85% of pre-service teachers used various technological tools in their teaching practices.

Hakim (2016) argues that it is difficult for teachers to motivate students to speak English. His study focuses on teachers' challenges in encouraging students to communicate in English. Therefore, the problem is evident and warrants special attention from teachers and researchers. The study recommends that teachers use engaging media in the classroom to provide context for speaking. This recommendation is based on quasi-experimental research involving videos used in senior high school to enhance various aspects of speaking skills among English language learners. An eleventh-grade class was divided into control and experimental groups, and pre- and post-tests were conducted to collect data. The Statistical Package for the Social Sciences (SPSS), version 18, was used to analyse the data. The findings indicated that the speaking skills of students in the experimental group improved; they developed confidence and, most notably, improved their pronunciation. Thus, the study demonstrates that the use of engaging media with relevant speaking contexts is highly effective in teaching speaking.

Ahmadi (2018) explored the role of technology in language learning. He emphasised that technology plays a vital role in the learning process and that nearly every class now incorporates technology in one way or another. Technology is not only helpful in language improvement but also in teaching and learning processes. It has paved the way for success in language learning. The study highlights the growing importance of technology in language teaching, especially in the modern age with improved facilities compared to the past. This literature-based study underscores how effective technology has been in developing language skills and how improved technological integration could enhance future language teaching projects.

Arifin (2020) explored the types of technology English language teachers prefer to use in teaching English at a private university in Indonesia. The study adopted a descriptive qualitative method, using observation and interviews as data collection tools. Two English language teachers were the participants, observed and interviewed by the researcher. The study shows that the teachers used various instruments, applications, and technological sources in their teaching, including “LCD, laptop, speaker, internet, Google Classroom, email, WhatsApp, Facebook, Instagram, YouTube, PowerPoint, focus key, Microsoft Word, and podcast.” The teachers expressed that they preferred using technology because it motivated students and increased their classroom engagement. Furthermore, these tools provided support in displaying materials, sending assignments, and offering feedback, regardless of the students’ or teachers’ locations. The study concludes that ICT use in language teaching is beneficial and recommends integrating technology into English language teaching and learning.

Fadilah and Habibah (2021) explored various types of linguistic input and output to enhance ESL learners’ English speaking skills. The study incorporated the use of YouTube video lessons, applying Krashen’s (1985) theory of input and Swain’s (1985) theory of output. A qualitative descriptive method was employed to collect and analyse the data, interpreting the phenomenon within its real-world context. Ten videos were selected for content analysis, with reading and listening considered sources of input, and speaking and writing regarded as sources of output. The content on YouTube was found to be effective for improving learners’ skills through a variety of reading, listening, speaking, and writing activities. The study indicated that learners could improve reading by engaging with blogs, books, and news, and improve listening through music and news broadcasts. Speaking could be enhanced through practices such as talking to oneself, conversing with native speakers, and spending time in English-speaking environments. Writing, on the other hand, could be improved by keeping a daily journal, log, or diary. Thus, the study recommends using YouTube video lessons to access a variety of linguistic input and output sources for improving students’ English speaking skills.

English language teachers, linguists and research scholars have been trying different tools and techniques to improve speaking skills of ESL learners. Norasiah et. al. (2022) for example tried to improve learners’ English speaking skills with the

help of short videos. This action research followed mixed method approach to collect the research data from 30 eighth graders English language learners. The quantitative data were collected through survey questionnaire whereas the qualitative data were collected through observation and interviews. The results of the study showed that the use of short videos to improve speaking skills of eighth grader English language learners proved effective. The speaking test indicated that average score in the pretest obtained by the students was 65.8 whereas the post-test average score was 75.

Numerous studies have integrated the use of technology to improve English language learners' reading skills. For an instance, Bhatti, M. S. (2021) studied ESL students' perceptions regarding the integration of computers to improve reading skills at the secondary level. A total of hundred students and thirty ESL teachers responded to the questionnaire with positive remarks in the favour of integrating computer to improve secondary level students' reading skills. Tinh, Nam & Bon (2024) on the other hand, observed the impact of technology on thirty four university ESL students' reading proficiency through incorporating ebooks to practice reading. As compared to reading through hard and printed books, the students were found to be motivated to read happily through the ebooks. Thus, it was found that the technology has a positive impact on students reading behaviour and motivation level. In another relevant study, Van, & Louw (2008) used interactive and personalized multimodal devices to improve ESL learners' reading proficiency. For a fixed treatment period, the research participants were taught under a specific lesson plan which integrated interactive tools to practice reading. A notable improve in learners vocabulary, reading fluency and comprehension was observed among the learners after the treatment period. Ahmed, Thomas & Hamid (2020) also had positive results of integrating interactive reading tools to improve 10<sup>th</sup> Grade students reading comprehension. The experimental group students who practiced reading through interactive reading tools showed better results as compare to the control group students who were taught through the traditional grammar-translation method. Moreover, Henry & Mohamad (2021) investigated the impact of using mobile phone to develop critical reading in pre-university ESL students. For this experiment, 'ReadMe' a mobile application was used to practice reading. The app was found to be effective after the experiment because 50% of the students from the experimental group showed improved results in critical reading thinking and comprehension. Pragasam & Sulaiman (2023) also found the use of mobile phone effective to improve ESL students' reading proficiency. Moreover, the students had a positive attitude towards the

integration of mobile phone for practicing reading indicating that there are numerous advantages of using mobile phone for practicing reading.

The literature on the use of technology indicates that English language teachers and researchers have been using different tools and techniques which involve the use of technology to teach English at different levels of education. All previous studies that approve the idea of applying technology to language teaching encourage the modern language teachers to incorporate the use of AI-tools and techniques to language teaching for improved results.

## **2.4 Digital Platform for English Language Learning**

Online storybooks (e-books) have also been used to develop reading motivation in sixth-grade students through a study conducted by Ciampa (2012). The researcher arranged a standardised test to measure participants' level of enjoyment of online e-book reading. Motivation was measured through a questionnaire, while a behavioural observation checklist was also administered during the treatment. A scoring rubric was used to assess participants' literal, inferential, and evaluative comprehension. The post-test, conducted at the end of the research, indicated that learners had made progress and their motivation level had also improved. The study concludes that the e-book/online reading programme is efficacious in improving learners' reading skills and motivation levels.

Nurhana (2014) conducted action research to improve the reading skills of 8th-grade English language students through Interactive Multimedia. As the study followed an action research model, it was divided into four steps: planning, actions, observations, and reflections. Observation and interviews were used as tools for data collection, while pre- and post-tests were employed as the primary sources of data on the reading skills of the research participants. The study recommends the use of Interactive Multimedia to improve the reading skills of 8th-grade English language learners. The learners showed improved results in reading, indicating that interactive multimedia is beneficial in teaching reading in the ESL/EFL context. Furthermore, the findings suggest that students not only improved their reading skills but also became more confident in reading English text aloud. They participated actively in reading tasks, which suggests an increase in interest and motivation.

Alsabbagh (2019) examined the barriers and enablers that hinder or support English language teachers in adopting digital platforms for teaching English at the Grade One level in Kuwait. Additionally, the study explored how frequently teachers adopt or prefer to adopt digital technology for teaching English at this level. Qualitative and quantitative research techniques were used to collect data, and 260 English language teachers shared their experiences regarding the barriers and enablers that influenced their adoption of digital technology. Data were collected through interviews and surveys; qualitative data were analysed through thematic analysis, while quantitative data were analysed using descriptive statistics.

The teachers reported facing many obstacles in adopting digital technology, particularly during their first year of using it. They believed that the Ministry of Education lacked adequate preparation and management. A lack of subject knowledge and training at the teacher level was another barrier to adopting digital tools. Teachers also stated that low confidence among educators was a major factor hindering adoption. Regarding the rate of adoption, teachers varied in their preference for using digital technology in Grade One English teaching. Only a few teachers claimed they preferred digital methods. Hence, the study's key focus was on the adoption of digital technology by English language teachers at the Grade One level in Kuwait. Since early education plays a crucial role in lifelong learning, introducing young learners to the latest tools and techniques is essential. In this respect, the study is highly relevant to the growing needs of young English language learners, particularly in the EFL/ESL context.

The need for digital literacy is increasing rapidly as nearly every aspect of life is influenced by it. Solikhati and Pratolo (2019) investigated the practice of digital literacy in a suburban school. The study aimed to examine how digital literacy was implemented, to identify teachers' behaviour in adopting it, and to explore the challenges and opportunities associated with it. The research involved two EFL teachers who were able to use technology in their teaching. As a qualitative study, data were collected through observation and semi-structured interviews. The findings indicated that the most commonly used digital devices for teaching English were smartphones and computers. Teachers showed a positive attitude toward using these digital platforms in English language instruction. However, several issues were identified, including a lack of resources, students' weak academic background, time constraints, and a limited budget. The study suggested that teachers should prepare

adequately and plan thoroughly to implement digital literacy in English language teaching. Furthermore, the study recommended improving technological facilities, increasing teacher training, and promoting digital literacy to enhance English language learning.

Weninger (2020) emphasised the importance of digital literacy, describing it as a critical competence for everyone—not just students. The main focus of the study was English language teaching. It explored three key aspects of digital literacy relevant to English language teaching: its promises, pitfalls, and potentials. In summary, the study discussed:

- How various aspects of digital literacy are important
- The implications of the concept
- How digital literacy is understood, conceptualised, and eventually implemented

The study contributes to the body of knowledge by discussing the benefits, challenges, and opportunities associated with digital literacy. It highlights that digital literacy is valuable not only in education but also in broader aspects of daily life. Therefore, its role in language teaching should not be overlooked. The study concludes that no innovation can be expected in English language teaching unless learners develop adequate digital literacy.

Hamidah (2021) explored the application and implementation of digital literacy in language teaching. The primary aim was to explain how digital literacy affects the learning of ESP (English for Specific Purposes) students. The researcher employed a conceptual method, relying on literature from various articles and studies to discuss how digital tools are used in ESP instruction. Based on the literature review, the study recommended that digital literacy should be incorporated into ESP teaching. However, its application should be carefully planned, aligned with learners' needs, objectives, and competence. The study found that learners show significant improvement when they are familiar with the content and method of instruction. It concluded that technology is effective in language teaching and should be included in future language education strategies.

Research in the field of digital platforms for English teaching and learning indicates a shift from traditional methods to digital approaches. Over time, various

digital tools, techniques, and platforms have been applied in English language teaching. Therefore, it can be asserted that today's trends in language teaching are largely inspired and supported by the continued adoption of digital platforms in language education.

## **2.5 ELT with ICT and CALL**

Technological advances opened newer gateways not only for language teachers but also for language learners, who now have ample opportunities to learn language through modern technology.

The role of Information & Communication Technology (ICT) and Computer-Assisted Language Learning (CALL) in this regard is also worth noting. According to Sánchez & Alemán (2011), ICT consists of electronic delivery systems like projectors and electronic devices such as TVs, radios, and computers. ICT is widely integrated into language teaching in the modern world. In contrast, according to Levy (1997), CALL can be seen as “the search for and study of the application of computers in language teaching and learning”. Lee (2001) postulates that applying CALL to language teaching brings positive changes in the behaviours of language learners and helps them improve their self-confidence. CALL is alternatively named as Computer-Assisted Instruction (CAI), Computer-Aided Instruction (CAI), Computer-Based Instruction (CBI), or Technology-Enhanced Language Learning (TELL) (Kiliçkaya, 2012). Levy and Stockwell (2006) postulate that activities in CALL are performed through various software, courseware, websites, online courses, programmes, and learning environments.

Tri (2014) researches the frequency of ICT use, students' perceptions and expectations about it, and their purpose for using ICT in English language learning. One hundred and forty-nine English language students were the research participants who responded to the questionnaire containing questions about the frequency of ICT use, their perceptions about the use of ICT in English language learning, their expectations regarding its use, and their purposes or targets in using ICT for learning English. The findings show that the participants use ICT for private purposes more than academic ones, especially for English language learning. Regarding participants' attitudes towards using ICT for English language learning, most students had a positive attitude. The findings also indicate that most students expect that the use of ICT for

English language learning will benefit teaching and learning if it is incorporated into classroom activities. This particular research project focuses on the crucial factors regarding the use of ICT in English language learning. The study covers the psychological aspects of using ICT in language learning, including perceptions, beliefs, attitudes, expectations, and purposes that the students have in mind. All these factors are essential in the sense of educational psychology as applied in a language class. In contrast, our study moves one step further by using technology and digital platforms to teach the English language to college students through AI-based applications.

Pintok (2016) describes the benefits of implementing internet technology to deliver reading instructions to middle school students. The study was conducted to continuously raise students' reading proficiency during the fall. Based on Vygotsky, Dewey, and Piaget's social constructivist view of education, the study investigated the impact of implementing internet technology to deliver reading content to students if the teachers adopted it. The research questions pertained to teachers' experiences using internet technology to provide reading content to learners. Thirty middle school teachers participated in the research and shared their teaching experiences through semi-structured interviews. The research data were coded using themes including "comfort with the internet, level of usage, and the need for professional development." The findings indicated that most teachers delivered their content through internet technology but could not guide or train their students on how to use the internet resources available to them. They also indicated that they lacked computer skills and knowledge, so they could not effectively support their students. This project recommends that all English language teachers and professionals address such gaps that hinder learning and meet both learners' and teachers' professional needs. The study highlights a significant factor: teachers' training and professional development for better outcomes in English language teaching. Reading is a recognised issue in the Pakistani ESL context as well.

Yuchen (2021) indicated that societal developments demand better English proficiency from graduates, which also poses challenges for English language teachers. The author postulates that, compared to English language teaching at the undergraduate level, English language teaching at the graduate level is more challenging because the learners lack motivation. Thus, information technology in education has provided both challenges and opportunities. Therefore, the study focused on English reading and

writing at the postgraduate level so that the deficiencies in English language learning at the graduate level could be addressed. This paper builds on using the intelligent teaching mode at the postgraduate level. The model has practical implications and utility for English language teaching in a smart classroom. The study suggested a plan under which the teacher would follow pre- and post-classroom activities accordingly. The model emphasised using online resources and technology to deliver teaching content.

According to Davies (2011), integrating computers into language teaching is not new. The use of computers in language teaching was first introduced in the 1960s, though the actual beginning of CALL was in the 1970s when it was applied in European schools. There are different opinions about the history and chronological evolution of CALL, but Warschauer (2004) divides the development of CALL into three distinct phases: Behaviouristic CALL, Communicative CALL, and Integrative CALL.

### 2.5.1 Behaviouristic CALL

According to Warschauer (1996), Behaviouristic CALL has its roots in the 1950s, although it was introduced in the 1960s and 1970s. During this period, the programs focused only on the drills, whereas the computers delivered the instructional material to the learners. Warschauer & Healey (1998) inform that the computer played the “mechanical tutor” role in Behaviouristic CALL and provided them with learning packages and quick feedback. Moreover, it was mainly used for repetition and drills for the assigned tasks. Thus, it can be asserted that the students were granted learning autonomy and individualization.

### 2.5.2 Communicative CALL

In the 1980s and 1990s, the general approach to language teaching and learning changed and communicative language teaching came into vogue. Interaction and meaningful activities were the key focus of this new method (Richards and Rodgers, 2002). Thus, new computer software was introduced to meet the requirements, especially in providing the learners with opportunities to learn beyond the classroom. This CALL phase was called Communicative CALL (Warschauer, 1998). In Communicative CALL, the computer plays three roles that are as follows:

- Computer as a tutor (knower of the correct answer)

- Computer as a source of Stimulus (Provider of the material that generates discussion and critical thinking)
- Computer as a tool to promote comprehension of a language and ability to use it (overall support system)

The role of the computer in the second phase of CALL seems more vital and prominent than in its first phase.

### 2.5.3 Integrative CALL

In the late 1980s, the criticism against the Communicative CALL led to the foundation of the third phase of CALL, which was named “Integrative CALL”. Communicative CALL was criticized for being too concerned with the peripheral aspects of language learning instead of its core contents (Kenning & Kenning, 1990). However, the dispute caused the development of a new paradigm that relies on two important technological aspects: the internet and multimedia. According to Warschauer (1998), Integrative CALL depends on the socio-cognitive view of language, assuming that authentic social interaction leads to effective language development. So, this paradigm aims to create an authentic learning environment where all language skills are focused. Thus, multimedia computers were introduced through which all language skills were integrated. In addition to this, the World Wide Web (WWW) provided ample opportunities for non-native speakers to interact with native speakers, which created an authentic social environment in which language learning became more natural and automatic.

All three phases of CALL indicate that language learning and teaching through computers have been undergoing a continuous evolutionary process, and new paradigms of language teaching have taken birth according to the need of time. CALL contributes to language teaching as a medium and it helps promote learning (Hardisty & Windeatt, 1989, p. 3). According to Clark (1988), this approach is called Computer Assisted Language Learning because the computer is a powerful tool for teaching and learning a language. In contrast, the role of a teacher and other non-technological aspects is also important. Hardisty & Windeatt (1989) inform that computers play a vital role in language teaching through various programs specifically designed for educational purposes. They help transmit knowledge, practice the language, monitor and assess learning, stimulate interests, individualize teaching and learning. The

functions served by computers indicate that a substantial change has occurred in how CALL is perceived. Earlier computers were only used to prepare tests and worksheets but now they are used for numerous purposes, including drills, practice, transmitting knowledge, giving instructions, keeping records, etc.

Kılıçkaya (2012) investigates the impact of Computer Assisted Language Learning (CALL) training on in-service language teachers' classroom implementation of CALL-based language teaching activities. 35 pre-service EFL teachers were the research participants in this particular study. The study followed a mixed-method approach to collect and analyse the research data. A questionnaire was floated among the participants for quantitative research data, whereas interviews were conducted for qualitative data. The questions in the questionnaire were about teachers' perceived knowledge of computers and computer skills, whereas the interview questions were about their perceptions and practices. The study's findings indicate that the research participants performed exceptionally well in the classrooms and positively influenced in-service CALL training in their teaching pedagogy. They claimed that the CALL training helped them a lot in implementing CALL-based activities into their classrooms while teaching English to EFL students. They further expounded that the school environment, curriculum and the national exam system were the key factors that impacted the implementation of CALL practices and activities in the EFL classroom.

So, CALL-based training for in-service EFL teachers was the key focus of the study. It focused on a very important idea that English language teachers should be equipped with technological teaching tools, which is only possible through training. This significant research indicated that English language teachers should implement computer technology. But before that, they should be trained well so that they might be able to have complete knowledge about the CALL-based activities, tools and resources. The study highlights the importance of CALL-based training and informs us about the factors that impact implementing CALL-based activities in the classroom. Though our research also pertains to the use of technology and seeks help from computers and mobiles to teach English language skills, it is different in the sense that it incorporates mobile phones/tabs/laptops/computers outside the classroom.

Moreover, it uses AI-based applications, which is something new and has not been followed much in English language teaching in the Pakistani ESL context.

Bish (2017) has critically examined the role and importance of a teacher in English language teaching under CALL. The author indicates that previously, the role of the teacher in implementing technology in a language class was ignored, which negatively influenced teaching/learning results. Thus, the study indicated that implementing ICT in language teaching may lead to better results if the role of the teacher is judiciously considered. The study is based on a survey of 319 English as a Foreign Language (EFL) teachers across 31 schools in different countries. The study tried to build a relationship between teachers' beliefs and learning improvement through technology in English language classes. The author claimed to have coined the term "micro-blending," which refers to a method of teaching a second or foreign language. Based on this emerging praxis, the researcher analysed the relevance and variation of teachers' readiness and acceptability of the application of technology to a language class. The study indicates that more than 89% variation has been found in teachers' preferences for the use of technology in the language classrooms. This particular research has explored a substantial area of English language teaching because the teacher's role in language teaching is one of the most critical factors that directly influence the teaching/learning outcomes. Moreover, the study has covered teachers' beliefs and opinions about what and how they teach are also significant factors.

Children with autism often face trouble reading and comprehending text. Hence, Henderson (2020) conducted a case study to examine the impact of the computer-assisted reading program Reading Eggspress (RE) on improving the reading skills of four primary-level students with autism. The participants' reading skills were tested through clinical evaluation of language fundamentals (5th edition) and Neale Analysis of Reading Ability (3rd edition). This was done through a pretest to determine participants' level of reading skills. To measure the baseline scores and change during the experiment, Reading Comprehension Probes (RCPs) were applied. The participants were taught reading in two phases through a computer-based reading program for four weeks. Reading Eggspress (RE) and Graphic Organizer (GO) were implemented during the first phase, whereas only RE was incorporated to improve

participants' reading comprehension during the second phase. The research findings indicated that the participants significantly improved their reading comprehension, but the variation in scores among the levels of development in all the participants was significant. When parents and teachers were asked about the method's utility, they favoured it and responded positively to the implementation of the computer-assisted reading program. The study participants also showed high satisfaction, claiming that using this program to improve students' reading was interesting as well, though their learning rate and pace varied.

Kormos, Brunfaut and Michel (2020) explored the area of computer-administered language teaching to investigate motivational factors. The study aimed to examine task-specific motivation in the assessment context for young language learners through computer-administered integrated test tasks. The study focused on the relationship between task performance and test task motivation. The study participants were 104 language learners who were 11-15 years old. The participants attempted the following three computer-administered assessment tasks:

- Listen-Write task
- Listen-Speak task with academic content
- Listen-Speak task with non-academic content

The participants were also given a task-motivation questionnaire, which appraised the young learners' task difficulty, emotions and anxiety. The questionnaire also had questions that helped expose the learners' level of effort and subjective competence. The research findings indicated that the young learners had positive views in favour of the integrated assessment tasks. They noted that the Listen-Speak tasks were more complicated, anxiety-provoking and comparatively less amusing than the Listen-Write tasks.

All the above researches indicate that the use of ICT and CALL techniques in English language teaching was fruitful and it contributed to ELT in a significant way which encouraged the researchers to incorporate AI-tools and techniques to English language teaching in different scenarios.

## 2.6 Artificial Intelligence in Education and Language Teaching

The very roots of Artificial Intelligence (AI) can be found back in 1763, 1837, 1898, 1949, 1943 and 1950 without a proper name, but it was in 1955 when the term Artificial Intelligence was coined and used by John McCarthy first time in a conference convened at Dartmouth College, in Hanover, New Hampshire. During this conference, computing scholars thought about the use of human language to develop computer programs that could be run based on thought-processing to perform activities through which learners could improve in the field of education. Thus, it was the first contemplation that led to the foundation of AI-based programs which we find in plenty today (Meacham 2021).

### 2.6.1 Utility of AI in ELL

Wanwu (2015) analysed the feasibility of the assistant platform that uses artificial intelligence and computer technology to provide English language learning opportunities. The system established by the researcher presents different services including English word inquiries, composition, revision and exam practice. The program helps the student learn, practice and revise the English language beyond the classroom. To analyse the feasibility of the assistant platform, an experiment was conducted. The experiment indicated that the platform is effective and it improves learners' English language skills.

According to Tai (2020), AI is a technology that involves machines and computers that perform different functions based on intelligence. These may be the machines that function to replace human labour to work more efficiently with better results. It's a kind of intelligence that is designed by humans but machines demonstrate it. After the advent of AI, human history has witnessed marvels in various fields like communication, transportation, medical, business, education and so on. Ouyang and Jiao (2021), assert that artificial intelligence (AI) is being extensively applied to education because of the development in the field of information technology and computers. They further claim that Artificial intelligence has offered better options and challenges in the field of education. At the same time, AI in education has been undergoing a paradigmatic shift which can be divided into three different shifts which are:

- AI-directed, learner-as-recipient

- AI-supported, learner-as-collaborator and
- AI-empowered, learner-as-leader

Kanan & Munday (2018) indicate that the importance of AI-powered tools has been accepted worldwide in the arena of education so rapidly. Humans have witnessed a great change in teaching and learning activities after the advent of AI-powered tools in education. The options to learn have been added with Mobile Assisted Language Learning (MALL), Computer Mediated Communication, Computer Assisted Language Learning (CALL) supported by e-learning systems, web learning and many other AI-based applications for second or foreign language learning. According to Loeckx (2016), AI is an effective tool for learning and it supports both teachers and students by decreasing their burden. Zhai et. al. (2021) postulate that students as digital citizens can use AI to learn in a better way but to learn under AI, they should have proper training and knowledge about the techniques and tools that are AI-powered.

Liu and Liu (2019) indicated that within the realm of artificial intelligence, language learning is closely interconnected with machine translation, natural language comprehension and speech recognition. While indicating towards the progress in AI and related fields, the researchers claimed that their country leads in artificial intelligence speech recognition with an accuracy rate exceeding 97%. Beyond comprehending human language, machines provide prompt feedback and speech recognition, aiding English learners in improving their listening and speaking skills. Leveraging speech recognition and machine translation technologies as cornerstones, various speech translation software have emerged, including Microsoft's new voice translation software that not only swiftly translates but preserves users' voice characteristics. Since 2016, machine simulations have become common at international conferences, indicating a trend toward standardization.

Delgado, Azevedo, Sebastiany & Silva (2020) explored the impact of Artificial Intelligence on English Language Teaching. The study focused on the uses of AI, its functionality and tools that are applied by American school teachers to teach language. The results showed that the tools that are commonly used by the teachers are valid and effective as they positively support teaching and learning activities. As

far as the advantages of AI-powered tools are concerned, the study indicated that students and teachers get inclusive opportunities to complement learning especially when we consider adaptive learning. Moreover, it was observed that AI-based tools tailor instructions to maximize learning according to learners' needs and learning pace. The teachers also confirmed the advantages of AI-powered tools for adaptive learning. However, some of the teachers pointed out that the teacher's autonomy is compromised and his focus on every learner is not ensured when learners are only left at the mercy of some app or program.

Ghoneim & Elghomy (2021) highlighted the importance of using Artificial intelligence-based programs to enhance and improve the listening skills of primary-level EFL learners. The study was conducted to verify whether or not the use of AI-based programs proves effective for developing the listening skills of EFL learners at the primary level. The participants of the study were 80 students who were divided into two groups with the strength of 40 students in each group named the experimental and control groups. The students in the experimental group were taught through an AI-based program whereas the pupils in the control group were taught under the grammar translation method. Pre and post-tests were conducted and listening skills were judged under a checklist that included all the important or targeted listening skills. The statistical data analysis indicated that the students taught under that AI-based program showed improvement in a significant way as compared to the students who were taught through the routine method.

Lulu, Ting, & Dongliang, W. A. N. G. (2021) proposed an innovative way of English language teaching and learning at the college level using corpus-based AI English listening teaching, AI-based oral English teaching using robot based AI and AI translation teaching. It also recommended teaching English writing through AI tools. The study indicated that the growing needs of college and university English language learners demand a change, especially in terms of learning English for a specific purpose (ESP). But, at the same time, the study highlighted that there are many challenges and opportunities in using AI-based tools and technology that should be carefully undertaken for language teaching at the college and university level.

Dewi, Wardani, Rahim, Putri, and Pandin (2021) conducted research affirming that Artificial Intelligence technology has potential to support English learning. Students who use AI-based applications like Duolingo, Google Translate, and Grammarly reported improved writing, listening, and speaking skills. Application-driven AI development elevates language translation quality and positively impacts English skill development, as shown by studies utilizing AI-enhanced tools like Netflix and Joox Music to enhance listening skills and employing AI-powered chatbots to improve language skills and confidence in writing.

Celik et al. (2022) underscore the need to empower teachers with AI integration skills to leverage AI-based education effectively. While teachers' AI-related skills remain insufficiently studied due to untapped potential, exploring their interaction with AI systems and contributions to AI-based education is essential. Positive student learning outcomes are observed with AI-based systems in teaching. This indicates that the teachers should be given a free hand to choose and implement AI-based language teaching which can make their teaching more effective.

Sumakul, Hamied, Sukyadi, and Network (2022) analyze AI's impact on language learning and teaching, portraying AI as a potential ally. As AI's automation transforms education, its integration brings new possibilities and challenges for educators and learners. The study highlights AI's potential benefits while considering student motivation and teachers' technological and pedagogical expertise. Though AI is transformative, more data from diverse teacher contexts and student perspectives are needed for a comprehensive understanding of its implications in education and language learning.

In another study, Vall, R. R. F., & Araya (2023) explored the benefits and challenges of AI-language learning tools. The researchers indicated that AI-powered computer programs and applications are the tools that language students and teachers use to develop and enhance foreign language skills. The study highlighted the advantages of AI-based applications and programs indicating that they help the learners and teachers in saving their time and speeding up their learning. Moreover, students get a chance to experience personalized learning which covers the issue of individual differences in a regular language class. While pointing out the challenges,

the study indicated that the learners might face various hurdles like lack of training and ability to learn through these tools, language complexities, cultural issues, and lack of required resources. Thus, the researchers recommend the careful tackling of the challenges to provide the learners with improved AI-powered tools with better algorithms and learning capacity.

The study covers an important aspect of the application of AI-powered tools to language teaching. It is essential to have a clear idea about the advantages and disadvantages of AI-powered tools before applying them to language learning and teaching to achieve the set targets. Conclusively, the study recommends the use of AI-powered tools for language teaching and learning. Thus, keeping the pros and cons of the application of AI-based tools in consideration, our study applies AI-based applications to improve college students' English language skills through experimental research.

Utilizing the framework of the Self Determination Theory, Annamalai, Eltahir, Zyoud, Soundrarajan, Zakarneh, & Salhi (2023) explored the motivational factors among 25 undergraduate students who were engaged with a chatbot for learning the English language. Through a process of thematic analysis, the interviews were conducted and scrutinized as part of the study in light of learners' psychological needs encompassing autonomy, competence and relatedness. The outcomes of the analysis indicated that while chatbots effectively addressed these fundamental needs, they exhibited a deficiency in emotional engagement and occasionally dispensed inaccurate language learning information. To redress these limitations, students recommended employing chatbots primarily for assessment purposes and advocated for their integration with blended learning or traditional classroom instruction to clarify uncertainties. In sum, this research significantly advanced the comprehension of Chatbot-facilitated language learning, underscoring their potential while offering insights for enhancing the educational experience, benefitting educators, developers and researchers alike. Unlike this study, our study incorporates the use of three different AI-based apps to teach English language skills to college-level English language learners. All these three applications are used for different purposes like self-assessment, reading practice and model reading.

### 2.6.2 AI in Language Assessment and Evaluation

Srihari, Collins, Srihari, Srinivasan, Shetty & Brutt-Griffler (2008) described computational methods of evaluation of short essays through automatic technologies. The study indicated that reading comprehension is largely tested through handwritten responses in various schools. The teacher makes learners read some text and asks them to reproduce the text in writing to assess comprehension through the written text. The study compares handwriting recognition and automatic essay writing technologies to analyse which scoring method is more effective. According to the authors, both approaches work under the fusion of two different methods and the first follows Latent Semantic Analysis (LSA) and the latter follows an artificial neural network (ANN) to score the handwritten text. LSA needs a large set of lexicons whereas ANN works with a small lexicon to produce the results. The study concludes that handwritten essay scoring is better than automated scoring because it seems more practical as compared to automated scoring because automated scoring cannot be trusted because of its loopholes and drawbacks. The study compares two scoring methods namely handwritten essay scoring and automated scoring and recommends the use of handwritten scoring because it is more practical and suitable in the educational context.

Wang (2018) analyzed the artificially intelligent standardized test system based on a genetic algorithm. In traditional educational settings, large tests were conducted which were not only difficult for the students to tackle but the teachers also faced troubles in the conduction of such tests and scoring was also not easy. Thus, this study was conducted to design a standardized test to indicate how standardized tests could be developed using AI technology. The test consisted of fuzzy and close matching to intelligent marks in combination with artificial intelligence to develop an optimized standardized English test system. Through an experiment, the author analysed the feasibility of the test. The findings informed that the intelligent standardized test system proved effective with the following advantages:

- It saved time for the teacher and test-takers
- It reduced the cost expenditures of printing and paper
- It assessed candidates' ability effectively
- It ensured automated feedback

Bin & Mandal (2019) came up with the idea that automatic evaluation of English composition is an important feature of computer and AI technology. So the study was conducted to make automatic scoring systems more effective. Moreover, the study highlighted that the integration of new technology also caused the optimization of English language teaching with a personalized teaching/learning environment in ELT. So, this study followed curriculum theory, field investigation and literature analysis to improve ELT in middle school. For this purpose, the study proposed a plan for college English-assisted instruction that is based on AI technology. It also focused on the improvement and humanization of English teaching. The study delves into the automatic scoring and evaluation of English composition which is very important in English language teaching. An automated feedback system not only saves teachers' time but also helps learners know about their mistakes and writing issues. Hence, our study also attempts to use AI-based applications that provide automated and quick feedback to teachers and learners right after the submission of assignments.

### 2.6.3 Use of Chatbots

Kim, N. Y. (2019) conducted a study to analyse the effect of AI-Chatbots on the improvement of college students' skills in English grammar. The participants of the study were 70 undergraduate students. These students were taking English class at a Korean university. The students were divided into two groups and students in the chatbot group participated in ten chat sessions for 16 weeks. They were directed to chat with bots instead of human beings. On the other hand, students in the human group were engaged to chat with each other for the same period. To examine students' performance and grammar learning before and after the activity, pre and post-tests were conducted. Then, the results of pre and post-tests were compared through a t-test. The findings indicated that the grammar skills of participants in both groups improved. Moreover, a noteworthy difference was found between the Chatbot and human groups. The Chatbot group was found to be more successful in learning grammar skills when the results were compared with the human group.

Rashid, Hashmi, Mohamed, Alqaryouti, and Sadeq (2023) investigated the impact of Chatbots on language learning. The work focused on exploring the role of Chatbot technology in language learning within the context of Malaysian higher

education institutions. The research adopted the Push-Pull Mooring-Habit (PPMH) theoretical framework to investigate several aspects of using Chatbots for English language learning. Performance Expectancy, Social Isolation, Effort Expectancy and the influence of COVID-19 fear were the important aspects that were covered. The learning experiences of 360 participants from three Malaysian universities were examined in the research. The research lasted for three months and it aimed to explore learners' perceptions about using Chatbots to learn language. A mixed method approach was applied to collect data using a questionnaire and in-depth interviews. The results showed that Performance and Effort Expectations proved to be positive contributors to learners' experience of using Chatbots for learning the English language. The students indicated that they felt improvement in their language performance when they tried Chatbots. They also informed that they felt it easier to learn language via Chatbot. As far as the Social Isolation factor was concerned, it was found to be a challenge for the students. The participants indicated that the conversation with bots was robotic and it lacked emotions. They also indicated that there was a lack of natural conversational overflow and chat felt artificial. All these factors served as "Push factors" that deterred some of the research participants from approving Chatbots. Interestingly, despite some disagreements about the social influence of Chatbots on their behavioral intentions, the research highlights that students still considered Chatbots to be beneficial as interlocutors for English language learning. This suggests that while there are challenges to overcome, the positive aspects of enhanced performance and reduced effort contribute to the overall acceptability of Chatbots as a language learning tool.

Overall, this research sheds light on the multifaceted nature of using Chatbots for language learning within Malaysian higher education institutions. The findings contribute to the broader understanding of how technology, specifically Chatbots, can impact language learning experiences and the factors that influence their adoption and effectiveness. The study endeavoured to investigate the impact of the use of Chatbot on language learning at the higher level of education. Chatbot is an AI-based technology that responds to the chat and questions as put by the user of the application.

#### 2.6.4 Analysis of the Effectiveness of Different AI Apps/Tools

Pikhart (2020) indicated that Artificial Intelligence has penetrated almost every field of life but its incorporation in teaching language through various apps has not been much focused on. So, the research tried to investigate the reasons why this area is neglected. The study analysed the selected language learning apps and investigated how artificial intelligence makes them useful for language learners. The results indicated that none of the selected apps had the features of artificial intelligence and deep learning. No machine learning was found to be supporting language development and improvement in the learners. Most of the apps were found to be set on predefined algorithms which lacked potential computational power. The study suggested solutions to the issues mentioned above. Moreover, it gave suitable ideas to incorporate artificial intelligence in language learning apps indicating that innovations must be incorporated to have fruitful results in language teaching and learning.

Al Mukhallafi (2020) investigated how effective is the use of AI in language teaching and learning. He indicated that the use of AI in language teaching/learning has proved significantly useful. So, this study has examined strategies through which AI can be effectively applied to language teaching/learning activities. The study also reviewed the previous literature to explore what strategies have been recommended for effective language teaching under AI so far. The researcher adopted an analytical descriptive approach to explore the literature. A questionnaire consisting of 40 items was used to collect the data. The study focused on ideas like AI strategies and effective applications for teaching/learning English, the usefulness of these applications, the practical use of these applications and the prerequisites for using such applications in the fields of teaching/learning English. 44 male students from the English language class participated in this particular study. The results indicated that employing AI for teaching proves beneficial. But it also indicated that the use of AI in language teaching is rare and language teachers need training in this regard. The study suggested a plan that includes the objectives, basics, contents, processes and methods of evaluation if AI is applied to English language teaching.

Yanhua (2020) analysed the incorporation of artificial intelligence technology in the EFL context. The author indicated that due to artificial intelligence and big data

the field of education has witnessed a great revolution. It is because of these technologies that researchers and language teachers have an opportunity to deepen their focus on individualized, personalized, cooperative and innovative learning. Thus, the study analysed the feasibility of using artificial intelligence in foreign language teaching and forecasted the future of integrated foreign language teaching. The study indicated that the integration of AI technology into foreign language teaching improves it and makes it effective. This indicated that the study forecasts that the use of AI tools for foreign language teaching will remain effective. It can be asserted that the use of AI-powered tools and techniques will improve EFL teaching and learning. Encouraged by the study, our study also integrates AI-based tools to teach the English language at the college level. Yong (2020) also indicated that using artificial intelligence in ELT at the college level is becoming a fashion and it has widened the scope and resources of learning. Moreover, the use of AI in college English teaching has also enriched the teaching methodology. Thus, the study gave an analysis of the use of AI technology and tools in the field of ELT at the college level. After exploring the existing literature, the study indicated that AI-based tools like speech recognition, language testing, and language translation are extensively used for language teaching. The study also indicated that there are many challenges and opportunities for the use of AI-based technology in language teaching at the college level.

Liu & Kong (2021) explored the existing literature in detail and informed how different people integrated AI into college language teaching and how new teaching modes were introduced in the recent past. The use of natural language processing (NLP) to teach English at the college level was one of the key concepts this study focused on. While exploring the capabilities of NLP in improving listening and speaking skills, the study indicated that speech and speaker recognition, voice recognition, lip reading, speech synthesis, text-to-speech, etc. are commonly used platforms to develop listening and speaking skills. Thus, language teachers and students at the college level can use all these platforms to learn the English language according to their means and resources. The study indicated that in the past, students were only at the mercy of the teacher to learn the English language but AI has introduced English language teaching with new modes and trends. Previously English classes were teacher-centered but in the present age, language classes can be made

student-centered and more collaborative. Thus, AI entities that contain different features of NLP can be followed for language teaching and learning. These entities include the programs and applications that help the learners learn different language skills while making the whole learning system more interactive and automated.

The use of AI in various spheres of life has been in vogue since its advent into human society. Many areas of AI have been researched so far and many areas are yet to be researched. The current study explores how AI is incorporated into college English language teaching and learning. The study contributes to college English teaching by enhancing learnability and learning progress, especially in the Natural Language Process (NLP). The study encourages college English teachers and learners to apply AI entities and tools to English language teaching/learning. So, the present study endeavours to improve English language learning at the college level in the Pakistani ELT context by using three AI-based applications.

Bewersdorff, Zhai, Roberts and Nerdel (2023) reviewed the existing literature on myths and mis- and preconceptions of artificial intelligence in the field of education. The reviewed research work emphasized the prevalence of confusion and misunderstandings about AI in various aspects of life. It highlights the necessity to analyze learners' preconceptions, misconceptions and myths about AI to design better educational programs. The study examined 591 research works, identifying 25 relevant studies meeting specific criteria. The geographic distribution of these studies spans six continents, with Europe and North America being the primary contributors. The focus of the studies was mainly on school and university levels. Findings indicate that learners often have a slight technical understanding of AI, attributing human-like attributes to AI systems and having narrow perspectives of AI's capabilities and limitations. Learners also tend to hold binary and vague views concerning AI's threats, dangers and benefits. The research underscores the significance of effective educational programs to enhance learners' comprehension of AI, enabling them to make well-informed decisions about AI incorporation in society and counteracting misinformation and undue apprehensions. The review has the potential to guide the development of more impactful strategies for AI education, ultimately contributing to better teaching and outreach approaches. This review covers the theoretical side of

the idea of using AI in education but our study, in contrast, applies AI-based applications to teach English language skills to college-level students.

### 2.6.5 Perceptions Regarding Using AI-Tools for ELL/T

Aljohani (2021) explored how Saudi EFL (English as a Foreign Language) teachers and students perceive the use of artificial intelligence (AI) to enhance English learning. This investigation was particularly significant as it pertained to Saudi Arabia's 2030 vision for educational development. It was indicated that many Saudi students criticize traditional English teaching methods as uninteresting and ineffective. As education evolves, there is a growing need to integrate technology for more effective learning. The research engaged 5 teachers and 16 students from Yanbu University College Female Campus, using a quantitative research approach. Data was collected through a closed-ended questionnaire. The study results showed a consensus among participants, highlighting the positive impact of AI on learning English in Saudi Arabia. This research provided valuable insights into how AI can tackle language learning difficulties, aligning with the nation's educational goals and future vision. The study pertains to perceptions of the EFL teachers and students regarding the application of AI technology to language teaching but our study covers the practical side of the idea of applying AI to English language teaching.

Firdaus & Nawaz (2024) researched English language teachers' views about the use of artificial intelligence in English language teaching. The key focus of the study was on the benefits of using AI-powered language teaching. The study also explored teachers' perceptions about the hurdles and obstacles the teachers might face while incorporating AI-based teaching tools into English language class. 110 English language teachers from public sector colleges of the Punjab province were the research participants who responded to the questionnaire and interview questions. The results indicated that the teachers had a positive inclination towards using AI-based tools for English language teaching but they also indicated various obstacles and hurdles which might hamper the application of artificial intelligence to language teaching in Pakistani ELT context. Thus, it is suggested that the feasibility of using artificial intelligence in English language teaching must be considered religiously and all problems and hindrances must be carefully checked before applying AI-powered tools to a language class. The study comes up with the idea that time and resources

are expensive, it is therefore essential for the language teachers to always consider the potential issues and obstacles before using artificial intelligence in language teaching.

#### 2.6.6 AI-Based Language Learning Models

Cai (2020), described the application of a hybrid education model for the teaching of English writing based on artificial intelligence. This was an experimental study in which the researcher developed a hybrid teaching model based on artificial intelligence and applied it to teach English writing. The model was designed based on learners' needs and requirements. Moreover, students' growth characteristics and cultural basis were also considered during the development of this model. The researcher also took into consideration the foreign classical teaching modes. The model presented by the author is suitable for students' AI courses because it follows the cooperative teaching mode, constructive teaching mode and mastery teaching mode. Thus, the use of an algorithm of AI for statistical analysis of a courses was tried in this research. It was found that these AI algorithms informed the researcher when and what typical courses could be taught to students in a specific class. The results showed that students' English writing skills were nourished by 40% and the teaching efficiency also improved by 35% when both were compared with previous tests. The study approves the experimentation with AI in the field of English language teaching.

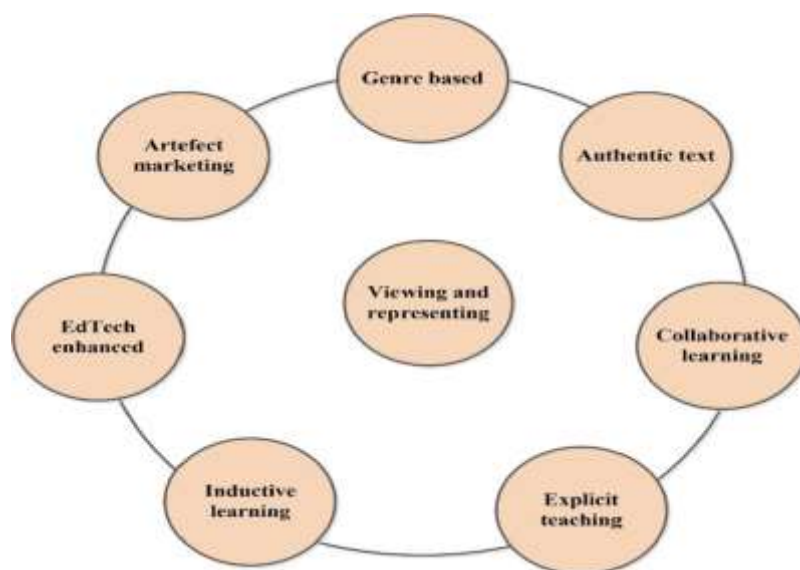
Qianjing & Lin (2021) developed and tested a language teaching and learning system by building on the AI algorithm and combining it with the spoken spectrum algorithm. The authors indicated that the previous reading practices which included online reading modes and models were proved ineffective according to the current needs of the learners so, something new was required to be implemented. Thus, the current experimental research was conducted in two phases. During the first phase, a new system was developed to teach reading and speaking skills whereas during the second phase, the new system was applied in the field to test its results. The article focused on the actual needs of the learners and established a model based on a mathematical algorithm that was effective for personalized learning. To verify the results, an experiment was conducted and the effectiveness of the new system was tested by comparing learners' performances in the pre and post-tests. The results showed that the AI-based English multimodal online reading system has positive results on students' English language learning. Thus, the study recommended the

development and implementation of new systems for English language teaching effectively. The current study also tries to build on the use of AI-based systems to improve the reading, writing and speaking skills of college English language learners.

Sun, Anbarasan, & Praveen, D. J. C. I. (2021) applied an AI-based module to introduce an online English teaching system under deep learning in comparison with a traditional English teaching system. The online teaching system provides a teaching platform for English teachers and helps them improve their teaching skills in the ELT context. The study followed neural networks and a decision tree algorithm to generate an automated English teaching assessment model. The model has the potential to provide extensive information, summarise the data and improve teachers' education and knowledge. When this system was applied in the field, it improved the results and the findings indicating that online English teaching under deep learning using digital platforms proved more effective as compared to traditional English language teaching.

Dong, Alharbi and Ahmad (2022) proposed a multi-criteria decision support system (MCDM) for AI-enabled production and application of English. The program offered multimode online reading to the learners which was even useful for a situation like Covid-19. The researchers believed that reading and writing are very important in an educational scenario. These skills can be improved through AI-powered tools and techniques which are the newest and latest options available to the learners and teachers alike. Thus the study indicated that a variety of AI-based tools have been introduced in the educational milieu including Robots' Assistant, Vidreader, Chatbots, Seeing AI, Classcraft, 3D holograms, and other AI-based programs. Not only that, smart instruction systems and sentimentalized artificial learning aids are what we can expect in the coming years to support education, especially English language learning. Thus, the study recommended the use of a super decision tool to support further experimental work in the field of English language teaching.

The multi-model teaching-learning program as proposed by the study included the following features:

**Figure: 6***Multi-model Teaching-Learning Program*

Dong, Alharbi and Ahmad (2022)

After the identification of important features of the super decision tool, the experiment was conducted and the results were found to be encouraging. Thus, the study proposed this model to be implemented while teaching reading and writing skills to English language learners. The researchers also recommended more research in the area so that more insights could be covered.

Li (2022) endeavoured to build an adaptive learning model of English to develop vocabulary in the learners based on blockchain and deep learning (DL). The model was tested through an experiment deciding that 46.8 % of the students would read English newspapers and magazines, 50.4% of the participants would learn and memorize classified English words and 59% of the learners would memorize English vocabulary through reading a text from a specific context. The results indicated that before using the adaptive model of learning the students underperformed whereas, after the use of the adaptive learning model, the students improved their vocabulary a great deal.

Though blockchain is mostly applied to the field of accounting and finance, this study used it with the combination of deep learning to keep records for students'

vocabulary development. Thus, the study mixed AI with blockchain to build a model to apply in the field of education, especially concerning English language teaching. It can be postulated that such types of studies encourage us to try newer things in language teaching for better results. So, inspired by this research the present study also endeavoured to incorporate AI-based applications to teach English language skills to college students.

Numerous studies have confirmed the positive impact of AI-powered tools on learners' skills development, motivation, and engagement, highlighting advances in areas such as speech recognition, automated assessment, and personalized learning. However, a clear research gap persists in the practical, experimental application of multiple AI-based tools within under-researched contexts like Pakistan's college-level ELT classrooms. Therefore, the current study fills the gap by incorporating three distinct AI-based applications (Readlee, @Voice Aloud Reader, and Entelechy) to enhance Pakistani college students' English language skills. It empirically contributes to the literature on AI in ELT and offers pedagogical implications of incorporating AI-tools in ELT at the college level.

## **2.7 Mobile Assisted Language Learning (MALL)**

In the recent past, English language teaching has undergone a rapid shift from CALL to MALL. According to Wickham (2014), gadgetization has overtaken previous teaching practices. New directions have been opened in ELT by the advent of Mobile Assisted Language Learning (MALL) and learners have a flexible learning environment in which they have access to better learning resources (Ballance, 2012). According to Kukulska-Hulme (2006), MALL can be defined as a subset of Mobile and Computer Assisted Language Learning which provides learners with "rich, real-time, convenient, collaborative, contextual and continuous learning both formally within schools and informally outside schools". The term "MALL" comes into being through the conceptualization of the existing literature on technology that is followed for language teaching (Godwin-Jones, 2011). Under MALL, the term M-learning is also used which refers to mobile learning (Chinnery, 2006; Soloway et al., 2001). M-learning, according to Jones & Jo (2004), has "mobility, ubiquity, immediacy, flexibility, connectivity, convenience, user-friendliness and low cost". Fotouhi-Ghazvini, Earnshaw & Haji-Esmaili (2009) postulate that M-learning is a kind of

micro-learning that can take place anywhere and anytime through mobile devices. Wu (2014) indicates that the smartphone is the most popular device that is used in MALL for language learning because it has internet connectivity and a built-in operating system that can run various applications efficiently.

Mobile Assisted Language Learning can be taken as an extension of CALL in form of micro-learning. The following works provide details about the trends use of mobile technology in English language teaching and learning:

### 2.7.1 Utility of Mobile Phone in ELL

Sad (2008) came up with a proposal to use a mobile phone to develop and improve English language skills among language learners. The author indicated that EFL teachers have several challenges in the form of a lack of technological support, large-sized classes and a lack of resources. Moreover, most of the students are found unmotivated. Harmer (2007) indicates that students remain unmotivated and uncooperative which hinders language learning. Thus, this study recommended the use of a mobile phone to improve student's English language skills in the EFL context. The author gave the idea to use four different projects to involve the learners in different activities where they could use the English language and learn from that environment. Following are the projects recommended for the teaching/learning activity:

- Project 1: A short film
- Project 2: A documentary
- Project 4: A commercial
- Project 3: An instructional video

The author also suggested criteria to assess the performances of the students in several activities incorporated into the various projects. The performances can be judged under the following scale:

- Needs improvement
- Good
- Very Good
- Excellent

The use of a mobile phone in language teaching in the EFL context by conducting various projects to teach English language skills can prove useful if the patterns suggested by the current study are followed. Our study also incorporates the use of the mobile phone but the strategy is different. In contrast to this study, the present study uses three AI-based mobile applications that are used to improve different language skills including reading, writing and speaking.

Chen & Chung (2008) conducted a study to improve ESL learners' vocabulary through item response theory and learning memory cycle with the help of mobile and wireless technology. The author indicated that English language learning is very common in non-English speaking countries so, it is very important to invent modern assisted-learning tools to teach the English language. So, the study highlighted that though wireless technology like tablets and mobile phones are being welcomed in the field of education, especially language learning, a lot is required to be done. To support vocabulary development in the learners, this study introduced a personalized mobile English vocabulary learning system based on Item Response Theory and the learning memory cycle. The system recommended appropriate vocabulary according to learners' needs, learning ability and memory cycle. The system was then implemented on a personal digital assistant (PDA) for personalized learning. The results indicated that the proposed system positively impacted the vocabulary learning of the students while their level of interest and motivation also improved.

The study uses wireless technology to promote vocabulary learning through personalized principle with positive results. It also recommends the use of mobiles and wireless technology to teach other language skills. Thus, the study also uses mobile study to teach language skills using AI-powered tools and technology.

The use of a mobile phone to teach English language skills in different contexts has been on the rise since its invention. The most common features as counted by Saran, Cagiltay & Seferoglu (2008) are reachability, localization, mobility and personalization. Thus, the researchers endeavoured to use this forum to develop instructional material to teach English vocabulary using GSM technology. For this purpose, students were asked to learn definitions of different words, sentences and other related information including pronunciation through visual representations.

After the completion of reading tasks, the students were required to solve the SMS quiz to give their learning feedback which could inform the teacher how effective was the activity. The results showed that there was a considerable improvement in the vocabulary acquisition of the participants. The study also provided a comprehensive detail to create multimedia messaging sending MMS content and short message service (SMS) quizzes so that the teachers could follow the method effectively.

El-Hussein, M. O. M, & Cronje (2010) sought to explain the meaning of mobile learning through the use of its key concepts in English language learning at the higher level of education/post-school education. Conversely, the study provided an interpretation learning model under mobile learning in the context of higher education. The study proposed to classify the concept under three dimensions. The first dimension indicated by the researchers is the mobility and ubiquity of the technology. The second one refers to the learner's mobility and the third one pertains to the examination of the dynamism and mobility of the information flow and process of learning. The findings indicate that revolutionary technologies in human society have caused a great and positive transformation in the ways knowledge is sought and disseminated. The study pertains to the theoretical and conceptual understanding of the concepts of mobile learning and its utility in language teaching.

Based on the idea that MALL can be incorporated for teaching language in real-life situations in authentic communication, Palalas (2011) tried language teaching through authentic communication using a mobile phone. Primarily, the aural skills of the ESL learners were focused on in this study. The students were provided with an opportunity to communicate with others through a podcast where peers and facilitators could support language learners. The students were given a chance to communicate in a real real-life setting where they could observe and learn how cultural and contextual elements were considered in real communication. The idea worked in the favour of language learners and it not only helped them learn the language but it also helped them to learn the language which was spoken for communication in a particular social milieu. This is vital research because it has shown a new way in which the English language can be taught with positive results. It has rejected the formal and traditional language teaching method which has been proven not to be very effective, especially in the Pakistani ESL context.

Hulme (2015) developed a mobile app for the social inclusion of immigrants who migrated recently to England. The researcher developed an Incidental Learning Framework to support the newcomers to the country. The mobile app provided activities to learn the English language. It had the option “image-to-text translation”, context-related awareness, local information, language learning games and so on. For the sake of a trial, the app was first tried in London, Madrid and Vienna and the most common issues found during this trial were related to mobile literacy, users’ affordability, privacy and ethical considerations. The results indicated that the study could prove beneficial in terms of formal and informal language learning as the app proved useful for foreign language learners. The app provided the learners with immediate assistance as per the needs of the language learners. This research comes up with a new idea of teaching language to new users. It encourages English language teachers to follow such ideas in formal language teaching as are suggested through this research project.

Bárcena (2015) examines the role of mobile-assisted language learning (MALL) in formal and non-formal education in modern times. The study provides us with the details about the rapid and continuous progress in the field of MALL and at the same time, it encourages the teachers who intend to follow this approach for second or foreign language teaching. It also benefits the researchers in this field by exemplifying how effectively this approach is changing the whole teaching/learning scenario. The study indicates that mobile technology has continuously influenced the teaching and learning of foreign languages. Smartphones and tablets have made it convenient to integrate digital technology for language teaching and learning. By 2015, 1.5 million different apps were available on Google Play stores which could be used for educational and language learning purposes. Many apps have been analysed and critically examined in this particular study for the benefit of all those who intend to incorporate such apps for language teaching and learning.

This research project gives a short description of many phenomenological works under MALL that have paved the way for further research and experimentation suggesting that the upcoming age is the age of technological revolution and marvels can happen. The present study also seeks encouragement on the basis that new things

should be tested and tried to bring a change in old language teaching techniques which might have been useful in the past but now they are not that beneficial as learners have stepped into a technological arena.

Elfiona & Zaim (2019) tried to improve the listening skills of EFL learners through mobile-based media. The researchers claimed that learning listening skills is more challenging as compared to other language skills because the listening skill of students is most often neglected during the teaching/learning process. One of the key reasons behind this as indicated by the researchers is teachers' inability to prepare appropriate media for listening and the students also find it difficult to have any such media on their own. Thus, a lack of appropriate listening material for practice leads to less listening practice. To resolve the issue, the study recommends the use of mobile-based media which can be consulted anywhere and anytime. The paper introduces the teachers and students to library research methods using a mobile phone. The study informs the teachers as to how they can develop and disseminate listening material through mobile-based media.

The study recommends the use of mobile phones for improving listening skills. It suggests the EFL teachers and learners that mobile-assisted media for improving listening skills can prove to be an effective solution for the issue of unavailability of appropriate listening material. The current study also uses mobile-assisted media to provide material for language learning but the key focus is on reading, writing and speaking skills.

Rasheed, T., Rasheed, M., & Naz, S. (2019) claimed that English language learners' interest has seen a shift from CALL to Mall in recent years. The reason behind this shift is the speedy development in the area of digital literacy and awareness. Increased facilitation and provision of digital platforms in the form of numerous educational and language learning apps have sought the attention of language learners as well as teachers. The study highlights the ubiquity of mobile learning which is not time and space bound. Thus, this descriptive research explores the role of smartphones in English language learning. Research data were collected through a mixed-method approach using a self-reported questionnaire. A total number of 480 final year BS English and M.A English students from six universities of Punjab

participated in this study under a convenient sampling technique. Data were analysed through Statistical Package for Social Sciences (SPSS 22.0) and interpreted through frequency, percentage, independent sample t-test, One-way ANOVA and mean score, and standard deviation. The findings indicated that MALL is an effective approach for learning the English language. Students showed great interest and motivation in using smartphones to learn English. Thus, the study concluded that the use of smartphones in English language learning is effective and experimental research can be conducted to analyse the efficacy of smartphones for English language teaching.

In a very relevant study, Wardak, M. (2020) tried to improve the vocabulary of EFL learners in an English for Academic Purposes (EAP) or English for Academic Studies (EAS) context. The author claims that language-related technology in language teaching is increasing day by day, which indicates that the number of ‘tech-savvy’ students also seems to be at a regular increase. The growing technological needs of language learners call for research in the area of language and technology. So, this study has tried to use different Apps that can help develop vocabulary in English for academic purposes context. Moreover, the study attempts to explore more methods and approaches which encourage language teaching through digital tools.

This research opened gateways for further experimentation and application of digital platforms like smartphones and tablets using different applications. As far as this study is concerned, the researcher has used Viber, Facebook Messenger and WhatsApp as sources to transmit vocabulary to the learners according to a set program, schedule and quantity. The research participants in this study were 20 EFL students at a British University. The students were attending a Pre-sessional EAP class. The key focus of the study was on learners’ perceptions, beliefs and learning experiences through smartphone applications as mentioned above. A questionnaire was used to collect the research data whereas pre and post-tests, interviews and observation were the other tools to collect the data. This research encourages the incorporation of the smartphone Apps to teach vocabulary in the EAP context because it has positive results. In comparison to this study, the present study also attempts to improve English language learning through AI-based mobile applications but the focus of the study is on overall reading, writing and speaking skills.

Dinç & Kim (2021) conducted a small-scale project to analyse the effectiveness of the implementation of the personalization principle within a language app. The focus of the study was the acquisition of English idioms through a web-based mobile app. The participants were made to learn idioms through the app for two weeks. The results indicated that there was a significant impact on the learning and students made remarkable progress in learning English idioms. The results also indicated that the impact of the personalization principle proved better for language learning as compared to other subjects like Chemistry, Physics, Biology, etc. The personalization principle is such a thing that can be followed by every language learner to learn anything. The study recommends the use of the personalization principle in language learning and it indicates that this principle is effective in language learning though it may not produce very positive results in learning other subjects like Chemistry and Physics.

### 2.7.2 Perceptions Regarding the Use of Mobile in ELL

Nah, White & Sussex (2008) studied the attitudes of Korean intermediate EFL language learners toward using a mobile phone to browse wireless application protocol (WAP) sites to develop listening skills. The study indicated that the trend of using a mobile phone using the internet to learn the English language, especially listening skills was on the rise in the early 2000s but just a few studies were conducted in this area. So, this study was conducted to investigate English language learners' attitudes towards using mobile and the internet to learn English. The key focus of the study was on task-based, learner-centered, collaborative and constructivist learning approaches. Moreover, it covered the aspects related to input, interaction, output and sociocultural theories about learning the English language.

It was an experimental research in which a group of undergraduate students participated. The participants were (EFL) learners who had enrolled in a listening course at a Korean university. The researchers designed a WAP site and incorporated it into improving the listening skills of the participants. The results indicated that the participants were found satisfied and they had positive attitudes towards using the WAP site as a medium of learning English listening skills. The study recommended the use of the WAP site in teaching listening skills as it was proven to be effective for this purpose.

Ekinci & Ekinci (2017) investigated the perceptions of EFL learners regarding the incorporation of mobile phone applications to learn English language skills. The study indicated that the use of mobile phones to control and deal with different affairs of life has become a fashion around the world. Thus, the application of mobile phones to language learning and teaching is no more a wonder. However, how the learners of the English language feel and what they perceive about the usage of mobile phones in language learning are important questions that may further decide the future of this phenomenon in the arena of ELT. Thus, the study engaged 20 EFL students from a Turkish university in a case study to express their feelings about the pros and cons of mobile apps that were used to teach the English language for ten weeks. The students were asked to use different mobile apps that they could download from AppStore and PlayStore. Duolingo, Memrise, Acobot, VoScreen, and English Central were the apps the learners used to learn English. The students were asked to use each app for 2 weeks to have an idea about the features of the apps. When students finally used the apps for the given timeline, their perceptions were recorded and descriptively analyzed. The results showed that the learners gave positive remarks about the use of mobile applications to develop English language skills. The participants indicated that they could observe many advantages and disadvantages of using different mobile applications and the mobile applications also differed from each other in terms of features. However, the participants were finally in favour of the use of mobile apps to learn and teach the English language.

This research project presents a comprehensive detail of the pros and cons of some of the commonly used mobile applications for learning English based on learners' perceptions and learning experiences with these apps. The present study also uses three different AI-based apps to improve college students' English language skills in a public sector college where most often, traditional methods of teaching English are applied and teaching/learning results are not encouraging. Thus, to bring innovation in English language teaching in public sector colleges, the current study endeavoured to go beyond the set teaching/learning patterns.

Almofadi (2021) investigated the experiences of lecturers who use mobile technology to teach English. The study indicates that English as a Foreign Language Learning incorporates the use of mobile phones as a support system worldwide but it

is at its initial stages. Thus, it is essential to investigate teachers' temperament, perceptions and readiness to use Mobile Phones to teach English. So, the study endeavours to investigate teachers' perceptions and use of the mobile phone in teaching English as a foreign language. This research has been conducted under a mixed-method approach using qualitative and quantitative techniques. The data analysis indicates that motivation has a significant role in teachers' use of mobile phones as a support system to teach English as a foreign language. Moreover, the availability of facilities and resources to teachers also impacts the behaviour of teachers. Another important factor that affects teachers' behaviour towards using mobile phones for teaching English is their level of education. The results indicate that highly qualified teachers are more inclined towards using mobile phones to teach English as compared to those whose education level is not so high. Age is also counted as a vital factor that influences teachers' perceptions about the use of a mobile phone in teaching English. The results indicate that young teachers are more inclined towards incorporating the use of a mobile phone in English language teaching. Thus, age and education both impact teachers' behaviours towards using a mobile phone to teach English. Another important factor that impacts teachers' perceptions about using mobile phones in language teaching is 'gender'. The results show that female lecturers are more inclined toward using mobile phone technologies to teach the English language as compared to male teachers. This particular study is significant because it has focused on the behavioural aspects which are important for teachers in the adoption of mobile technology to teach English. The study has covered an important area because it's important to explore how teachers feel about using mobile technology in English language teaching and what sort of perceptions they have about using mobile phones in English language teaching. According to Chee (2002), it's necessary to study perceptions because perceptions give rise to actions.

### 2.7.3 Analysis of the Utility of Different Mobile Apps

The research carried out by Fujimoto (2012) at Griffith University in Australia examines the rising prevalence of mobile devices and their possible utility in language learning. With mobile phones being so common, researchers have been investigating their educational potential, as seen in studies by Chen & Chung (2008) and Stockwell (2008). Despite generally positive opinions about mobile learning, obstacles such as input difficulties, small screens, and the perception of phones as non-educational tools

have led to resistance (Stockwell, 2008). The main idea is that technology's suitability for learning is linked to its non-educational usage patterns (Kennedy & Levy, 2008). Therefore, comprehending how learners use their phones for personal purposes can shed light on their educational possibilities. To explore this, two thorough surveys were conducted with Australian university students ( $n = 182$  and  $n = 158$ ). The findings, covering learners' views on using mobile phones for learning and their integration with everyday phone activities, are extensively discussed. The research also provides insights into selecting tasks and designing recommendations to enhance mobile learning experiences. The results showed that in Australia, mobile phones are commonly used for various purposes other than education. Some of the participants indicated that they use mobile phones to learn the English language. Thus, it can be asserted that non-educational use of a mobile phone is more common in Australian university students.

Nushi and Egbali (2017) indicate that it is the age of technology and every other affair of human life is controlled by technology. As far as language teaching is concerned, there are so many mobile applications available in the market but before undertaking any new application for language teaching, it is important to observe and analyse the features of the app. So, this paper reviewed the mobile app named Duolingo for its features and utility for second language learning. The study indicated that it is a free app that can be downloaded easily. It has lessons and exercises for listening and speaking activities. Vesselinov & Grego (2012) postulate that the app showed improvement in students' learning when it was applied in the area of language teaching. The app offers gamifying learning which keeps learners level of interest alive and they feel inclined to keep playing games which are a source of language learning and language improvement. The app also offers cautionary notes which the learners can consult any time they want. Moreover, the app provides translation, matching, pairing, listening and speaking exercises which are a key need of a language learner. Thus, the review of the app concludes that the app is user-friendly and it is very useful for language learning. The researcher recommends the use of this app for language teaching. Thus, the current study also uses the free versions of three AI-based applications that help learners improve their language skills. These apps are helpful in reading, model reading and self-assessment.

Rosell (2017) indicates that the application of smartphones and tablets in language learning and teaching has become a common practice. Smartphones and tablets are contributing to English language teaching and learning to a large extent. But, most of the researchers have not analysed the effectiveness of language learning apps. So, there was a need to evaluate the language learning apps. Thus, the study analyses the literature available on the potential and effectiveness of apps to help in language learning gives a detail of different apps and evaluates their effectiveness for language learning. The study offers a framework to evaluate the effectiveness under four critical components which are technology, pedagogy, user experience and language learning.

Sun, Lin & Chiang (2019) aimed to investigate the impact of mobile technologies on education especially in the area of reading skills. Since reading is a basic skill among other language skills, it was considered that university students must develop and improve their reading to meet the daily challenges. Moreover, it was considered that the influx of technology has challenged the teaching of reading and teachers feel confused about which apps and tools are trustworthy and effective. The observation lasted from January 2020 to September 2020 and the author investigated the researches published on Web of Science and Scopus. The results showed that most of the studies recommended the use of mobile applications to improve reading comprehension. Moreover, the researcher found that almost every study indicated that the interest and motivation level of the learners also improved to a considerable and significant level after the treatment period. Thus, it can be asserted that this research encourages the use of mobile applications in language teaching, especially in the area of reading comprehension. The author indicated that different experimental research favoured the use of mobile applications for language teaching with positive results. Moreover, the study recommends delving into different specific reading apps to come up with self-experienced insights because there are numerous apps available in the market but their utility and efficacy are yet to be tested and tried. Thus, encouraged by the study, the current study also incorporates the AI-based mobile application Readlee to improve college students' reading pace, comprehension and other aspects that pertain to reading.

Cavus & Ibrahim (2017) attempted to develop an interactive application to teach the English language through stories on the mobile phone. The study analysed the feasibility of an interactive mobile application to improve the language skills of the learners including vocabulary, pronunciation, listening and comprehension. The study was experimental and it used a speech recognition engine through a mobile phone for the identification of spoken words. This activity aimed at correcting the pronunciation of the students. The learners were given an interactive platform to learn through their mobile phones. Thus, 37 volunteer students participated in the experimental research. The pre and post-tests were conducted for data collection. The results indicated that the English language skills of the learners improved. The study recommended the integration of an interactive app using a mobile to teach the English language. The remarkable feature of the app is that it is interactive and teaches learners in an interactive atmosphere.

Johri (2020) analysed the existing literature in the area of MALL to determine the future of an ESL class. The study builds on the idea of using a mobile phone for English language teaching indicating that the technological revolution has changed the patterns of teaching and learning of the English language in the recent past. The rapid rise of the trend of using mobile apps is an indication that the future English classroom will be quite different from today's classroom. After the conceptualization of the literature in the MALL context, the study indicated that language learning apps ensure the mobility and ubiquity of learning practice and these apps strengthen the relation of learners with learning. Moreover, mobile devices help increase the level of motivation in learners which directly impacts language learning. The author asserted that the language learning apps administered through mobile phones help learners retain their vocabulary repertoire which directly supports the development of other language skills including listening, speaking, reading and writing. The apps allow learners to read authentic material because apps sometimes contain multiple texts and resources beyond syllabus books and material. The study exposed that mobile language applications not only help learners develop language skills but are also helpful in assessment, feedback and progress monitoring.

Some commonly used apps as introduced by the author are: "Quizlet; Duolingo; English Launch Pad; Culips ESL Podcast; MyWordBook; Speaking pal

English Tutor; Voxy; Grammar up; English Listening & Speaking; and KAHOOT". All these apps have various functions and these apps are used to teach different language skills. The use of these apps can make the future English classroom more interesting, personalized, lively, systematic and conducive. Encouraged by the study, the current study also undertakes AI-based mobile apps to teach the English language at the higher secondary level in the Pakistani ELT context.

#### 2.7.4 Sharing Learning Content through Mobile

Chen, Hsieh & Kinshuk (2008) proposed a new idea of sharing learning content through mobile phones while keeping the issue of a small screen in mind. The study indicated that it has become a trend to use mobiles and wireless technology to teach language but the issue of small screen is always ignored. When learners feel it is difficult to read text from a small mobile screen, they get frustrated and leave studying through mobile. Thus, Learning Content Representation (LCR) through a small screen needs a solution. So, the study proposed a solution to this problem by considering two dimensions i.e. Instructional Strategies (written annotation and pictorial annotation) and Learners Cognitive Model (LCM) (verbal and visual short-term memory). The results indicated that pictorial annotation helps students more in mobile language learning environment with lower verbal and higher visual ability. It was indicated that visual content makes it easier for learners to learn the language in a better way. The author postulated that Cognitive Load Theory (CLT) should be adopted while sharing learning material because it endorses that excessive information/material causes irritation and lack of concentration. So, basic and limited material with low verbal and high visual abilities should be shared with learners through mobile. It cannot be denied that the small screen of mobile is irritating when large texts and loaded information are shared. The solution that the study has proposed seems effective as compared to excessive and loaded texts. The current study also uses mobile apps through which English language is taught and the idea of excessive text and small mobile screen has also been considered carefully.

The SALSA (Sensors and Apps for Languages in Smart Areas) was a project initiated by Gaved & Peasgood (2015) to investigate how a smart city infrastructure could prove effective in the provision of accurate, location-based language learning, especially to newly migrated individuals who needed to learn a foreign/second

language. The project offered a smart city in the form of a mobile app that provided a rich language-learning environment to all those who downloaded the app. Moreover, the app provided an option to have classroom activities irrespective of time and location. It helped the people who could not learn the language in a proper classroom due to family and work-related constraints. Moreover, the app provided a personalized and flexible educational approach for learners having individual differences. The key feature of the app was that it triggered learning-based and context-sensitive information through a notification which provided the app user with most of the required language sets. The app also provided the learners with relevant language exercises and activities that could help a learner in learning particular phrases and expressions that could be used in the relevant context. For all this, no internet connection was required which is the most remarkable feature of the app.

The project is need-based and it helped the immigrants in learning a foreign/second language through a mobile phone app that could be downloaded through a smartphone. The features of the app are unique and user friendly which makes language learning easier for a new learner. The app is designed for immigrants and it supports them in learning a new language irrespective of age, gender, time and location. The current study also incorporates the use of mobile apps but the context is educational and specific language skills are targeted in the study.

### 2.7.5 ELL Models under MALL

Collins (2005) provided a model for adult English language learners to cope with their daily language needs. The author indicated that adults are most often preoccupied with their jobs and professions and they don't find extra time to learn or improve their English language as they cannot sit and learn in a proper class. However, mobile learning is one of the most accessible sources that they can use to learn, practice and improve their English language skills. Thus, keeping the issue in consideration, the study explored the available technologies and proposed a model that integrates research-based pedagogy for mobile language learning. So, first, the author examined how mobile multimedia content to improve language skills is disseminated. Moreover, the knowledge about cross-cultural awareness was also explored. The study then indicated what sort of tools, sources and technologies are commonly used to convey the learning material and content. It was observed that

static and non-interactive content was provided to the learners and they could only listen and view the material as passive learners.

Since it was a need-based research, the study proposed a pedagogical model while suggesting suitable and interactive content. The author proposed that material containing short dialogues, Read-along, recorded audio stories with animated text, picture dictionaries with audio playback, translation into learners' language and so on could be used as learning content and shared through mobiles which learners could consult as per their need and leisure. Moreover, location-specific and GPS-based content was also suggested by the researcher for mobile language learning. The recommendations and proposed model seem to be effective as they fulfil learners' needs. Inspired by the idea of using mobile phones and new technology to teach English language skills, the present study also incorporates the use of mobile phones to deliver learning content through AI-based technology to fulfil the needs of college-level English language learners.

López-Sotos, Fernández & Santiago (2020) came up with an M-learning system using mobile phones to improve the English language skills of the learners. The study proposed an educational system through which students could learn English even outside the classroom on their own. The study indicated that M-learning is becoming a fashion around the world so newer things must be tried to excel in this field. Moreover, it was highlighted that there is a lot of exploitation in the market and students are befooled with expensive and cheap applications which do not benefit the learners in true letter and spirit. Thus, the study proposed a new system of education that favours language learning at a low cost with a maximum of learning. So, the system provides several learning contents, practices and features to heterogeneous learners. The proposed system is based on three models:

- Domain Model
- Pedagogical Model
- Learner Model

All these three models have different features that fulfill learners' needs up to an extended level covering learning material, pedagogical aspects and feedback systems. Most importantly, when the system was applied to a language class its results

were encouraging. Firstly, students' level of interest increased. Secondly, audio and video learning content offered by the system was highly approved by the students. Thirdly, a great number of learners were found satisfied with learning English in interactive sessions. Fourthly, the listening and speaking skills of the learners improved a great deal. Thus, this research recommends the use of new apps for better and improved results. It further entails that low-cost or no cost should be the ultimate target of the researchers and the students should be provided with either free versions or low-priced versions of the applications to boost up M and E-learning.

While a considerable body of research has explored the potential of mobile-assisted language learning (MALL) in enhancing English language proficiency, much of the focus has remained on vocabulary acquisition, listening comprehension, and learners' perceptions of various mobile applications. Several studies have proposed models or assessed the general utility of mobile devices and apps (e.g., Duolingo, WhatsApp, Quizlet) in informal, non-AI-enhanced environments. However, most of these studies are descriptive, small-scale, or focused on single-skill improvement, with limited integration of Artificial Intelligence. Furthermore, very few empirical studies have investigated the use of AI-based mobile applications in a formal academic setting, particularly in public sector colleges in Pakistan, where traditional, teacher-centered methods are persistently dominant. So, there is also a noticeable absence of experimental research that evaluates the impact of AI-powered apps on college level English language learners' language skills namely reading, writing, and speaking. Thus, this study addresses a critical gap by employing an experimental design to investigate the impact of three AI-based mobile applications on Pakistani college students' overall English language proficiency.

## **2.8 Conclusion**

The review of existing literature in the area of English language teaching using digital platforms and modern technology indicates that there exists a plethora of works and research in this domain. An extensive analysis of the literature reveals that the use of technology in English language teaching is not new; rather, its roots can be traced back to the early history of English language instruction. The studies cited above show that language was once taught using recorded lectures, tape recorders, telephone calls, and similar tools. The data further indicate that the use of multimedia and screen-based

learning was also in vogue in the past. Subsequently, the advent of computers, CDs, and MP3 technology contributed significantly to English language teaching. As time progressed, technological advancements ushered in the age of information technology, with the expansion of computers and the internet. This led to the emergence of new paradigms, such as Computer-Assisted Language Learning (CALL), where computers were used to deliver and facilitate learning content.

Later, the technological revolution gave rise to Artificial Intelligence (AI), which introduced entirely new systems that made English language teaching and learning more systematic, efficient, and engaging. This technology harnesses the power of computers, laptops, tablets, and mobile phones, functioning in accordance with human needs. Numerous AI-based apps, programmes, and systems have since been developed to facilitate English language learning. These tools are widely used to develop learners' language skills, especially among younger users. Among the most common AI tools are chatbots, which are now regularly used for both learning and teaching English.

The global use of mobile phones for English language teaching and learning has also gained prominence under the label of Mobile-Assisted Language Learning (MALL). Over the past 10 to 20 years, the integration of AI and smartphones in English language instruction has become a major trend, contributing significantly to the transformation of traditional teaching and learning practices. The combination of AI and smartphone technology has become a hallmark of contemporary English language instruction. Today, numerous language learning apps are AI-powered and compatible with mobile phones, tablets, laptops, and desktop computers.

It can therefore be asserted that the history of technology in English language teaching and learning has experienced many evolutionary phases, including the use of print, audio, visual, broadcast media, audiovisual tools, computers, the internet, artificial intelligence, mobile phones, smartphones, virtual reality, augmented reality, and beyond. English language teaching and learning practices have, without doubt, undergone a continuous process of evolution to reach their current state.

The detailed and comprehensive discussion of the works cited above indicates that a significant body of research exists in the field of English Language Teaching (ELT). However, the in-depth literature review also enabled us to identify a niche area that warrants further exploration. The advent of Artificial Intelligence in education

invites language researchers and teachers to experiment with modern apps and innovative teaching and assessment tools to achieve improved learning outcomes. The present study has been inspired by the advantages and potential that AI technology offers to both teachers and learners. While traditional English language teaching techniques have proven beneficial in their own ways, AI tools appear to be more effective, practical, and time-saving in comparison.

Thus, the current study departs from past research in several ways:

- In earlier periods, there were no AI-powered apps or tools capable of generating automated feedback for learners and teachers. In contrast, numerous such tools are now available to enhance the teaching of English more effectively.
- Teachers previously faced limitations in providing language instruction around the clock. However, the apps used in this study support learners due to their ubiquity and 24/7 accessibility.
- Students and teachers once struggled with limited resources. Today, mobile phones, tablets, laptops, and computers equipped with AI-based tools are widely available and effectively support English language learning.
- Most importantly, English language teaching—particularly in the Pakistani educational context—has not yet widely experienced the use of AI-powered apps such as those employed in this research project.

In conclusion, it can be asserted that from the earliest stages of English language teaching and learning to the present day, much work has been done to enhance the effectiveness of instruction. However, AI-based applications such as **Readlee**, **Entelechy**, and **@Voice Aloud Reader** have not yet been explored in the context of improving English language skills among college students in Pakistan. This study therefore identifies a clear research gap and seeks to address it through experimental research by integrating AI-based technology into English language teaching at the college level.

## **CHAPTER 3**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter presents the research methodology employed in the present study. It outlines the theoretical framework that served as the foundation for this research and provides detailed information about the research design, research paradigm, research procedure, research participants, data collection tools, data analysis methods, and ethical considerations.

#### **3.2 Theoretical Framework**

According to Grant and Osanloo (2014), a theoretical framework serves as a blueprint and is the main driving force behind conducting and completing any research work. Lysaght (2011) also emphasises the necessity of a theoretical framework for a thesis. In light of its significance, the present study is grounded in two theories relevant to language teaching and learning, along with a third framework aimed at understanding learners' perceptions regarding the use of AI in English language learning (ELL). The first theory relates to the development of reading skills among English language learners, while the second underpins the concept of overall language proficiency. The third framework supports the investigation of learners' perceptions and beliefs.

##### **3.2.1 Grabe's (2009) Theory of Reading**

The current study relies on Grabe's (2009) theory of reading. He has elaborated on reading in detail and discussed what reading involves and how it works. The theory of reading entails that human beings were not born to read; instead, they invented reading just a few thousand years ago. It was because of the invention of reading that human beings could rearrange their brains to think and form opinions. A considerable portion of the world can read. However, most people among these readers can read at a much higher level of comprehension, critique and challenge the information and reinterpret it appropriately (Elley, 2001; Tucker, 2000; UNESCO, 2007).

Reading is an incremental and complex process involving not only cognition but many other external factors. Urquhart and Weir (2014) postulate that during reading, a reader receives and interprets information that is written in a particular language and shared through print. Grabe endorses this definition as it truly depicts the whole reading process. The definition indicates that reading is a two-way process and there is an interplay of comprehension and interpretation of a concept, idea and information, making the whole process complex and convoluted. Thus, this complex phenomenon includes the following traits:

- A quick process
- A well-organized process
- An understanding process
- A communicating process
- A planned process
- A stretchy process
- A decisive process
- An evaluative process
- A learning process
- A linguistic process

The processes involved in the reading activity give a functional account of how reading is processed and what it requires to make the activity successful. In a sense, we can assert that all these processes are the working and functional components of reading, and without them, reading cannot be effective. In addition to this, we also need to know the following:

- How do we read?
- What are the cognitive processes involved in reading?
- How do they work together?
- How does comprehension emerge?
- How can we interpret a text in multiple ways?
- How do inference and background knowledge influence comprehension?

Last but not least, the definition of reading informs that a broad range of sub-skills is to be considered by the readers and the language teachers.

Depending on their needs, people may need to read in multiple languages and diverse contexts. However, reading becomes more crucial when considered in an

educational context. So, the development of academic reading skills is most often the target of language learners and language instructors. Reading fluency and comprehension may greatly interest language learners and teachers alike. Over the past few years, many types of research have been conducted to indicate how component skills influence reading fluency and comprehension. New ideas are being incorporated into teaching reading at varying levels of education. Thus, scholars have suggested that the lower and higher processes are related to reading development. The lower-level processes in reading activity enlist the following:

- Word recognition
- Syntactic parsing and
- Meaning encoding as propositions/ semantic-proposition encoding

Grabe postulates that all these lower-level processes are greatly dependent upon the 'working memory' of the reader and working memory is fundamental to understanding all these processes. Moreover, counting these lower levels doesn't mean they are so simple; instead, they are highly cognitive and automatised, making the whole reading phenomenon convoluted.

Conversely, the higher-level processing in reading activity includes the following:

- Interpreting the text
- Inference
- Executive-control processing (how we direct our attention), and
- Strategic processing.

Lower and higher-level processes simultaneously operate and interplay to influence the reading activity. But, the higher-level processes incorporate attentional processes while reading difficult and complex texts. The attentional mechanisms require a reader to (a) respond to reading goals and purposes, (b) apply strategies appropriately, (c) engage in metacognitive awareness and monitoring, (d) draw on background knowledge as appropriate, and (e) support inferences for text processing and text evaluation. The theory also includes valuable discussion on motivational

factors and assessment methods for reading activity, which may greatly interest language teachers.

The current study follows the theoretical framework suggested by Grabe (2009) because issues pertaining to reading fluency and comprehension are crucial in teaching reading at the college level. Instructional achievements in teaching reading to ESL students have been a key concern of English Language Teaching in the Pakistani educational context. Thus, Grabe's reading theory fulfills educational/instructional and research needs. Moreover, the current experimental research endeavours to improve college English learners' language skills using AI-based apps, though the key focus of the study is on the improvement of reading skills so that enhanced and proper linguistic input may result in improvement of linguistic output, which is the ultimate goal of a language learner.

### 3.2.2 Bachman and Palmer's (2010) Theory of Language Ability

The second theory the current study followed is Bachman and Palmer's (2010) theory of language ability, comprising an embedded model of language proficiency. Different theorists and linguists have presented different ideas about language teaching and learning. We can count Hymes's (1972) and Canale and Swain's (1980) language proficiency models as well-reputed models of language proficiency. So, based on Hymes's (1972), Canales and Swain's (1980) models and Bachman and Palmer's (1982, 1990 and 1996) models of language proficiency, Bachman and Palmer presented another extended theory of language proficiency in 2010. The theory of language proficiency by Bachman and Palmer (2010) is quite comprehensive because it consists of the elements vital for developing language proficiency in learners. Bachman and Palmer (2010) have indicated that language proficiency depends upon the following traits of a language user:

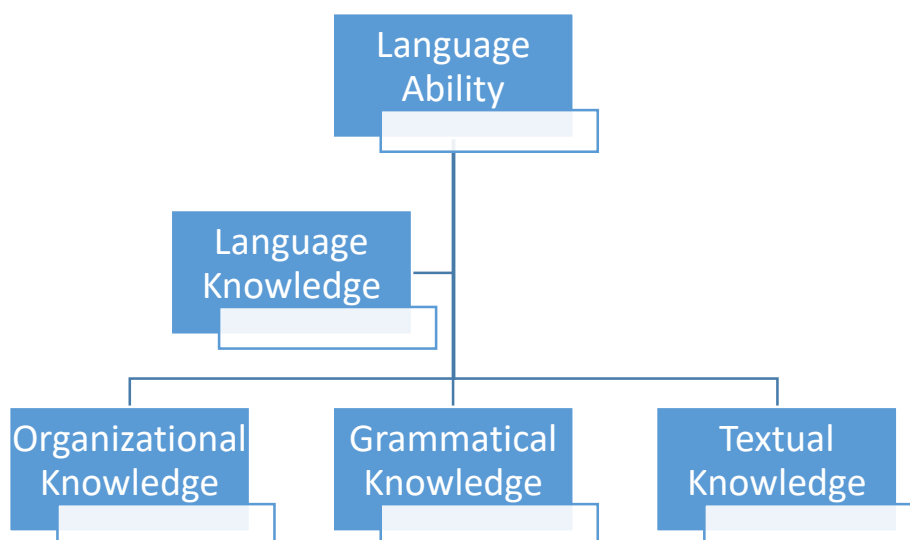
- Topical knowledge
- Affective schemata and
- Language ability

The current study follows the adapted model of Bachman and Palmer (2010) relying only on the variables coming under Language knowledge which comes under Language ability.

The model of language proficiency can be understood well through the following diagram:

**Figure: 7**

*Model of Language Proficiency*



### 3.2.2.1 Language Knowledge

Language knowledge is subdivided into organizational, grammatical and textual knowledge. Organizational and grammar knowledge refers to vocabulary, phonological and syntactic rules. At the same time, textual knowledge refers to a language user's ability to produce a language with cohesion, symmetry, organization of thought, rhetorical elements, etc.

Many linguists have admired this model of language proficiency for its scope and range. It covers both linguistic and pragmatic aspects of language. This model is also helpful in language teaching and assessment because it provides a guideline to the stakeholders as to what linguistic traits a language learner and teacher should focus on. This model informs the instructors about what and how to teach in terms of language teaching. The model is helpful in language assessment because it indicates

the areas that must be focused on during teaching/learning activities. Because of the multi-directional approach, the current study follows Bachman & Palmer's (2010) theory and embedded model of language proficiency to assess the level of improvement in writing and speaking skills of the learners after practicing reading for about eight months. Both writing and speaking were tested to determine how much continuous reading practice under AI-based programs helped the learners improve other language skills.

The current study followed the theoretical framework presented by Bachman and Palmer (2010) for its model of language ability. The key features of this model were used in the current study through a series of lesson plans and home assignments implemented through three different AI-powered apps. Since developing language ability among college English language learners was the basic aim of this study, the research participants were engaged in learning activities that specifically focused on transmitting language knowledge to the learners. To reach the set targets, the participants had to complete 80 reading tasks followed by different questions involving speaking and writing activities at the end of each task. The participants were directed to receive language knowledge through the assigned text and apply it to their speaking and writing tasks. Each lesson was followed by two questions which the participants were required to answer through speaking and two of the questions were to be answered through writing. The basic aim of this activity was to enable the participants to speak and write along with the reading tasks so that these activities might not be ignored during the learning activities and at the same time, the learners might get a chance to apply their language knowledge to writing and speaking tasks. As far as the use of AI-based apps in this regard was concerned, the 'Readlee App' was used for speaking and writing activities. The app provided an option to either speak and record the answers or type them on the given platform. Thus, both options were used by the teacher and the participants were restricted to answer two questions through speaking and two through typing so that both skills could be equally focused upon. Moreover, speaking and writing skills were analysed/tested through pre and post-tests (See appendix B for pre and post-tests) through different activities like dialogues, short speeches, discourse completion tasks and paragraph writing.

### 3.2.3 The Extended Unified Theory of Acceptance and Use of Technology Model (2012) – (UTAUT2)

The current study followed the Unified Theory of Acceptance and Use of Technology (UTAUT2) (Venkatesh et al., 2012) to have an idea about research participants' perceptions, beliefs and learning experience after using AI-based apps for English language learning. UTAUT2 is based on a blend of models like Technology Acceptance Model 1 (TAM 1) Davis (1986), Theory of Planned Behaviour (TPB) (Ajzen, 1985) and Technology Acceptance Model 2 (TAM 2) (Venkatesh & Davis, 2000).

Later on TAM was upgraded and synthesized with UTAUT by Venkatesh, Morris, Davis, and Davis (2003). Thus, this version of the model consisted of the factors like performance expectancy, effort expectancy, social influence, and facilitating conditions. Harris, Brown, & Evaluation (2010) postulate that UTAUT aims at assessing the degree of collaborative use of technology in knowledge-intensive environments. Later, Venkatesh, Morris, Davis, and Davis (2003) synthesized TAMS into the UTAUT which consisted of performance expectancy, effort expectancy, social influence, and facilitating conditions which can be measured through some other variables like age, gender, experience and voluntariness of Technology users.

This theory aims at assessing an individual's perceptions and beliefs of the use of technology in educational settings. The key focus of UTAUT is an individual's opinion about the use of technology based on performance expectancy (to assess the degree of usefulness of technology), effort expectancy (to assess the level of difficulty/ease), social influence (to assess appreciation of the use of technology in social networks) and facilitating conditions (to assess the availability of resources to use/apply technology) (Venkatesh et al., 2003).

UTAUT was further modified by Venkatesh, Thong, & Xu, (2012) based on the development of multimedia technology which incorporates the use of technology at an extended level. The modified version of UTAUT was called UTAUT2 as it consisted of three additional constructs along with the previous ones. The amended version of UTAUT was enriched with 'hedonic motivation', 'price value', and 'habit'. Thus, in addition to the key constructs of UTAUT, UTAUT2 informs that one's opinion to use



other studies, Tosuntaş, Karadağ, & Orhan, (2015); Šumak & Šorgo, (2016) investigates the perceptions and beliefs of learners about the application of interactive whiteboards in language learning whereas students' view point about mobile learning was investigated by Thomas, Singh, & Gaffar, 2013 respectively. Botero, Questier, Cincinnato, He, & Zhu (2019) also analysed students' perceptions on MALL under UTAUT2.

Thus the current study undertook UTAUT2 to investigate college level ESL learners' perceptions and beliefs regarding the use of AI-based Apps for English language learning particularly at college level in Pakistani educational context. The key focus of the study in this regard was:

- Performance expectancy: Performance expectancy refers to language learners' that AI-based apps are useful in English language learning.
- Effort expectancy: Effort expectancy is concerned with learners' opinions about the ease and comfort for using AI-based Apps for English language learning.
- Social influence: Social influence is concerned with learners' opinions about the use of AI-based apps that may be influenced by teachers and peers in terms of support, supervision and guidance.
- Facilitating conditions: Facilitating conditions refer to the learning environment and technical support for the availability of resources to use AI-based Apps for English language learning.
- Hedonic motivation: Hedonic motivation refers to language learners' beliefs about entertainment and enjoyment while using AI-based Apps for English language learning.
- Price value: Price value covers research participants' perceptions about the benefits of using AI-based applications for English language learning in comparison with the cost spent on their use of these apps.
- Habit: Habit refers to language participants' tendency to use AI-based apps in learning the English language.

Thus, the current study incorporated an adapted survey questionnaire developed by Naz (2019) to investigate learners' perceptions and beliefs regarding the use of technology for English language learning. The questionnaire is based on UTAUT2 to meet the third research objective and answer the third research question. The research

participants were required to respond to the questionnaire after using AI-based Apps for a period of 32 weeks to learn and improve English language skills.

### **3.3 Research Design**

The present study employed a quasi-experimental research design to investigate the effectiveness of AI-based applications in improving English language skills among Pakistani college students. This design was selected because random assignment of participants was not possible within the practical constraints of Pakistani college classrooms, where students are taught based on institutional policies rather than researcher control. Using intact classes preserved the natural instructional environment and enhanced ecological validity while still allowing a systematic comparison of outcomes between the treatment and control groups. According to Campbell and Stanley (1963), quasi-experimental designs are well-established as appropriate and rigorous alternatives to true experiments in educational settings where randomization is difficult or unethical. Methodologists emphasize that such designs are particularly suitable for evaluating instructional interventions in real classrooms and can provide strong evidence of causality when supported by careful control of confounding variables and pre-test measures. Quasi-experimental designs allow researchers to examine cause-and-effect relationships by comparing groups while still applying structured interventions and maintaining control over key variables such as pre-test scores, instructional time, and learning content (Cook & Campbell, 1979). This approach ensured methodological rigor while accommodating the practical realities of college-level classroom environments.

In this study, a total of 50 college level students were selected and equally divided into an experimental group and a control group. The experimental group was instructed using selected AI-based language learning applications, while the control group was taught through the traditional Grammar Translation Method (GTM). By comparing the performance of the two groups before and after the intervention, the study aimed to determine the actual impact of AI-based English language teaching. The use of a quasi-experimental design ensured objectivity, reliability, and the ability to measure changes in students' language proficiency in a systematic and controlled manner. This method was especially suitable because there is increasing interest in

using technology for language learning, and it was important to find out through evidence how effective it is for Pakistani ESL students.

So, the present study employed a quasi-experimental design by achieving random assignment within the accessible population. As per the guidelines by Campbell & Stanley (2015), after obtaining participants' consent, randomization was conducted within one intact college class to form truly random experimental and control groups, thereby meeting the fundamental criterion of a true experiment. To control extraneous variables, both groups were instructed by the same teacher during the same classroom conditions and timeline, following identical syllabi, instructional schedules, and assessment procedures. Pre-test results established equivalence in baseline proficiency, further enhancing internal validity. Moreover, the intervention i.e. AI-based language instruction, represented an ethical and pedagogically sound improvement in teaching-learning outcomes meeting the required ethical and institutional requirements. These conditions collectively justify the selection of a pure experimental design, ensuring both methodological rigor and ethical integrity.

### 3.3.1 Study Plan and Syllabus Break-Up

The students were provided with an entirely different learning environment as they were experiencing their reading with the help of 3 different Apps. There were 80 lesson plans (See appendix G for some sample lesson plans) that were implemented by the teacher during the whole experimental phase. Each lesson was taught during the classes in the college and these lessons were followed by 80 reading tasks and quizzes that were to be submitted by the students after the class from their homes. This is how 2 textbooks namely English Textbook 2 (For the intermediate students) and the Novel (Good bye Mr. Chips) were covered during the whole action phase. The whole teaching and learning action during the current research project was implemented according to the following timeline:

**Table: 1**  
***Timeline for the Implementation of the Plan***

No. of Week	Month	Chapter
1	September 2022	<b>Pre-Test</b>
		<b>Book 2 Part 1</b>
		1. The Dying Sun
2		2. Using the Scientific Method
3		<b>Test-retest</b>
		3. Why Boys Fail in College
4	October 2022	Revision/Monthly Tests
5		4. End of Term
6		5. On Destroying Books
7		<b>Book 2 Part 2</b>
		1. First Year at Harrow
8		Revision/Monthly Tests
9	November 2022	2. Hitch Hiking Across the Sahara
10		3. Sir Alexander Fleming
11		<b>Novel</b>
		Chapter 1 to 5
12		Revision & Monthly Test
13		<b>Novel</b>
	December 2022	Chapter 6 to 10
14		
15		<b>Mid-term Exam</b>
16		<b>Winter Holidays</b>
17		<b>Novel</b>
		Chapter 11
18	January 2023	Chapter 12
19		Chapter 13 & 14
20		Revision/Monthly Tests

21		<b>Novel</b>
		Chapter 15 to 18
	February 2023	
22		<b>Book 2</b>
		6. The Man Who was a Hospital
		7. My Financial Career
23		8. China's Way to Progress
24		<b>Send-Up Exam</b>
	February 2023	
25		9. Hunger and Population
26		10. Jewel of the World
27		<b>Book II Part 2</b>
		14. Louis Pasteur
28	March 2023	15. Mustafa Kamal
29		Any Pending Work &
30		Revision
31	April 2023	<b>Post-test</b>
32		

### 3.4 Site for the Research

The current research was conducted at a male public sector college (Government Associate College of Commerce, Kahuta, District Rawalpindi, Pakistan). The researcher has been serving in this college as a lecturer of English for the last 13 years. The college offers intermediate in Commerce and Computer Science to only male students of the locality at the government level. In this college, English is taught as a compulsory subject in both parts of intermediate.

### 1.5 Participants of the Study and Sampling

50 male college-level ESL learners were the participants of this study. To ensure the unbiased distribution of learners in control and experimental groups, a systematic random sampling technique was used so that all participants might get an

equal chance of participation in the study. Codes were used instead of students' class roll numbers and from roll number 201 to 249 all odd roll numbers were coded as 01 to 49. Students with odd roll numbers and codes were kept in the experimental group whereas all even roll numbers from 202 to 250 were kept in the control group with the codes from 02 to 50.

So, one intact class of 50 college ESL students was equally divided into experimental and control groups. Having 25 students in each group provided a workable balance between treatment and comparison while still allowing for the application of parametric statistical tests such as *t*-tests. According to Cohen's (1988) guidelines, a sample of roughly 25 per group is sufficient to detect effect size ( $d \approx 0.5$ ) at  $\alpha = 0.05$  with power  $\geq 0.70$ – $0.80$  in a pre-test/post-test in an experimental research. Recent MALL/AI-assisted language-learning experiments in comparable contexts have worked with similar numbers (e.g., 20–30 participants per group) while achieving statistically significant results. Moreover, the research was conducted in one public-sector College where administrative permission was granted for only one intact class. Recruiting additional participants would have required access to multiple institutions, which was not feasible due to time constraints and lack of resources. Furthermore, besides quantitative testing, the study included qualitative interviews, classroom observations, and field notes. A larger sample could dilute the depth and manageability of these data sources. The 50 students were all second-year Pakistani college ESL learners with similar curricular exposure and proficiency levels. So, this relative homogeneity reduces the need for a very large sample to achieve representativeness within the defined population.

### 3.5.1 Experimental Group

There were 25 students in the experimental group. These participants were taught their English textbooks according to preplanned lessons. In total, 80 lessons were taught during the classes through grammar translation method. The students were required to read the same lessons at home as their reading tasks. Moreover, the students were required to use 3 different AI-based Apps to submit their reading tasks. Firstly, they were required to listen to the assigned text through the '@voice aloud reader' App. Secondly, they were required to submit their reading task through the 'Readlee App' and thirdly, they were required to solve the quiz automatically

generated through the App named ‘Entelechy’. They participants from this group submitted 80 reading tasks using the AI-based Apps mentioned above. The whole action and experimental phase lasted for about 8 months (September 2022 to April 2023).

### 3.5.2 Control Group

Like the experimental group, there were 25 students in the control group as well. The participants from the control group were taught there textbooks in class through grammar translation method and the same 80 lessons were implemented in their class as were taught to the experimental group. In addition to the lessons taught by the teacher during the class, the students were assigned the reading tasks as their home assignments. The students were required to read the same text at home through their textbook as was taught by the teacher in the class. Unlike the experimental group, these students were not asked to use any AI based Apps for completing their reading tasks.

### 3.5.3 Demographic Details of the Participants

Demographic details of the research participants are always important because it is essential for a researcher to be well aware of each and every detail regarding each participant of his study. Unconscious of these details, a researcher might not get the true results of his study and he may not reach as many insights as he can reach through the detailed knowledge of his research participants (Hammer, 2011). In the present study, the demographic details of the research participants were collected through a modified/adapted questionnaire (See appendix A for questionnaire on demographic details). The questionnaire consisted of questions about age, gender, native language, English language learning background, satisfaction with language proficiency, experience of learning English with AI-based Apps, readiness to learn English with AI apps, access to technology and location. The following table provides the details regarding participants’ demography:

**Table: 2**  
**Demographic Details**

<b>Age</b>		
<b>Variables</b>	<b>Frequency</b>	<b>% age</b>
17 years	2	4%
18 years	31	62%
19 years	17	34%
<b>Gender</b>		
Male	50	100%
Female	0	0%
<b>Native Language</b>		
Punjabi/Potohari	49	98%
Pashto	1	2%
Sindhi	0	0%
Balochi	0	0%
Any other regional language	0	0%
<b>English Language Learning Period</b>		
10-11 years	1	2%
12-13 years	49	98%
14-15 year	0	0%
More than 15 Years	0	0%
<b>Satisfaction with English Language Proficiency</b>		
Yes	1	2%
No	48	96%
To some extent	1	2%
No idea	0	0%
<b>Have experience of using AI-based Apps for learning English</b>		
Yes	50	100%
No	0	0%
<b>Have access to technology</b>		
Yes	48	96%
No	2	4%
<b>Willing to use AI- Apps for learning English</b>		
Yes	50	100%
No	0	0%
Maybe	0	0%
Can't Decide	0	0%
<b>Location Urban/Rural</b>		
Urban	35	70%
Rural	15	30%

The table of demographic details indicates that 50 male college-level English language learners were the participants of the current study. The participants were of different ages but all of them were 17 to 19 years old. 4% of them were 17 years old, 62% of them were 18 years old and 34% of them were 19 years old. The data indicated that neither they were too young nor were they too old.

As far as the native language of the participants is concerned, the data indicated that 98% of them were Potohari (language that is spoken in the Potohar region of District Punjab) speakers living in the Punjab province whereas only 2% of them were Pashto speakers. As the study was conducted in the Punjab province, most of the participants were Punjabis.

The data indicated that the participants had been learning English for more than 10 years in an academic setting. 2% of them claimed to learn English for 10-11 years whereas 98% of the participant informed that they had been learning English for 12-13 years. This indicated that the participants had been learning English in an academic setting for a long period.

When asked how much satisfied they were with their English language proficiency, only 2% of them answered in yes. 2% of them claimed that they were satisfied to some extent but 96% of them informed that they were not satisfied with their English language proficiency. This indicated that most of the participants were not satisfied with the previous English language learning experience because they were not able to read, write and speak in English perfectly.

Then participants were asked to inform whether they had ever used AI-based Apps to learn English or not. All participants indicated that they never had a chance to learn English with AI-powered tools and Apps rather they always learned English in traditional ways. But, it was encouraging to know that all participants were motivated to learn English with the help of AI-based Apps and they consented to join this mode of learning positively. For, this it was essential for them to have access to technology and technological gadgets like mobiles, tablets, computers/laptops and the Internet. Only 4% of them claimed that they didn't have access to these resources whereas 96% of the participants informed that they had the resources needed for the current research. Those who informed that they lacked access to technology were

asked to use college computer laboratory to learn English with the help of AI-based Apps.

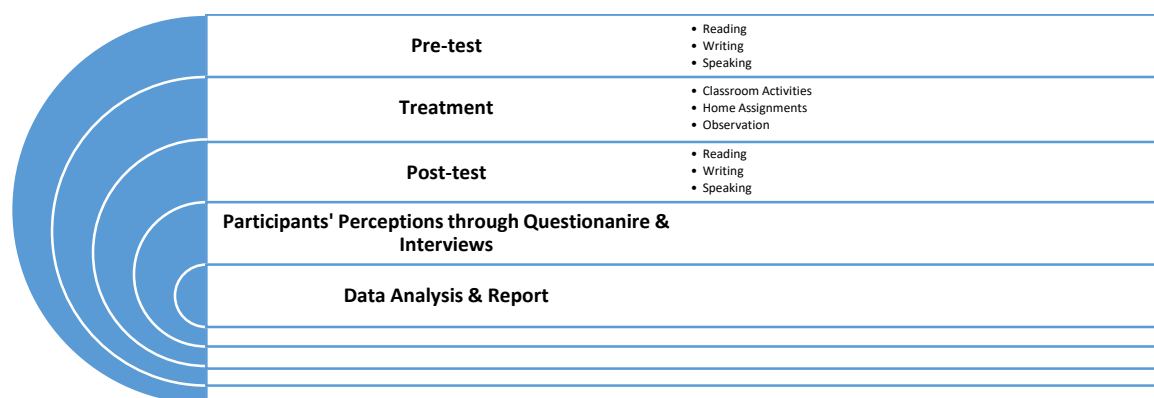
As far as the location of the participants was concerned, 70% of them were living in urban areas whereas 30% of them were living in rural areas where they might have issues with internet and access but, only 4% of them informed that they lacked these resources. All the other participants informed that they had network and internet access even if they lived in rural areas.

### 3.6 Research Procedure and Data Collection

The current study was conducted under three different phases. The following figure presents a comprehensive detail of research procedure and data collection:

**Figure: 9**

*Research Procedure*



The figure indicates that the research data were collected in three different phases which are explained below:

#### 3.6.1 First Phase

During the first phase, the research data was collected for diagnostic purposes and important data about reading, writing and speaking skills were collected through a pre-test (See appendix B for the pre-test). Johnson and Brown (2015) postulate that dependent variables are measured through pre-tests in experimental research. The results and findings at this stage are helpful to compare the situation after the treatment period is over. According to Miller (2008), a pre-test is the measurement of a participant's performance and previous knowledge and it is conducted before the

treatment phase starts. Thomas and Williams (2013) indicate that a pre-test is an initial assessment of a dependent variable conducted before the experiment starts.

### 3.6.2 Advantages of a Pre-Test

While counting the benefits and purposes of a pre-test, Smith (2020) indicates that, a pretest provides us with a baseline at which the participants have performed. This baseline measures the dependent variable and helps us in comparing the results found in the post-test. Moreover, confounding variables are controlled through a pre-test because they might impact the research in different ways. These variables might prove important either as covariates or elements important for various comparisons (Johnson and Brown, 2015). In addition to these advantages, another advantage as counted by Thompson and Williams (2013) is that a pretest is based on the randomization of the assignment in two different groups which indicates whether or not the test can be conducted successfully. Thus, the issues about the implementation of different methods and techniques can be resolved at this stage and at the same time, causal inference can be ensured indicating how the treatment period influences the results. According to Miller (2008), the statistical power of the study increases because of a pre-test because it provides the assessment of dependent variables which are later compared with the results of the post-test indicating what difference the study makes and what future steps can be suggested to resolve the issue.

So, the pre-test was conducted to collect preliminary research data. Since this phase consisted of three important aspects of language learning, the data were collected through the following procedures:

## 3.7 Data Regarding Learners' Reading, Writing and Speaking Skills

During the first phase, the data regarding learners' reading, writing and speaking skills were collected through a pre-test. Pre-tests for each language skill were based on the following 8 different activities.

### 3.7.1 Lower Level Reading Skills

Reading skills that include fluency (WCP), accuracy (Word recognition and pronunciation) and comprehension were tested through the blend of the AI-based

application “Readlee” and a model introduced by Srisang & Everatt (2021). Reading fluency and accuracy were tested through “Readlee” for which the college computer lab was used and students were directed to read the given text aloud through “Readlee” under the supervision of the researcher. Moreover, a manual pre-test was also administered to assess the lower and higher-level skills of the research participants. These reading skills included word processing, vocabulary, grammar knowledge and inference on the one hand and comprehension on the other hand. The lower-level traits like word processing/recognition, vocabulary and grammar knowledge were tested through the following procedure:

### 3.7.2 Word Processing/Recognition

To assess the participants’ ability to process or recognize the word, the participants were required to recognize and separate the words through a slash (/) which they were required to place in between the two distinct words.

For example: stomachcontaininggreenishliquid

(stomach/containing/greenish/liquid)

### 3.7.3 Vocabulary

In the current study, participants’ level of vocabulary was tested through a test that contains a sentence having a typical underlined word for which participants were required to choose one out of four options that had the same meaning as the underlined word.

For example: She turned abruptly to receive the phone call.

a) Silently      b) Loudly      c) Quickly      d) Slowly

### 3.7.4 Grammar Knowledge

The grammar knowledge of the participants was tested through a test that consisted of a few sentences which were grammatically incorrect and the participants were required to correct the sentences.

For example:

Incorrect:      None of the boys were willing to work.

Correct:      None of the boys was willing to work.

### 3.7.5 Inference

To assess the inference skills of the participants, a test was administered based on the model introduced by Srisang & Everatt (2021). This activity engaged the participants in a test in which they were given five short passages. Each paragraph was followed by four multiple-choice questions that focused on the inference skills of the participants including:

- Literal comprehension inference
- Grammatically connecting inference
- Vocabulary relating to inference
- Text coherence inference
- Prior knowledge inference

### 3.7.6 Higher Level Reading Skills

#### 3.7.6.1 Comprehension Skills

To assess the overall comprehension skills of the participants, a comprehension test was administered. The participants were required to attempt 3 paragraphs followed by questions that helped in assessing their level of understanding. The students were required to read the given text carefully and answer the questions given at the end of each passage. Each paragraph for comprehension was followed by 5 multiple-choice questions. Each answer had the weightage of a point as a score. The assessment and evaluation were based on point scores measuring the performance of the participants so that performance in pre and post-tests could be compared and analysed. This comparison was essential to reach the findings and conclude the study.

### 3.7.7 Writing and Speaking Skills

To assess the writing and speaking skills of the participants, a pre-test was conducted following Bachman and Palmer's (2010) model of language ability. The writing skills of the participants were tested through the following activities:

- Discourse completion tasks
- Paragraph writing

DCTs and paragraph writing activities were conducted to check the vocabulary, grammar and background knowledge of the learners.

Moreover, the speaking ability of the participants was assessed through dialogues and short speeches. During the test of speaking, the voice of the students was recorded through a mobile recorder for assessment. The key focus was on:

- Pronunciation
- Vocabulary and grammar (Accuracy)
- Fluency

Thus, pronunciation, accuracy and fluency were assessed through short speeches and overall communication skills were tested through dialogues using a scale as suggested by Verner (2017). Based on this scale, speeches and dialogues were assessed at the following 4 levels with codes ranging from 1 to 4:

1. Meets expectations high
2. Meets expectations low
3. Slightly underperforms
4. Does not meet expectations

While analyzing the data, the codes were converted into numbers/scores to interpret the data mathematically. Then the score was subtracted from four because (4) was considered the highest score with the poorest performance. This means that the lowest number stood for better performance and the higher number referred to the poorest performance in the speaking test.

The first phase ended after the achievement of preliminary data sought through various pre-tests designed to assess participants' reading, writing and speaking skills. The data and information sought through pre-tests were recorded for further procedures and comparison after the third phase was over.

## **3.8 Second Phase**

### **3.8.1 Experimentation**

Phase two included an experiment which was conducted using AI-based applications i.e. Readlee, @Voice Aloud Reader and Entelechy to improve the reading skills of the participants. The period of the experiment was one academic session which started from September 2022 and lasted till April 2023. The total period of this academic activity was 8 months which is termed as a session in the Pakistani college setup. During the phase of the experiment, the chapters from the textbooks were

divided into numerous reading tasks and readings were uploaded on the Readlee Class Portal regularly according to a schedule set by the teacher. A total number of 80 reading assignments were assigned to the students during the experiment covering 2 textbooks of English (Book II & Novel) that were included in the syllabus of intermediate class. The students were divided into control and experimental groups. The students in the experimental group were assigned reading tasks through 'Readlee' in addition to their regular classwork. Readlee is a new application for mobiles/tablets/laptops/computers and it uses artificial intelligence to improve literacy. It's a Co-designed software by two teachers, Steve Askar and Drew Madson to personalize reading instructions for learners; the software listens to students read any text out loud and immediately provides them with personalized feedback.

Moreover, the learners were required to download another AI-based app named @ Voice Aloud Reader which is helpful in modeling reading. The App is mobile-friendly and it can be used to model reading any text for ESL learners. The app reads any text aloud including news articles, long emails etc. The participants were directed to first listen to the model reading through @ Voice Aloud Reader and then read the same text through the Readlee App. This practice helped the learners improve their pronunciation and reading techniques.

One more AI-based app named 'Entelechy' was also used for the assessment and evaluation of the learners. The participants were directed to use the app to assess their comprehension themselves and the teacher also used this app to generate quizzes for each lesson that was uploaded on the "Readlee" portal. But, the students were asked to do their quiz through the Google form for which they were provided the Google form link regularly. This app helped the participants in the assessment of reading comprehension. The participants could upload any text for which it generated a questionnaire/quiz for them to answer. Through that quiz, the learners could assess their comprehension because the app checked the quiz and scored the attempt. It also provided a solution for all the questions so that the learners might know the correct answers.

### 3.8.2 Home Assignments

The teacher uploaded a text/assignment on the Readlee class portal that could be accessed by the students through their mobiles/tablets/laptops/computers. The students in the experimental group were added to the class through the Readlee app and reading tasks were assigned to the students as per the schedule made by the teacher. Both groups were kept engaged in the reading activities throughout the set research period. Moreover, the participants were required to answer a few questions through speaking and writing at the end of the assignment so that these skills might not be ignored. On the other hand, the students in the control group were also assigned reading tasks but they were asked to read at home on their own without using any AI-based program like 'Readlee'.

The entire action plan was practically implemented through lesson plans which were incorporated throughout the research period according to a set schedule. One of the lesson plans is hereby presented to give an idea of how the routine activities were administered during the research whereas 80 lesson plans (See appendix G for a few sample lesson plans) have been mentioned in the appendices.

### 3.8.3 Lesson Plan

Class:	Intermediate Part II	Subject: English
Chapter:	The Dying Sun by James Jeans	Duration: 30 Minutes
Date:	September 01, 2022	Teacher's Name: Yasar Riaz

#### General Objectives

- To give students information about the size of the Earth, stars and other planetary systems.
- To give students knowledge about the beginning of life on Earth and the forming of planets in the universe.

#### Specific Objectives

- To improve students' English language skills including reading, writing, listening and speaking.
- To improve students' level of vocabulary

- To improve and enhance student's knowledge of grammar
- To improve students' level of comprehension and inference

### Teaching Material

During the lesson: Textbook, Whiteboard, and Marker

After the lesson: Textbook, Smartphone/Tablet/Computer/Laptop

### Brainstorming

Do you know?

- What is the size of the Universe?
- How do the stars travel?
- How did the planets come into existence?

### Announcement of the topic

The Dying Sun by: James Jeans

### Model Reading by the Teacher in the Classroom

(Target: 50 % of the whole chapter is to be covered on day one.)

### Figure: 10 (a)

*Screenshot of Lesson 1*



A few stars are known which are hardly bigger than the earth, but most of them are so large that hundreds of thousands of earths could be packed inside each and leave room to spare; here and there we find an immense star large enough to contain millions and millions of earths. And the total number of stars in the universe is probably something like the total number of grains of sand on all the seashores of the world. Such is the littleness of our home in space when measured up against the total substance of the universe.

These millions of stars are wandering about in space. A few form groups which journey in company, but most of them travel alone. And they travel through a universe so immense that it is very, very rare event indeed for one star to come anywhere near to another. For the most part each star makes its voyage in complete loneliness, like a ship on an empty ocean. In a scale model in which the stars are ships, the average ship will be well over a million miles from its nearest neighbour. From this it is easy to understand why a star seldom finds another anywhere near it.

### Partial feedback

- Tell the meaning of the following words  
Immense, Voyage
- Who is the writer of this chapter?
- How do the stars travel?

### Figure: 10 (b)

#### *Screenshot of Lesson 1*

We believe, however, that some two thousand million years ago this rare event took place, and that another star, wandering blindly through space, happened to come near the sun. Just as the sun and moon raise tides on the earth, so this second star must have raised tides on the surface of the sun. But they would be very different from the little tides which the small mass of the moon raises in our oceans; an immense tidal wave must have traveled over the surface of the sun, at last forming a mountain so high that we can hardly imagine it. As the cause of the disturbance came nearer and nearer, the mountain would rise higher and higher. And before the second star began to move away again, its tidal pull had become so powerful that this mountain was torn to pieces and threw off small parts of itself into space. These small pieces have been going round the sun ever since. They are the planets, great and small, of which our earth is one.

### Final Feedback

- How did the planets come into existence?
- When did this rare event take place?

### Assignment

- Listen to the same text at your home through the Mobile App “@ Voice Aloud Reader” for Model Reading
- Read the same text aloud through the Readlee portal at your home and answer the following questions in both spoken and written form. Press the submit button after completing the task.
- What is the text about? (Speak and record through READLEE)
- What is the most inspiring idea in the text? (Speak and record through READLEE)
- What is the size of a common star? (Write and submit the answer through READLEE)

- What are the planets? Write and submit the answer through READLEE)
- Solve the quiz generated by the App “Entelechy” through the link shared in the WhatsApp group.

### 3.9 Observation

Another tool for data collection during this research was observation. Gorman and Clayton (2005) indicate that observation is a systematic process that involves recording of different facts, figures, behaviours and other observable insights for a research. Observation involves a systematic process that involves data collection through a field experience and behaviour recording during the research (Creswell, 2017). According to Babbie (2016), observation involves a structured and careful process to collect data through the field experience within a research context. Visual and auditory experiences are the primary sources through which data is gathered in observation. Baker (2004) postulates that observation is a multifaceted research mode. It makes the researcher play different roles and the teacher as a researcher has to apply different techniques to collect the data. According to Gold (1958), a researcher can play four different roles which are: observer, participant, participant as observer and complete participant.

Since observation itself is a technique to collect data, it entails further structured and systematic procedures through which an observer collects data for his research. According to Polit and Hungler (1987), logs and field notes are the primary sources of data collection in observation. Logs can be used to record different events and conversations and field notes can be used from a broader perspective because they are more interpretive and analytical. Polit and Hungler (1987) indicate that the quality of the data which is collected through logs and field notes ensures the success of observational research. So, data collection through these sources is a hard nut to crack. Spradley (1980) postulates that taking notes during observation is a difficult task that demands keen interest and concentration during the experiment. Moreover, at first, a condensed version is generated which expands when it is explained and interpreted in the thesis. So, three principles are important to follow in this regard. The first principle is “the identification of the speaker and the language used,” the second one is making

an “exact record” and the third one is using “concrete language.” So, during the observation a researcher needs to follow certain principles.

As far as the current study is concerned, it also used observation for data collection during the field research. Field notes were taken on a diary on regular basis and it was ensured that nothing goes unattended and unobserved. The key focus was on participants’ behaviour, interest, motivation level, problem solving techniques, progress making and so on. Every observation whether visual or auditory was noted in the log on a regular basis. The participants were also directed to open their hearts whenever they needed to discuss and share anything. So, whenever the participants shared or discussed anything pertaining to their tasks, it was also noted in the log for further insights.

### **3.10 Third Phase**

In the third phase, a post-test (See appendix B for post-test) was conducted to gain an idea about the impact of the manipulation on students’ learning. According to Smith (2010), a post-test is conducted after the treatment period to assess the dependent variables. This test helps the researchers evaluate the impact of the manipulation on the results or change that was expected before the experiment. Garcia & Martinez (2018) inform that the post-test is arranged at the end of the research to assess the influence of the intervention on the dependent variables.

As far as the advantages of the post-test in research are concerned, it helps us assess the effect of manipulation and treatment on the dependent variables in experimental research (Smith, 2010). Then a post-test helps evaluate the change in behaviour of the participants caused by the manipulation and intervention. Moreover, the causal impact of things on results during and after the research is also ensured through the post-test (Garcia and Martines, 2018). The most striking feature of a post-test is that it enables us to verify the hypotheses that are formulated at the start of research.

So, the reading skills of the participants were assessed through a post-test using the Readlee app. Moreover, the impact of reading ability on writing and

speaking skills was also assessed based on the idea that reading is a source of language input whereas writing and speaking are the sources of language output. Thus, reading, writing and speaking skills were assessed through the post-tests using the same models and techniques that were used during in the pre-test, though the test items had different contents. The same test items were not repeated in the post-test because the students were already familiar with them and we might not be able to reach the required results by using them again. The following items were included in the post-test (See appendix B for post-test):

- Reading pace and accuracy
- Word processing/Recognition
- Vocabulary
- Grammar Knowledge (Sentence Correction)
- Inference skills
- Comprehension skills
- Discourse Completion Tasks
- Paragraph writing
- Dialogues
- Short speeches

### **3.11 Participants' Learning Experience**

Moreover, after the experiment period was over, data regarding students' learning experience and perceptions about the use of AI-based apps for English language teaching was collected through a Likert scale questionnaire whereas selected participants were interviewed as well. The questionnaire was shared with the participants using Google form link.

#### **3.11.1 Questionnaire**

A questionnaire (See appendix C for the questionnaire on participants' perceptions about the use of AI-based apps and learning experience) developed by Naz (2019) was adapted to collect data regarding participants' perceptions about the use of AI-based apps. The questionnaire consisted of 35 statements which targeted participants' learning behaviour and perceptions about the use of AI-based Apps for

learning English. The statements of the questionnaire were based on the following key themes:

- Usefulness of the AI-based Apps for teaching and learning the English language.
- Impact of AI-based Apps on the improvement of students' reading skills.
- Effectiveness AI-powered tools for improving writing skills.
- Role of AI-harnessed Apps in enhancing speaking skills in the English language learners at the college level.
- Impact of AI-powered Apps on the vocabulary building and grammar knowledge.
- Support in sharing of learning material through AI-based Apps.
- Whether it's good to keep using these Apps or not?
- Participants' satisfaction on the use of 'Readlee' App for improving reading skills.
- Whether Reading through 'Readlee' was a fun or not?
- Difficulty level/troubles in using the 'Readlee' App.
- Satisfaction level on learning through 'Readlee'.
- Effectiveness of the assignments assigned through 'Readlee'.
- Participants' opinions about the improvement in the reading pace after using the 'Readlee' App.
- Impact of the reading assignments on participants' improvement in comprehension skills.
- Impact of the use of the 'Readlee' App on participants' pronunciation, vocabulary, writing and speaking skills.
- Effectiveness of '@voice aloud reader' for model reading, pronunciation and reading style.
- Usefulness of the 'Entelechy' App for developing comprehension skills through the system of automated feedback.
- Whether the use of 'Entelechy' was a fun or not?
- Learning correct use of English with AI-based Apps.
- Whether AI-powered Apps reduce students' dependence on teacher or not?
- Whether English language learning with AI-based makes it a private and personal matter for a student or not?

- Impact of the use of AI-harnessed Apps on participants' level of motivation.
- Participants' opinion about the use of AI-tools by all English language teachers.
- Whether the use of AI-powered tools in language teaching and learning is a wastage of time or not?
- Whether the participants liked to use AI-powered Apps during the current research or not?
- Participants' opinions about the cost and expenditures of using AI-based Apps for learning English.

### 3.11.2 Interviews

Interviews (See appendix D for interview questions) were also conducted to have students' perceptions about the use of AI-based Apps for teaching and learning English. The interview questions were an adapted version of the questions designed by Wardak (2020). The participants were given a chance to express their views about their English language learning Experience. The interview questions in this study were developed based on the formulation of the problem and the purpose of the research. 7 participants from the experimental group participated in the interview and they were selected through a systematic random sampling technique. Every 5<sup>th</sup> participant was selected for the interview through sampling technique. The interview questions were based on the following themes:

- Participants' English language learning experience with AI-based Apps.
- Contribution of AI-powered Apps in participants' improvement in English language skills and students' level of satisfaction.
- Participants' readiness to keep using AI-powered Apps in future.
- Most striking and amazing feature of AI-based Apps.
- Challenges faced by the participants while using AI-harnessed Apps.
- Participants' preference for traditional or AI-powered English language teaching.
- Participants' opinions about teacher's retention of the use of AI-powered tools in future.
- Impact of AI-based Apps on students' motivation level.

- Recommendation of the use of AI-powered Apps for other English language learners.
- The most effective App among the three used during the current research.

### **3.12 Pilot Study**

A pilot study can be considered as a short version of a research. It is launched to test the feasibility of research that is to be conducted at full-scale. It's a kind of pre-test that help the researcher assess and analyse any issues and hurdles that might cause trouble in collecting the final research data. A pilot study may not guarantee the success of a study but it surely reduces the chances of failure. So, a pilot study is crucial for research, especially in social sciences (Teijlingen, Edwin & Hundley, 2002).

Thus, the pre-test questionnaire was first shared with 4 other English language teachers and scholars. They suggested some improvements in the questionnaire which were acknowledged by the researcher and the changes were made accordingly. The questionnaire was distributed among 10 research participants randomly. The participants responded to the questionnaire and it was then analysed for further research proceedings. The results indicated that the participants had no issues while responding to the questionnaire though they needed two to three sessions to complete the tasks as it covered three different language areas including reading, writing and speaking. So, the pilot study proved helpful when the large-scale experimental research was finally launched.

### **3.13 Reliability**

In this particular study, the reliability of the instruments and data was measured by comparing participants' scores in tests and re-tests under Cronbach's alpha using SPSS. Using Cronbach's alpha to test reliability of the instrument is common in social science researches. It compares variance or covariance between 2 variables and a test is considered to be reliable if there exists a significant deal of covariance between the items (Tavakol & Dennick 2011). As far as the current research is concerned, the retest consisting of the same items as used in the pretest was conducted after a gap of a fortnight to check the reliability. The reliability test produced the following results:

**Table: 3***Reliability*

Result	N	Items
.953	50	2

The correlation of participants' scores in tests was analysed through SPSS with 0.91 value which indicated the test was highly reliable. So, the results indicated that the results of test and retest were consistent and the test was reliable. Thus, the reliability test was positive which encouraged us to administer the test in the field for the data collection.

**3.14 Validity**

The validity of the test was checked through Pearson's correlation between the scores from the instrument and the criterion using SPSS. According to Schober, Boer & Schwarte (2018), Pearson's correlation coefficient checks the linear relationship between the two variables. The range of this correlation is -1 to 1 where a strong and perfect linear relationship of X and Y variables is represented by 1, a negative relationship is represented by -1 and no relationship is represented by 0. In the current study, the data were tested based on assessment criteria and the scores achieved by the participants were divided into 3 intervals/ranges in the Y category and compared with the X category (the genuine scores of the pre-test achieved by the participants). The below table reflects the output sought through validity coefficient test using SPSS.

**Table: 4***Validity Test*

	Test scores	Criterion Scores
Test scores: Pearson Correlation	1	.878
Sig. (2-tailed)		.000
N	50	50
Criterion Scores: Pearson Correlation	.878	1
Sig. (2-tailed)	.000	
N	50	50

The sample size (N) was 50 combined from the experimental and control groups. The validity coefficient was found to be 0.878 indicating that there was a strong correlation between the means of both the tests. The p-value .000 being < than the common alpha 0.05 also suggested that there was a statistically significance correlation between the test scores and criterion scores. Thus, the validity test indicated that the test was valid and it could be implemented in the current study.

### **3.15 Data Analysis**

After the post-test, the results of pre-and post-tests were compared and similarities and dissimilarities were presented in tabular forms. Participants' scores in pre/post-tests were analysed through SPSS and percentages were sought and presented in tabular form. The mean and median of each test score were also taken to have an idea about the average performance. There were different activities through which the participants were tested. In reading, reading pace, accuracy, comprehension and inference skills were tested. In writing, grammar and writing skills were tested through discourse completion tasks and paragraph writing whereas in speaking, pronunciation, accuracy and overall communication skills were tested through dialogues and short speeches. Participants' scores in the pre-test of each category were presented in a tabular form and then they were further explained through histograms to discuss further insights like range of minimum and maximum scores in various tests. The same procedure was followed to present participants' results in the post-tests of each category and then participants' scores in pre and post-tests were compared at two levels. Firstly, participants' scores in pre and post-tests of each category were compared to have an idea about the level of improvement after the treatment period and secondly, the percentages of improvement in both the groups (Experimental & Control Group) were compared in a tabular form to indicate which group was at advantage and which improved more during and after the treatment period.

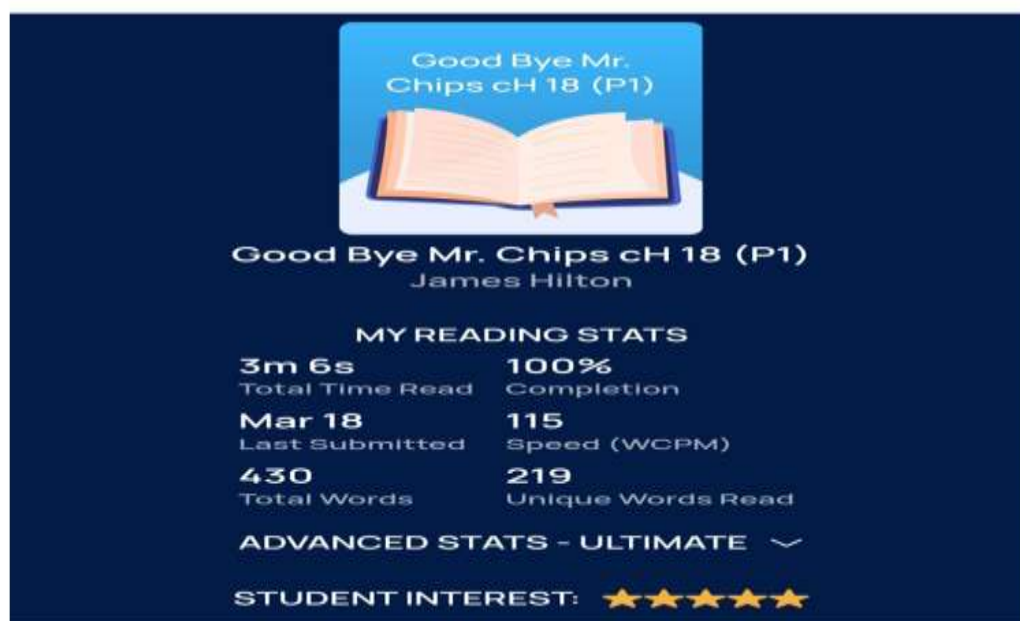
The quantitative data obtained from the pre- and post-tests were analyzed using the Statistical Package for the Social Sciences (SPSS, Version 23) to ensure accuracy and reliability in statistical computation. Initially, descriptive statistics (means, standard deviations, and percentages) were generated to summarize participants' performance in both the experimental and control groups, providing an overview of

central tendencies and score distributions. To analyse the correlation 'The Pearson product-moment correlation coefficient' was applied. According to Chee (2015), the Pearson product-moment correlation coefficient' takes into account the exact magnitude of each score on each variable. To determine the statistical significance of differences between pre- and post-test scores, paired-sample t-tests were conducted separately for each group. This test was selected because it is appropriate for comparing the means of two related samples, thus revealing whether observed changes in performance were attributable to the intervention rather than random variation. The SPSS software was operationalized through systematic data entry, variable labeling, and execution of analysis commands via the "Analyze → Compare Means → Paired-Samples T Test" pathway. Output tables were then interpreted to examine *p*-values, mean differences, and effect sizes, providing empirical support for or against the stated hypotheses.

Moreover, the AI-based program Readlee was also used for data analysis. Since Readlee provides complete information regarding the reading skills of the learners including, Word count per minute, accuracy, and comprehension. It was also used as a tool to analyse the data. Readlee provided its evaluation in the following way:

**Figure: 11**

*Screenshot of Readlee Feedback*



Qualitative data were sought through two important sources that are:

- Observation &
- Interviews

During the treatment period, field notes were taken on a diary on a regular basis. Thus, every important detail was recorded for analysis and insights. As far as interviews were concerned, after the treatment period, the participants were interviewed and they were asked different questions on their perceptions regarding the use of AI-powered apps for improving their English language skills and at the same time, they were required to share their learning experience during the treatment period.

The qualitative data sought through observation and interviews were analysed through thematic analysis. Whereas themes were generated according to the research questions and research needs.

### **3.16 Ethical Considerations**

Ethical considerations form an important part of research and the researchers must ensure the validity of the data, sampling, privacy of the participants confidentiality, accessibility to data, transparency and integrity (Bashin, 2020). So, Ethical integrity was upheld at all stages of this study to ensure the protection and dignity of all participants. Prior to data collection, formal permission was obtained from the relevant college administrations, and ethical approval was secured in line with institutional research guidelines (See appendix E for permission letter). Participants were fully informed about the purpose, procedures, and potential benefits of the study, and their participation was strictly voluntary. Because 2nd-year college students in Pakistan can be 17-20 years old, special attention was paid to the inclusion of minors. The research therefore adopted a dual consent model for those who were under 18. So, written consent forms, signed by parents or guardians, were collected and securely stored prior to any testing or classroom intervention. For, this the same consent form as was signed by the participants was signed by the parents/guardians representing the minors (if any). All participants, and they were assured of their right to withdraw at any

stage without any academic or personal repercussions (See appendix F for informed consent letter).

Confidentiality and anonymity were maintained throughout the research process. Personal identifiers were removed from datasets, and codes were assigned to participants for analytical purposes. Data was stored securely and accessed only by the researcher. In reporting results, care was taken to present findings objectively and respectfully, avoiding any language that might cause bias or stigma.

### 3.17 Research Limitations

While the study was designed with methodological rigor, several limitations must be acknowledged as they might impact the validity, reliability, and generalizability of the findings.

**i. Sample Size and Sampling Technique:** The study was conducted with a limited sample of public sector college students with specific demographic features from the Punjab Province in Pakistan. Although the sample was purposively selected, it may not represent the wider population of Pakistani college students from other provinces. This limits the generalizability of the results across diverse socio-economic and educational contexts.

**ii. Access to Technology:** The study assumed participants had access to smartphones or tablets and a stable internet connection. However, digital inequality could have influenced the extent to which students engaged with the apps outside the class. This may introduce variability in treatment exposure, affecting the internal validity of the intervention outcomes. To meet this challenge, the participants who could have internet issues were permitted to use college computer lab to submit their daily assignment.

### 3.18 Summary of the Chapter

This chapter outlined the comprehensive research methodology including research designed, research site, participants, sampling technique, data collection tools, method of data analysis and analytical techniques. It also informed how ethical issues and limitations were addressed during the current research work. The chapter ensured that the meticulously crafted research methodology helped in answering the

research questions posed for the current study in a coherent and systematic way. This chapter laid the foundation for the next chapters i.e. data analysis and conclusion. It was because of the analytical strategies and technique described in the research methodology that the data were presented, described and analysed profoundly in the next chapter and findings were also reached systematically.

## **CHAPTER 4**

### **DATA ANALYSIS**

#### **4.1 Introduction**

This chapter consists of the details regarding the analysis of the data gathered through pretest, post-test, observation, questionnaire and interviews. As the fundamental aim of the study was to observe the impact of the use of AI-powered Apps on students' learning of English language skills, an experiment was conducted lasting for 8 months commencing from 1st September 2022 and ending till 30th April 2023.

The data sought through a mixed method approach have been analysed using quantitative/qualitative techniques and descriptive statistics in the following sequence:

##### **Step 1**

- Analysis of Pre-Test Results
- Analysis of Post-Test Results
- Comparison of Pre and Post-Test Results

##### **Step 2**

Students' Perceptions Regarding the Use of AI-Powered Apps

- Questionnaire
- Interviews.

##### **Step 3**

- Observation/Field Notes

#### **4.2 Students' Performance in the Pre-Test**

The quantitative data are presented in tabular form indicating students' performance and scores in the pretest and post-tests. These tests included tasks about reading, writing and speaking skills.

##### **4.2.1 Pre-Test of Reading Pace and Accuracy (Experimental Group)**

To collect the data regarding students' reading performance, a reading task was assigned to both the groups namely the control and experimental group. The students

were asked to read the text through ‘Readlee’ an AI-based app. The App was selected to make students read throughout the experiment phase because it has unique features that provide automated feedback to students and the teacher simultaneously. So, the students read the assigned text and the App provided us with the following results:

**Table: 5**

***Reading Pace and Accuracy Pre-Test Exp. Group***

<b>Participants</b>	<b>WCPM</b>	<b>ACCURACY</b>
1	82	52%
3	94	80%
5	69	78%
7	76	73%
9	79	84%
11	89	79%
13	68	74%
15	59	56%
17	61	70%
19	55	70%
21	73	58%
23	62	71%
25	117	90%
27	72	79%
29	110	93%
31	80	86%
33	113	94%
35	78	50%
37	107	90%
39	101	83%
41	39	37%
43	85	72%
45	100	88%
47	51	45%
49	91	80%

Table 5 presents details about participants’ performance in the pre-test of reading in which they were asked to read the assigned text through the Readlee App. The performance of the students from the experimental group is separately presented in this table. Moreover, the table consists of the data regarding students' reading pace based on Word Count per Minute (wcpm) and reading accuracy.

#### 4.2.2 Reading Pace in the Pre-Test (Experimental Group)

Students' performance in reading pace is presented in the form of graphs which indicate 5 different ranges to present the lowest to highest score obtained by the participants.

**Figure: 12**

*Range of Words Read per Minute in Pre-Test (Exp. Group)*

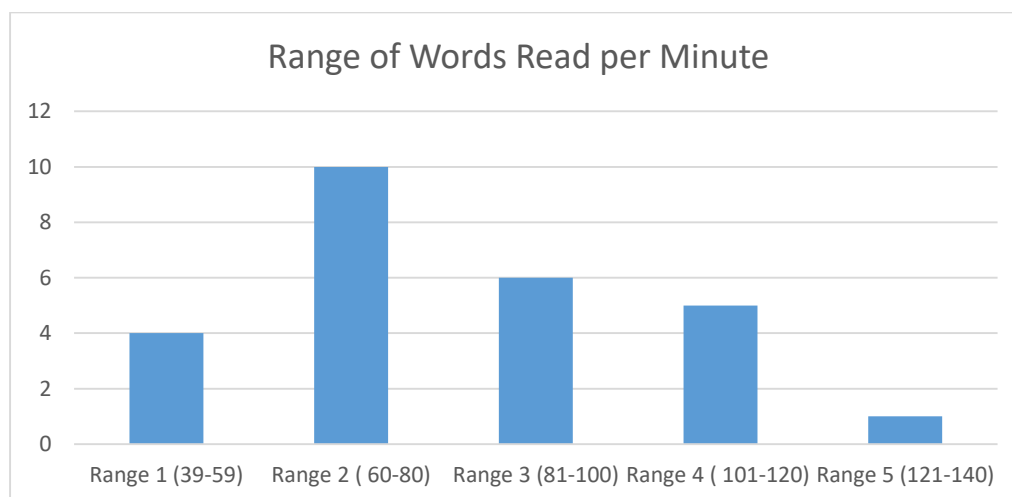


Figure 12 shows that only 4 participants could read in the first range i.e. 39 to 59 words per minute. 10 participants could read in range 2 i.e. 60 to 80 words per minute. Whereas in range 3, 6 students could read within the range of 81-100 words per minute. 5 participants could read 101 to 120 words per minute. Only one participant could read within range 5 i.e. 120 to 140 words per minute. Statistically, the Mean of the wcpm in the pretest is 80.44 indicating that the average wcpm in the pretest is around 80.44. Conversely, the Median is 79.0 suggesting that half of the values are below 79.0 and the same are above in range.

#### 4.2.3 Reading Accuracy in the Pre-Test (Experimental Group)

As far as the reading accuracy of the participants from the experimental group is concerned, the data obtained through the pre-test of reading indicated that the participants were found to be accurate in reading within the range of 37% to 94%. The mean score of the percentage of accuracy is 73% whereas the median is 78%. The number of participants who met different levels of accuracy is presented through the following graph:

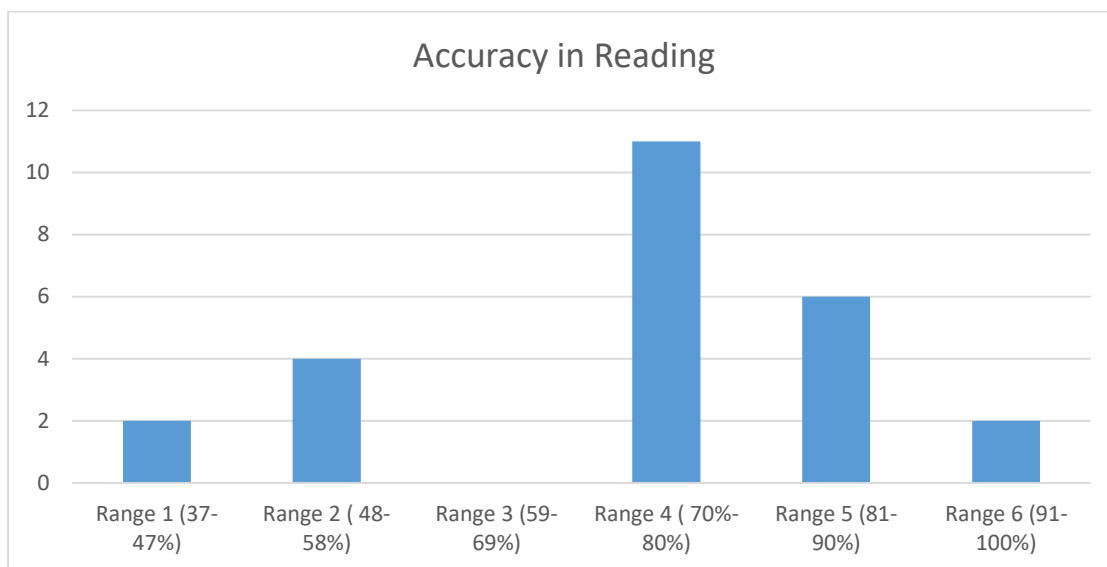
**Figure: 13***Range of Reading Accuracy in Pre-Test (Experimental Group)*

Figure 13 shows that the level of accuracy among the participants from the experimental group varied from student to student. Thus, only 2 students performed in range 1 i.e. 37% to 47%. 4 participants could read in the 2nd range of accuracy i.e. 48 to 58%. No participants were counted in the 3rd range i.e. 59% to 69%. 11 participants could read in the 4th range i.e. 70 to 80%. 6 participants read within the 5th range of accuracy i.e. 81 to 90% and only 2 participants could read in the 6th range of reading accuracy i.e. 91 to 100%.

#### 4.2.4 Post-Test of Reading (Experimental Group)

After the treatment period which lasted for about 8 months, a post-test was conducted for both the groups. In the post-test of reading, the performance of the experimental group is as under.

#### 4.2.5 Reading Pace and Accuracy Post-Test (Experimental Group)

A post-test of reading pace and accuracy was conducted at the end of the experiment to have an idea about students' improvement in the reading pace and accuracy. The following table presents the results of the post-test of reading pace and accuracy:

**Table: 6**  
*Reading pace and Accuracy Post-Test (Experimental Group)*

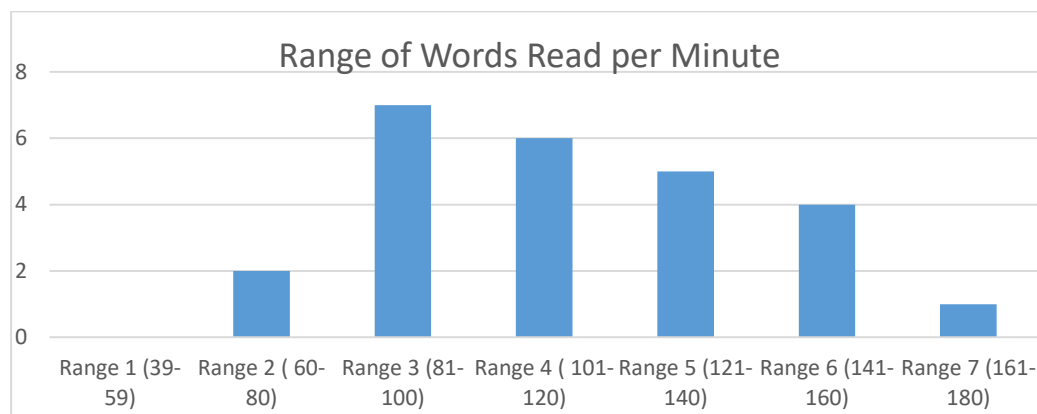
Participants	WCPM	ACCURACY
1	163	93%
3	122	85%
5	100	81%
7	106	90%
9	123	87%
11	97	88%
13	147	88%
15	88	82%
17	125	90%
19	102	70%
21	167	89%
23	78	78%
25	118	81%
27	72	84%
29	115	92%
31	94	86%
33	116	90%
35	160	94%
37	148	90%
39	130	81%
41	87	67%
43	128	86%
45	97	47%
47	82	70%
49	118	87%

Table 6 consists of students' performance in reading while reading pace and accuracy were the key observations. The students were asked to read another text through the Readlee App and the App provided us with automated feedback on

students' reading in the post-test. The data sought through the post-test of reading indicated that the lowest word count per minute was 72 words per minute whereas the highest was 167. If divided into 7 different ranges, students' performance in reading pace can be explained through the following figure:

**Figure: 14**

*Range of Words Read per Minute (Experimental Group)*



In comparison with Figure 13, figure 14 indicates that no students read in 1st range i.e. 39 to 59 words per minute. Only 2 students performed in the range two i.e. 60 to 80 words per minute. 7 students could read in range 3 i.e. 81 to 100 words per minute. 6 students were able to read within the 4th range i.e. 101 to 120 words per minute. 5 students could read in the 5th range i.e. 121 to 140 words per minute. 4 students successfully read in the range 6 i.e. 141 to 160 whereas only 1 student could read in the 7th range i.e. 161 to 180 words per minute. The data indicated that there was a notable increase in the reading pace of the students in the experimental group as the range of reading words per minute increased from 72 to 167 words per minute whereas in the pretest of reading the students could read only 39 to 122 words per minute. Thus, statistically, the mean value of the data is 115 which means that the students' reading pace is around 115 words per minute in the post-test and the median is also 116 indicating that half of the total participants performed under the mean value and half of the participants performed above the mean value in the post-test of reading.

#### 4.2.6 Reading Accuracy in the Post-Test

Table 6 describes participants' performance in reading accuracy in the post-test of reading. The data indicated that the participants could read with 47% to 94%

accuracy at varying levels. The mean value of the performance in the reading accuracy test in the post-test is 83% whereas the median is 86%. The performance of the participants in the post-test of reading accuracy can be further understood by the following graph:

**Figure: 15**

*Range of Reading Accuracy in Post-Test (Experimental Group)*

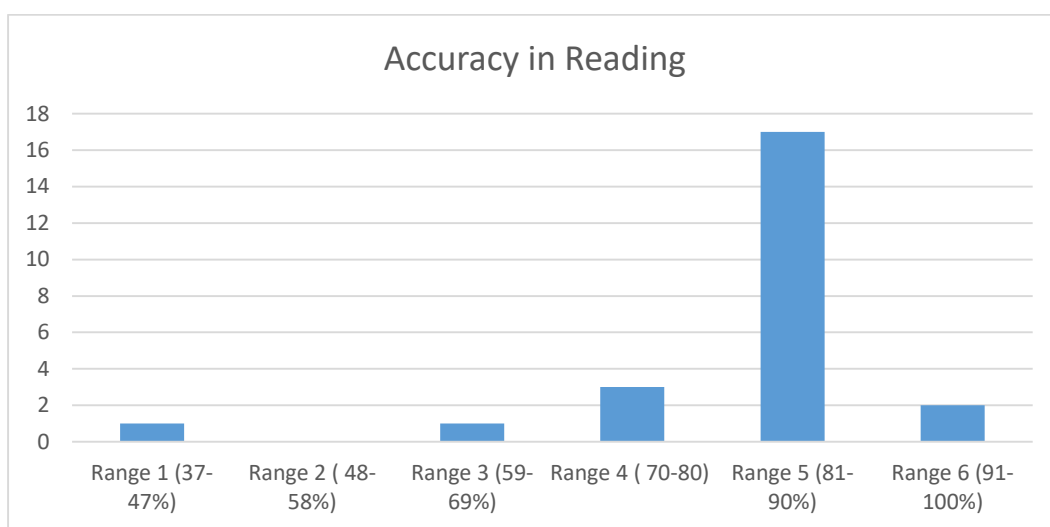


Figure 15 indicates that the participants from the experimental group read the assigned text at varying levels of accuracy. The data indicated that only 1 participant could read in the 1st range i.e. 37% to 47% of reading accuracy. No participant was found to fall in range 2 i.e. 48% to 58% of reading accuracy. 1 participant read the assigned text within the 3rd range i.e. 59% to 69%. 3 participants were able to read in range 4 i.e. 70 to 80%. Significantly, 17 participants from the experimental group could read in the 5th range i.e. 81% to 90% whereas only 3 participants read the assigned text in range 6 i.e. 91 to 100% of reading accuracy.

#### 4.2.6 Comparison of Pre and Post-Test of Reading Pace and Accuracy (Experimental Group)

In this particular experimental research, pre and post-tests were conducted to have an idea about students' previous learning and improvement after the treatment. Now when the results of pre and post-tests of reading have been analysed, the results of pre and post-tests of reading are compared in the following table:

**Table: 7***Comparison b/w Pre and Post-Test Performance (Experimental Group)*

<b>P. No</b>	<b>WCPM PRE</b>	<b>WCPM POST</b>	<b>DIFFERENCE</b>	<b>ACCURACY PRE TEST</b>	<b>ACCURACY POST TEST</b>	<b>DIFFERENCE</b>
1	82	163	81	52%	93%	41%
3	94	122	28	80%	85%	5%
5	69	100	31	78%	81%	3%
7	76	106	30	73%	90%	17%
9	79	123	44	89%	87%	-2%
11	89	97	8	79%	88%	9%
13	68	147	79	74%	88%	14%
15	59	88	29	56%	82%	26%
17	61	125	64	70%	90%	20%
19	55	102	47	70%	70%	0%
21	73	167	94	58%	89%	31%
23	62	78	16	71%	78%	7%
25	117	118	1	90%	81%	-9%
27	72	72	0	79%	84%	5%
29	110	115	5	93%	92%	-1%
31	80	94	14	86%	86%	0%
33	113	116	3	94%	90%	-4%
35	78	160	82	50%	94%	44%
37	107	148	41	90%	90%	0%
39	101	130	29	83%	81%	-2%
41	39	87	48	37%	67%	30%
43	85	128	43	72%	86%	14%
45	100	97	-3	88%	47%	-41%
47	51	82	31	45%	70%	25%
49	91	118	27	80%	87%	7%

#### 4.2.7 Improvement in the Reading Pace (Experimental Group)

Table 7 provides the comparison of students' performances in reading pace and accuracy in pre and post-tests. The data indicate that 19 out of 25 participants from the experimental group improved their reading pace and their word count per minute also improved at varying levels. These 19 students improved by 14 to 94 words per minute word count. 1 student showed 0% progress and 1 scored -3 which indicated that these students made no progress and failed to improve their reading pace. 4 students from the experimental group improved by 1, 3, 5 and 8 words which cannot be regarded as significant improvement. So, it can be asserted that 6 students did not improve during and after the treatment period. Thus, the data indicated that 76% of the students improved their reading pace and showed significant improvement in their reading pace.

#### 4.2.8 Improvement in the Reading Accuracy (Experimental Group)

Moreover, table 5 provides a comparison of the reading accuracy of the participants while comparing their performance in pre and post-tests of reading. As far as the accuracy in reading is concerned, 16 participants from the experimental group improved their reading accuracy whereas 9 of the participants could not improve. Thus, it can be asserted that 64% of the participants from the experimental group improved their reading accuracy whereas 36% of the participants could not make any progress in improving their reading accuracy.

#### 4.2.9 Pre-Test of Reading (Control Group)

Like the experimental group, the control group also consisted of 25 participants who were asked to read the assigned text through an AI-based App 'Readlee'. The pre-test aimed at evaluating the reading pace and accuracy of the students so that it could be compared with the results of the post-test to reach the findings. The participants from the control group showed the following performance in their reading pace and accuracy:

**Table: 8**  
*Reading Pace and Accuracy in Pre-Test (Control Group)*

Participants	WCPM	ACCURACY
2	16	41%
4	63	59%
6	51	39%
8	62	81%
10	85	76%
12	51	65%
14	50	75%
16	106	90%
18	84	90%
20	48	64%
22	125	80%
24	88	81%
26	62	48%
28	92	83%
30	123	87%
32	66	86%
34	115	86%
36	64	95%
38	62	94%
40	85	73%
42	55	62%
44	90	40%
46	87	74%
48	97	75%
50	117	89%

#### 4.2.10 Reading Pace in the Pre-Test (Control Group)

Table 8 consists of the data regarding the reading pace and accuracy of the participants from the control group. As far as the reading pace of the participants is concerned, 22-125 word count per minute was counted by the Readlee App when the participants read the assigned text through this app. This indicated that the lowest word count per minute was 22 and the highest wcpm was 125. However, the 22 score is too low and insignificant to count for analysis because the reading style of the participant was not recognized by the Readlee app. Thus, the mean and median of the wcpm were taken from 48 being the lowest and 125 the highest values in this data. So, the mean value of the data regarding the reading pace is 77 whereas the median is 84. Furthermore, the overall performance of the participants in reading pace can be considered through the following graph:

**Figure: 16**

*Range of Words Read per Minute in the Pre-Test (Control Group)*

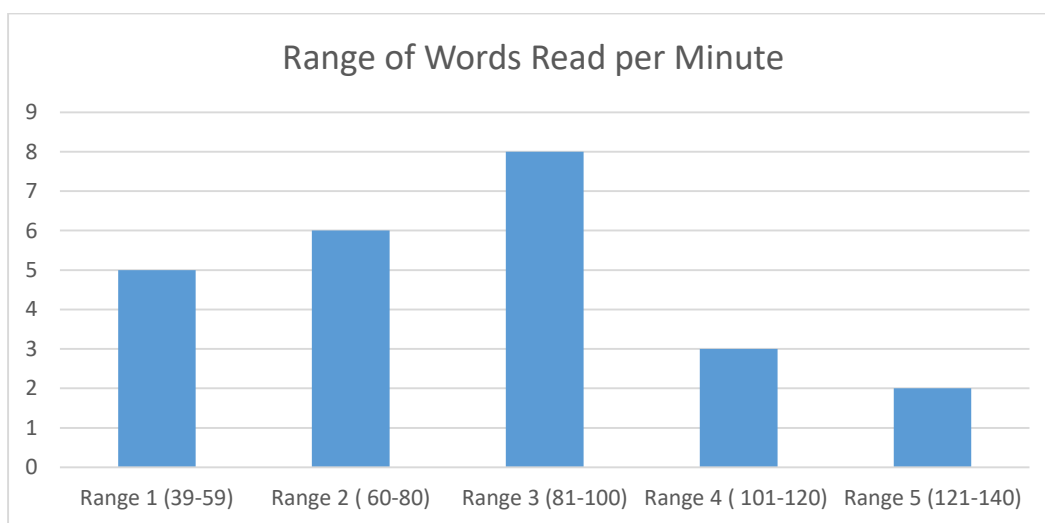


Figure 16 provides the details about 5 different ranges in which the participants from the control group could read the assigned text. The data indicates that 5 participants could read within the 1st range i.e. 39 to 59 words per minute. 6 students read within range 2 i.e. 60 to 80 words per minute. 8 of the participants from the control group read the given text with a pace of 82 to 100 words per minute. 3 participants from the control group could read within the 4th range with 101 to 120 words per minute speed whereas only 2 participants could read within the range of 121 to 140 words per minute.

#### 4.2.11 Reading Accuracy in the Pre-Test (Control Group)

As far as accuracy in reading is concerned, the data indicated that the participants from the control group performed at varying levels of accuracy while reading the assigned text and read the text with 39 to 95% accuracy. Thus, the mean value of participants' reading accuracy was 73% whereas the median was measured to be 76%. Further details regarding the reading accuracy of the participants can be understood through the following figure:

**Figure: 17**

*Range of Reading Accuracy in Pre-Test (Control Group)*

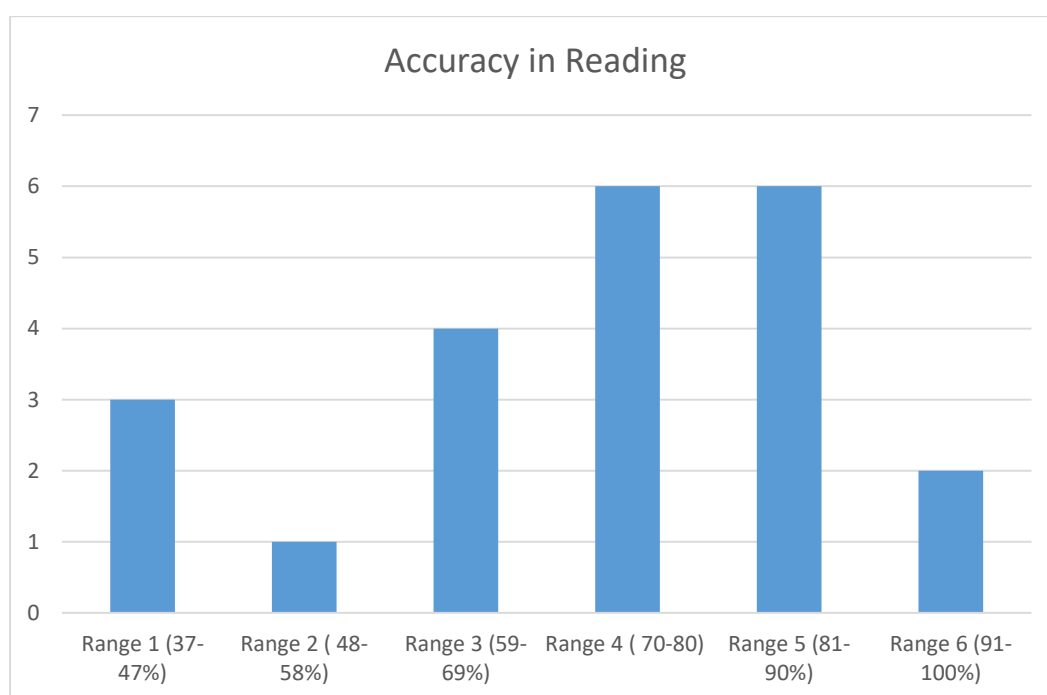


Figure 17 informs that only three participants from the control group could read the text within the lowest range of accuracy i.e. 37 to 47%. Only 1 participant read within the 2nd range of accuracy i.e. 48 to 58%. 4 participants read within the range of 59 to 69%, and 6 participants could read within the range of 70 to 80% i.e. 4th range of accuracy and the same number of participants read within the 5th range of 81 to 90% of accuracy and only 2 students could read within the range of 91 to 100% of accuracy.

#### 4.2.12 Reading Pace and Accuracy in the Post-Test (Control Group)

The participants from the control group also appeared in the post-test of reading pace and accuracy. Their performance in this test was recorded as the following:

**Table: 9**

*Reading Pace and Accuracy in the Post-Test (Control Group)*

Participants	WCPM	ACCURACY
2	28	41%
4	66	59%
6	41	39%
8	56	81%
10	100	76%
12	42	65%
14	50	75%
16	95	90%
18	102	90%
20	51	64%
22	125	80%
24	100	81%
26	42	48%
28	103	83%
30	126	87%
32	95	86%
34	101	86%
36	56	95%
38	71	94%
40	73	73%
42	64	62%
44	51	40%
46	76	74%
48	96	75%
50	117	89%

Table 9 provides the details regarding the participants' performance in the post-test of reading. Like the participants from the experimental group, the participants from the control group were also asked to read the assigned task through the 'Readlee' App and the performance of the participants was recorded based on pace and accuracy. As far as the reading pace is concerned, the participants could read within the range of 28 to 126 words per minute at varying pace. The lowest wcpm was recorded to be 28 words per minute and the highest wcpm was recorded to be 126. Thus, the data indicated that the mean value of students' scores in reading pace is 77 whereas the median is 73. Participants' performance in reading pace can be further understood through the following figure.

**Figure: 18**

*Range of Words Read per Minute Post-Test (Control Group)*

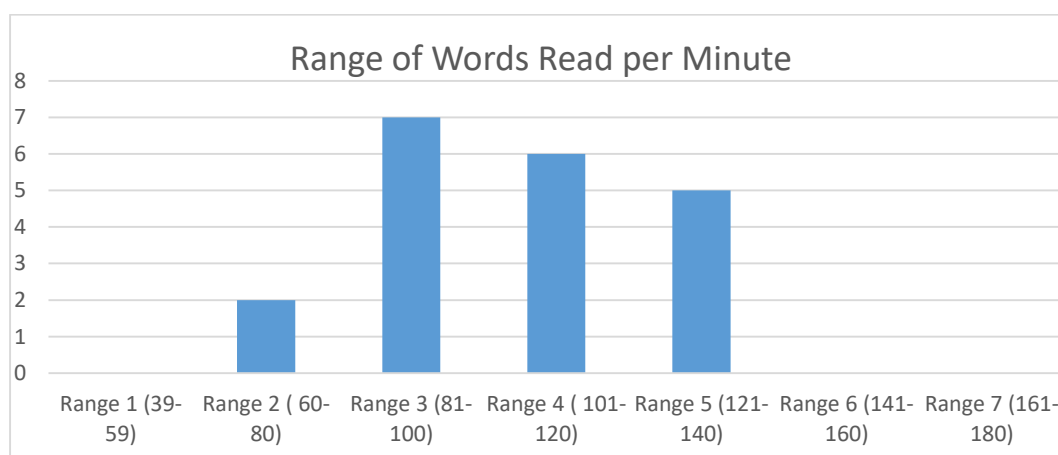


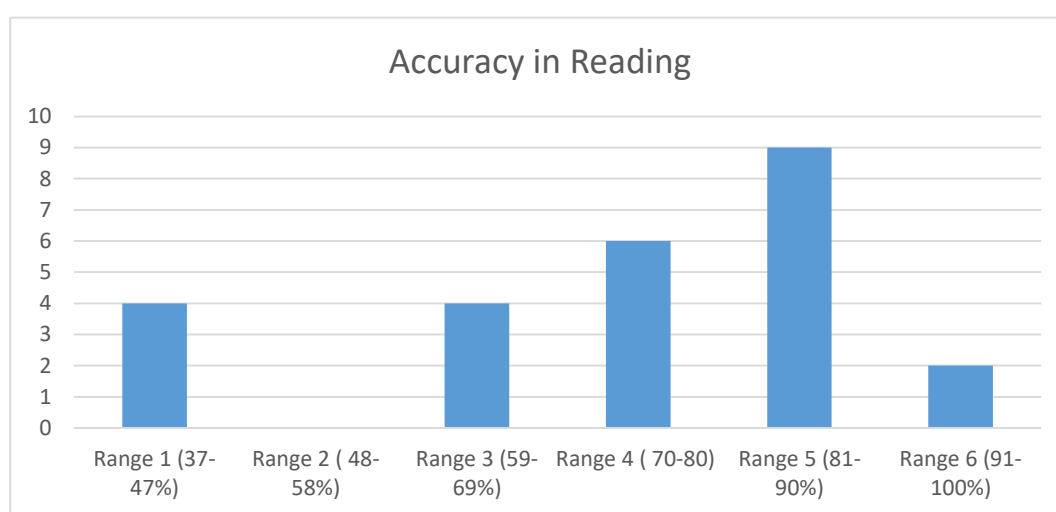
Figure 18 has 7 ranges of reading pace because the participants from the experimental group read the assigned text of the post-test in 7 ranges and to have equal ranges for comparison, the performance of the participants from the control group is also measured through the same ranges. The data indicated that the participants from the control group read-only within 5 ranges. No participant from this group could read in 1st, 6th and 7th ranges i.e. 39 to 59 words per minute, 141 to 160 words per minute and 161 to 180 words per minute respectively. Only 2 participants could read within the 2nd range i.e. 60 to 80 words per minute, 7 participants could read the given text in the 3rd range i.e. 81 to 100 words per minute, 6 participants could read in range 4 and read 101 to 120 words per minute and only 2 participants could read within the 5th range i.e. 121 to 140 words per minute.

#### 4.2.13 Reading Accuracy in the Post-Test (Control Group)

As far as the reading accuracy of the participants from the control group in the post-test reading is concerned, they could read 39 to 95% accurately at varying levels of accuracy. The mean value of the percentage of accuracy level is 73% whereas the median is 76%. Furthermore, participants' performance in the accuracy test can be understood through the following graph:

**Figure: 19**

*Range of Reading Accuracy in the Post-Test (Control Group)*



According to figure 19, only 4 participants from the control group could read within the 1st range of accuracy i.e. 37 to 47%. No participants could read in the 2nd range i.e. 48 to 58%. Only 4 participants could read within the 3rd range of accuracy i.e. 59 to 69%. 6 participants could read in range 4 i.e. 70 to 80% accuracy. 9 participants could read within range 5 i.e. 81 to 90% whereas only 2 of the participants from the control group could read with the highest range of accuracy i.e. 91 to 100%.

#### 4.2.14 Comparison of Improvement in Reading Pace and Accuracy (Control Group)

The following table presents a comparison of control group participants' improvement in the reading pace and accuracy after the treatment period:

**Table: 10***Comparison b/w Pre and Post-Test Performance (Control Group)*

<b>P. No</b>	<b>WCPM Pre- Test</b>	<b>WCPM Post- Test</b>	<b>DIFFERENCE</b>	<b>ACCURACY PRE TEST</b>	<b>ACCURACY POST TEST</b>	<b>DIFFERENCE</b>
2	16	28	12	41%	41%	0%
4	63	66	3	59%	59%	6%
6	51	41	-10	39%	39%	12%
8	62	56	-6	81%	81%	17%
10	85	100	15	76%	76%	1%
12	51	42	-9	65%	65%	0%
14	50	50	0	75%	75%	36%
16	106	95	-11	90%	90%	-2%
18	84	102	18	90%	90%	27%
20	48	51	3	64%	64%	-1%
22	125	125	0	80%	80%	-7%
24	88	100	12	81%	81%	19%
26	62	42	-20	48%	48%	-18%
28	92	103	11	83%	83%	7%
30	123	126	3	87%	87%	0%
32	66	95	29	86%	86%	26%
34	115	101	-14	86%	86%	-1%
36	64	56	-8	95%	95%	-2%
38	62	71	9	94%	94%	30%
40	85	73	-12	73%	73%	-3%
42	55	64	9	62%	62%	5%
44	90	51	-39	40%	40%	-29%
46	87	76	-11	74%	74%	-5%
48	97	96	-1	75%	75%	10%
50	117	117	0	89%	89%	1%

#### 4.2.15 Improvement in the Reading Pace (Control Group)

Table 10 presents the comparison between pre and post-tests of reading. As far as reading pace is concerned, the participants from the control group read the

assigned text at varying levels of reading pace. The difference can be counted by -39 to 29 words which indicated that some of the participants read fewer words in the post-test as compared to the pretest. -39 to 0 words indicated that the participants could not improve rather they lagged behind the other students who improved their reading pace. One of the participants could not read aloud properly to the app and word count in both pre and post-tests were not significant enough to be counted for the comparison. This indicated that the Readlee app requires a proper reading style for the evaluation and assessment of reading performance. However, the data indicated that out of 25 participants from the control group, only 5 participants could improve their reading pace based on word count per minute. 11 participants read fewer words as compared to the pre-test word count. 3 of the participants read the same words in both tests and showed 0% progress/improvement in reading pace whereas 5 of the participants showed very low progress i.e. 1 to 10-word increase in the word count which was regarded as insignificant. So, the mean value of improvement in the reading pace of the participants from the control group was found to be 2.8 whereas the median was 0. Thus, the data indicated that only 20% of the participants from the control group made significant progress in their reading pace during the session and 80% of them could not improve their reading pace throughout the session.

#### 4.2.16 Improvement in the Reading Accuracy (Control Group)

Moreover, Table 10 consists of a comparison between participants' performance of pre and post-test in terms of reading accuracy. The data indicated that only 10 participants could improve their reading accuracy ranging from 6% to 36% improvement in their reading accuracy. Only 1 of the participants could improve 5% in reading accuracy which was considered to be insignificant and was not counted in considerable and significant improvement. 3 of the participants showed 0% improvement in their reading accuracy whereas 9 of the participants showed poorer performance in the post-test when accuracy was measured. These 9 participants scored in minus and read with -1 to -29% accuracy as compared to the pre-test. Thus, the data indicated that only 40% of the participants from the control group improved their level of reading accuracy whereas 60% of them could not improve their reading accuracy during the session. Moreover, the mean value of accuracy improvement was found to

be 6.36% whereas the median was 0% which indicated that half of the participants scored in minus and half of them improved a little.

#### 4.2.17 Comparison of Improvement b/w Experimental and Control Group in Reading Pace and Accuracy

After the comparison of participants' performances in pre and post-tests, we got the average by which the participants from both groups improved their reading pace and accuracy. Thus, table 7 presents the details about participants' level of improvement to indicate which of the groups improved more.

**Table: 11**

*Comparison of Improvement in Pace and Accuracy b/w both Groups*

<b>Observations</b>	<b>Experimental Group</b>	<b>Control Group</b>	<b>Group which Improved</b>	<b>Difference</b>
Reading Pace	76%	20%	Experimental	56%
Reading Acc.	64%	40%	Experimental	26%

Table 11 presents the comparison between the performances of the participants from the control and experimental groups in reading pace and accuracy. The data indicated that the participants from the experimental group were at an advantage after practicing reading through AI-based apps. 76% of the participants from the experimental group improved their reading pace whereas only 20% of the participants from the control group could improve their reading pace. Moreover, 64% of the participants from the experimental group improved their reading accuracy during the treatment period whereas only 40% of the participants from the control group could improve their reading accuracy. Thus, the situation indicates that AI-harnessed apps supported the experimental group in improving their reading pace and accuracy significantly.

The data indicated that the insufficient opportunity of reading and lack of reading practice caused low improvement in the students' reading pace and accuracy in the control group whereas the students from the experimental group had sufficient opportunity to practice and improve their reading pace and accuracy with the help of AI-based Apps. According to Rochman (2017), insufficient reading opportunities to

students negatively impacts students' reading skills. So, our experiment also proves that providing sufficient opportunity to students to read with the help of AI-powered tools is helpful in improving students' reading pace and accuracy.

### 4.3 Pre-Test of Inference

#### 4.3.1 Inference Pre-Test (Experimental Group)

The third observation after reading pace and accuracy in reading was participants' skill of inference. It was also tested through pre and post-tests using a questionnaire. The performance of the participants from the experimental group in the pre-test of inference is presented in the following table:

**Table: 12**

*Participants' Score in Inference Pre-Test (Experimental Group)*

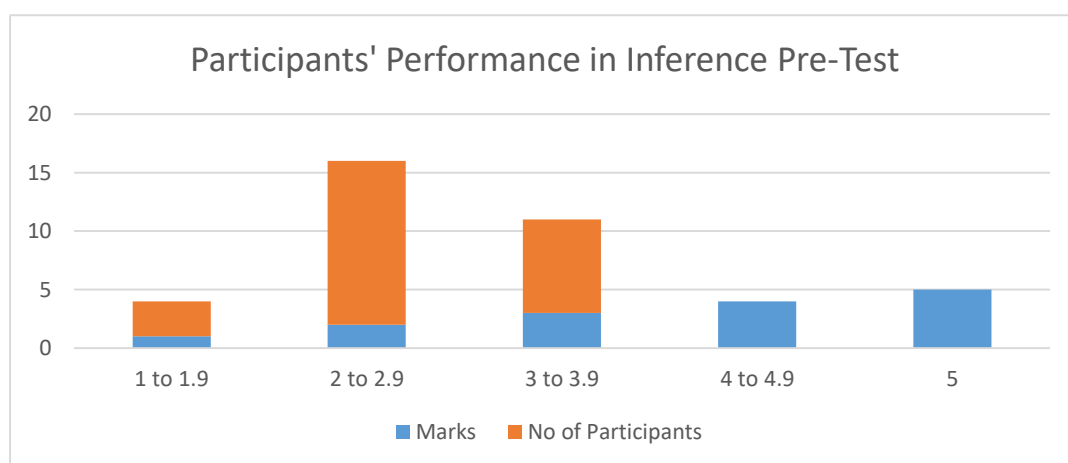
Participants	Inference	Inference	Inference	Inference	Inference	Average
	1	2	3	4	5	
1	4	3	3	3	2	3
3	1	2	2	2	2	1.8
5	3	3	2	2	2	2.4
7	4	2	3	2	2	2.6
9	1	2	2	2	2	1.8
11	3	3	3	3	3	3
13	3	3	2	3	2	2.6
15	4	3	3	2	3	3
17	3	2	3	2	2	2.4
19	3	3	3	3	2	2.8
21	2	3	3	2	3	2.6
23	4	3	3	2	3	3
25	4	3	3	3	2	3
27	4	3	3	2	3	3
29	3	2	3	3	2	2.6
31	3	3	3	2	3	2.8
33	4	3	3	2	3	3

Participants	Inference	Inference	Inference	Inference	Inference	Average
	1	2	3	4	5	
35	3	3	3	2	3	2.8
37	3	4	3	2	3	3
39	2	3	2	2	3	2.4
41	4	3	3	2	1	2.6
43	3	3	2	3	2	2.6
45	2	2	2	2	1	1.8
47	2	2	2	2	2	2
49	4	2	3	3	2	2.8

Table 12 consists of the scores of the participants from the experimental group in the pre-test of inference. The participants were required to read five short passages and answer the questions given at the end of each paragraph whereas the maximum marks for each paragraph were 5. So, the table presents participants' scores in 5 columns whereas the last column presents the average score of each participant. Thus, the data indicated that the participants from the experimental group performed in the inference pre-test at varying levels and the lowest average was found to be 1.8 whereas the highest average was 3. The performance of the students in the inference pre-test is presented in the following figure:

**Figure: 20**

*Participants' Performance in Inference Pre-Test (Exp. Group)*



The figure 20 indicates that the participants performed in inference pre-test at varying levels. 3 of the participants scored in category 1 i.e. 1 to 1.9. Then, 14 of the participants scored within the range of 2 to 2.9. 8 of the participants scored in the 3rd category i.e. 3 to 3.9. Whereas no participant could score beyond the 4th and 5th category i.e. 4 to 4.9 and 5. Thus, it can be asserted that most of the students scored in the 2nd category i.e. 2 to 2.9. Thus, both mean and median values of the average performance were counted to be 2.6 in the pre-test of inference as taken by the participants from the experimental group.

#### 4.3.2 Post-Test of Inference (Experimental Group)

After the treatment period, a post-test was conducted to have an idea about the experimental group participants' improvement in inference. Participants were required to read five short passages and answer the questions given at the end of each passage. Participants' score in the post-test of inference is presented through the following table:

**Table: 13**

*Participants' Score in Inference Post-Test (Experimental Group)*

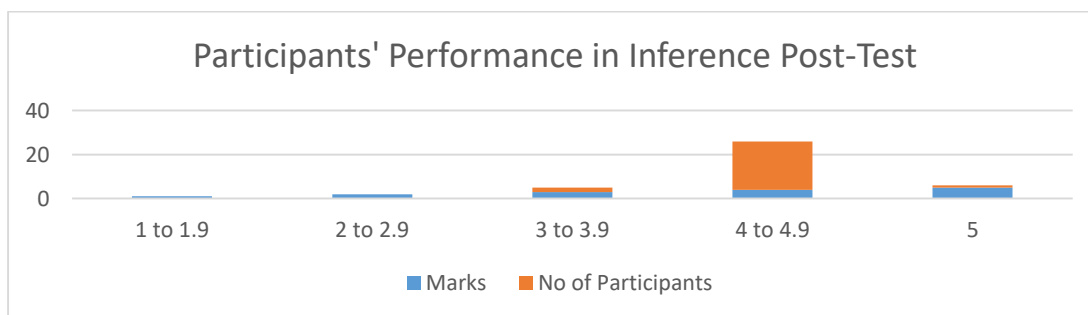
Participants	Inference 1	Inference 2	Inference 3	Inference 4	Inference 5	Average
1	5	4	5	4	4	4.4
3	4	4	3	3	3	3.4
5	4	4	4	5	5	4.4
7	5	4	5	5	4	4.6
9	4	3	4	3	3	3.4
11	5	4	4	5	4	4.4
13	5	5	5	5	3	4.6
15	5	5	5	5	4	4.8
17	5	5	5	5	5	5
19	4	4	4	5	3	4
21	5	4	4	5	4	4.4
23	5	4	5	4	5	4.6
25	5	4	5	5	4	4.6
27	5	4	5	5	5	4.8

Participants	Inference	Inference	Inference	Inference	Inference	Average
	1	2	3	4	5	
29	5	4	5	4	5	4.6
31	4	4	5	5	5	4.6
33	5	4	5	5	4	4.6
35	4	4	4	5	3	4
37	5	5	5	3	5	4.6
39	5	4	4	4	4	4.2
41	5	4	4	5	4	4.4
43	5	4	5	5	4	4.6
45	4	4	5	5	5	4.6
47	4	4	4	5	4	4.2
49	5	4	5	4	4	4.4

Table 13 consists of the results of the inference post-test and the results are presented in the average score made by each participant from the experimental group. The data indicated that the lowest score in the inference post-test was 3.4 whereas the highest score was 5. The participants achieved scores at varying levels. The following graph presents the details of participants' performance in the post-test of inference:

**Figure: 21**

*Participants' Performance in Inference Post-Test (Exp. Group)*



The data presented in Figure 21 indicated that none of the participants from the control group scored in 1st two categories i.e. 1 to 1.9 score and 2 to 2.9. Only 2 participants scored in between the 3rd category i.e. 3 to 3.9. Most of the participants scored in the 4th range i.e. 4 to 4.9 and only one participant scored 5 i.e. maximum

score in inference post-test. Thus, the mean value of the average score made by the participants from the experimental group was noted to be 4.40 whereas the median was 4.6.

#### 4.3.3 Comparison of Pre and Post-Test of Inference (Exp. Group)

Pre and post-tests of inference were conducted to have an idea of whether the treatment during the experiment was effective or not. Thus, the performances of the participants from the experimental group in pre and post-tests of inference are compared through the following table:

**Table: 14**

*Comparison of Pre and Post- Test of Inference (Exp. Group)*

P. No.	Inf 1		Inf 2		Inf 3		Inf 4		Inf 5		Ave.in Pr-test	Ave. in Po-test	Diff. in Ave.	% of Imp.
	Pr	Po	Pr	Po	Pr	Po	Pr	Po	Pr	Po				
1	4	5	3	4	3	5	3	4	2	4	3	4.4	1.4	47%
3	1	4	2	4	2	3	2	3	2	3	1.8	3.4	1.6	89%
5	3	4	3	4	2	4	2	5	2	5	2.4	4.4	2	83%
7	4	5	2	4	3	5	2	5	2	4	2.6	4.6	2	77%
9	1	4	2	3	2	4	2	3	2	3	1.8	3.4	1.6	89%
11	3	5	3	4	3	4	3	5	3	4	3	4.4	1.4	47%
13	3	5	3	5	2	5	3	5	2	3	2.6	4.6	2	77%
15	4	5	3	5	3	5	2	5	3	4	3	4.8	1.8	60%
17	3	5	2	5	3	5	2	5	2	5	2.4	5	2.6	108%
19	3	4	3	4	3	4	3	5	2	3	2.8	4	1.2	43%
21	2	5	3	4	3	4	2	5	3	4	2.6	4.4	1.8	69%
23	4	5	3	4	3	5	2	4	3	5	3	4.6	1.6	53%
25	4	5	3	4	3	5	3	5	2	4	3	4.6	1.6	53%
27	4	5	3	4	3	5	2	5	3	5	3	4.8	1.8	60%
29	3	5	2	4	3	5	3	4	2	5	2.6	4.6	2	77%
31	3	4	3	4	3	5	2	5	3	5	2.8	4.6	1.8	64%
33	4	5	3	4	3	5	2	5	3	4	3	4.6	1.6	53%
35	3	4	3	4	3	4	2	5	3	3	2.8	4	1.2	43%
37	3	5	4	5	3	5	2	3	3	5	3	4.6	1.6	53%
39	2	5	3	4	2	4	2	4	3	4	2.4	4.2	1.8	75%
41	4	5	3	4	3	4	2	5	1	4	2.6	4.4	1.8	69%
43	3	5	3	4	2	5	3	5	2	4	2.6	4.6	2	77%
45	2	4	2	4	2	5	2	5	1	5	1.8	4.6	2.8	156%
47	2	4	2	4	2	4	2	5	2	4	2	4.2	2.2	110%
49	4	5	2	4	3	5	3	4	2	4	2.8	4.4	1.6	57%

Table 14 presents a comprehensive detail of the experimental group participants' performance in both tests. The comparison of the average score in both tests indicated that the participants from the experimental group scored better in the post-test and the participants improved by 43 to 156% in inference skills. According to the data presented through the above table, the lowest percentage of improvement was 43% whereas the highest percentage was 156%. The overall scenario indicated that all of the participants from the experimental group improved their inference skills in reading though the range/average of improvement was found to be different and it varied from student to student.

#### 4.3.4 Pre-Test of Inference (Control Group)

Like the experimental group, the control group also took pre and post-tests of inference. Thus, all the participants from the control group read the same five short passages as were assigned to the experimental group. The performance shown by the participants from the control group in the inference pre-test is presented in the following table:

**Table: 15**

*Participants' Performance in the Pre-Test of Inference (Con. Group)*

Participants	Inference 1	Inference 2	Inference 3	Inference 4	Inference 5	Average
2	4	3	2	2	3	2.8
4	2	2	3	2	3	2.4
6	4	3	3	2	3	3
8	3	2	3	2	2	2.4
10	4	2	3	3	3	3
12	4	3	3	2	2	2.8
14	3	3	3	2	3	2.8
16	4	3	2	2	3	2.8
18	2	3	2	2	3	2.4
20	1	2	2	2	2	1.8
22	3	3	3	2	2	2.6

Participants	Inference 1	Inference 2	Inference 3	Inference 4	Inference 5	Average
24	2	2	2	1	2	1.8
26	2	2	2	2	2	2
28	3	3	3	2	2	2.6
30	4	3	3	3	3	3.2
32	4	3	3	3	3	3.2
34	4	3	3	3	3	3.2
36	2	2	3	2	2	2.2
38	3	3	3	2	2	2.6
40	3	3	3	2	3	2.8
42	4	4	3	3	2	3.2
44	3	2	3	2	3	2.6
46	4	3	3	2	3	3
48	2	2	1	2	2	1.8
50	4	3	2	2	3	2.8

The data presented in table 15 indicated that the participants from the control group scored at varying levels. The participants were required to read five passages and answer the questions given at the end of each passage. Column 7 of table 15 consists of the average score achieved by each participant from the control group. According to the data, the lowest score achieved by the participants was 1.8 and the highest score was 3.2. Thus, the mean value of participants' performance was 2.70 whereas the median was 2.8. Further detail of the score achieved by all the participants is presented through the following graph:

**Figure: 22**

*Participants' Performance in Inference Pre-Test (Control Group)*

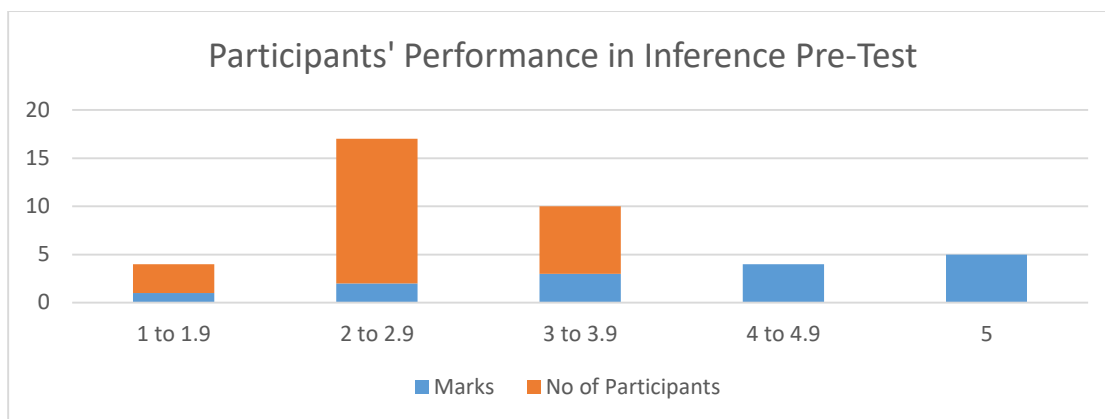


Figure 22 shows that the participants from the control group scored only in the first three categories. Only 3 participants scored in the 1st category i.e. 1 to 1.9 score. 15 of the participants scored within the 2nd range i.e. 2 to 2.9 and 7 participants could achieve scores in the 3rd range i.e. 3 to 3.9. None of the participants could reach the level of 4 to 4.9 and 5 i.e. the maximum score in the inference pre-test. The data indicated that most of the participants from the control group scored within the 2nd range of score i.e. 2 to 2.9.

#### 4.3.5 Post-Test of Inference (Control Group)

Participants from the control group also took the post-test of inference and here again, they read 5 different passages followed by 5 questions with each para and the weightage for each para was 5. The results are presented in the following table:

**Table: 16**

*Participants' Performance in Inference Post-Test (Control Group)*

Participants	Inference 1	Inference 2	Inference 3	Inference 4	Inference 5	Average
2	4	4	3	3	4	3.6
4	2	2	2	3	1	2
6	4	3	3	3	3	3.2
8	3	2	2	1	3	2.2
10	2	1	3	4	4	2.8
12	4	3	3	3	1	2.8
14	2	2	2	3	2	2.2
16	3	3	2	3	3	2.8

Participants	Inference	Inference	Inference	Inference	Inference	Average
	1	2	3	4	5	
18	1	2	1	3	2	1.8
20	2	2	2	3	3	2.4
22	3	2	3	3	3	2.8
24	2	1	2	1	2	1.6
26	2	3	2	2	2	2.2
28	3	3	3	1	3	2.6
30	3	3	2	3	3	2.8
32	4	2	3	3	3	3
34	3	3	2	3	3	2.8
36	2	3	2	2	3	2.4
38	3	3	2	2	3	2.6
40	3	3	2	3	3	2.8
42	3	3	2	4	3	3
44	3	3	3	4	3	3.2
46	4	2	2	4	2	2.8
48	3	3	2	3	3	2.8
50	4	4	3	3	3	3.4

In Table 16, results are presented through overall average in column 7. The data indicated that the participants could obtain 1.6 to 3.4 marks. Thus, the lowest score counted in the test was 1.6 and the highest was 3.4. Whereas, the mean value of the control group participants' performance in the post-test of inference was 2.75 and the median was 2.8. However, the following figure further presents the details which show various ranges of scores achieved in the post-test of inference by the participants from the control group:

### Figure: 23

*Participants' Performance in Inference Post-Test (Control Group)*

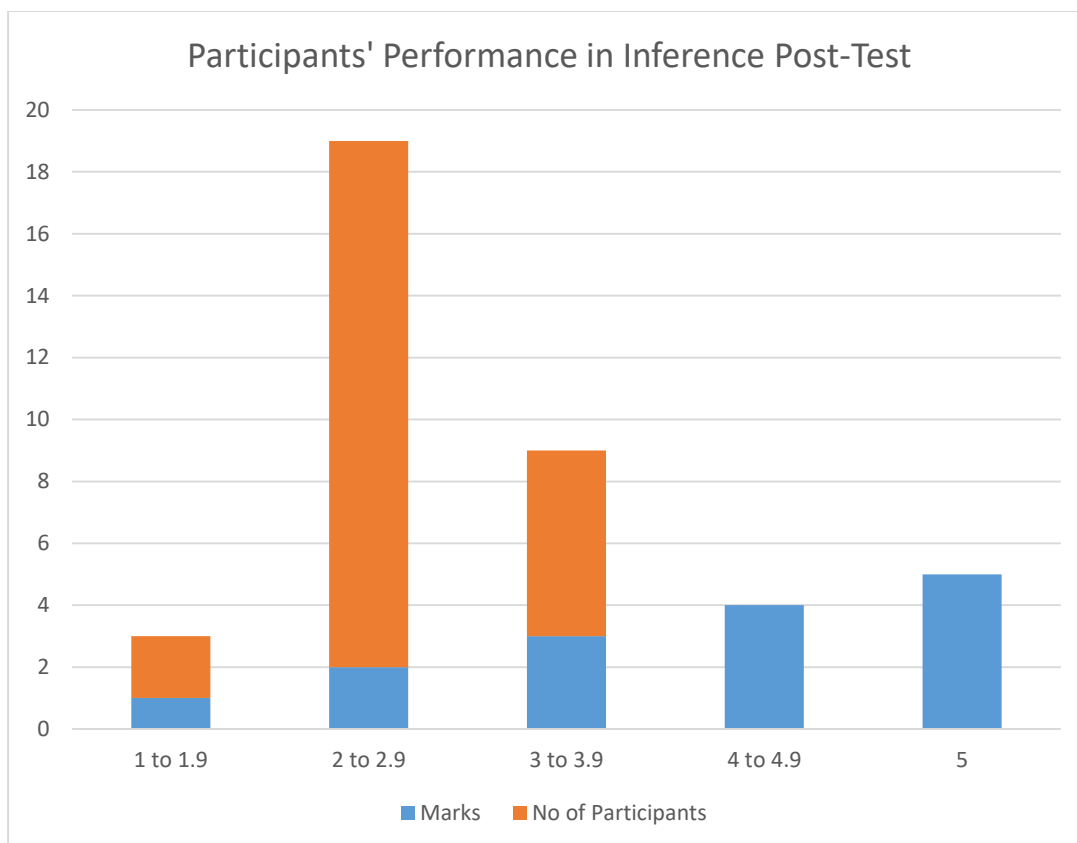


Figure 23 indicates that the participants from the control group performed at varying levels and scored within 3 ranges. 2 of the participants performed within the 1st range i.e. 1 to 1.9 whereas 17 of the participants performed in the 2nd range i.e. 2 to 2.9 score and 6 of the participants could score within the 3rd range i.e. 3 to 3.9. None of the participants from the control group scored within the highest ranges of score i.e. 4 to 4.9 and 5. Thus, the data indicated that 68% of the participants scored within the 2nd range i.e. 2 to 2.9 score. So, it can be asserted that most of the participants from the control group scored in the 2nd range in the post-test of inference.

#### 4.3.6 Comparison of Pre and Post-Test of Inference (Control Group)

As the basic aim of conducting pre and post-tests was to analyse participants' learning and improvement after the treatment period, the results of pre and post-tests are hereby compared through a table for further insights:

**Table: 17***Comparison of Pre and Post-test Performance (Control Group)*

P. No	Inf1 Pr Po		Inf2 PrPo		Inf3 Pr Po		Inf 4 PrPo		Inf5 PrPo		Average score in Pre-Test	Average score in Post-Test	Diff. in Ave.	% of Imp.
2	4	4	3	4	2	3	2	3	3	4	2.8	3.6	0.8	29%
4	2	2	2	2	3	2	2	3	3	1	2.4	2	-0.4	-17%
6	4	4	3	3	3	3	2	3	3	3	3	3.2	0.2	7%
8	3	3	2	2	3	2	2	1	2	3	2.4	2.2	-0.2	-8%
10	4	2	2	1	3	3	3	4	3	4	3	2.8	-0.2	-7%
12	4	4	3	3	3	3	2	3	2	1	2.8	2.8	0	0%
14	3	2	3	2	3	2	2	3	3	2	2.8	2.2	-0.6	-21%
16	4	3	3	3	2	2	2	3	3	3	2.8	2.8	0	0%
18	2	1	3	2	2	1	2	3	3	2	2.4	1.8	-0.6	-25%
20	1	2	2	2	2	2	2	3	2	3	1.8	2.4	0.6	33%
22	3	3	3	2	3	3	2	3	2	3	2.6	2.8	0.2	8%
24	2	2	2	1	2	2	1	1	2	2	1.8	1.6	-0.2	-11%
26	2	2	2	3	2	2	2	2	2	2	2	2.2	0.2	10%
28	3	3	3	3	3	3	2	1	2	3	2.6	2.6	0	0%
30	4	3	3	3	3	2	3	3	3	3	3.2	2.8	-0.4	-13%
32	4	4	3	2	3	3	3	3	3	3	3.2	3	-0.2	-6%
34	4	3	3	3	3	2	3	3	3	3	3.2	2.8	-0.4	-13%
36	2	2	2	3	3	2	2	2	2	3	2.2	2.4	0.2	9%
38	3	3	3	3	3	2	2	2	2	3	2.6	2.6	0	0%
40	3	3	3	3	3	2	2	3	3	3	2.8	2.8	0	0%
42	4	3	4	3	3	2	3	4	2	3	3.2	3	-0.2	-6%
44	3	3	2	3	3	3	2	4	3	3	2.6	3.2	0.6	23%
46	4	4	3	2	3	2	2	4	3	2	3	2.8	-0.2	-7%
48	2	3	2	3	1	2	2	3	2	3	1.8	2.8	1	56%
50	4	4	3	4	2	3	2	3	3	3	2.8	3.4	0.6	21%

Table 17 compares the results of pre and post-tests, and provides us with the facts about participants' learning and improvement. The data indicated that 44% of the participants from the control group scored minus in the post-tests and they could not make any progress in developing inference skills. 20% of the participants secured the same marks as they got in the pre-test of inference. So, they also did not make any improvement. Only 9 participants i.e. 36% of the participants could improve by 7 to 56% but out of these 9 participants, only 2 participants made significant progress by improving 33% and 56% after the treatment period. Thus, it can be asserted that very few participants from the control group could improve their inference skills in reading.

#### 4.3.7 Comparison of Improvement in Inference Skills b/w Exp. and Control Group

The basic aim of conducting pre and post-tests of inference for both the experimental and control groups was to compare the level of improvement between both groups to estimate how far AI-based Apps can improve students' learning of English. Thus, the results are compared through the table below:

**Table: 18**

*Comparison of Improvement in Inference Skills from both Groups*

Observation	Experimental Group	Control Group	Group which Improved	Difference
Inference Skills	100%	36%	Experimental	64%

Table 18 indicates that 100% of the participants from the experimental group improved their inference skills and all of the participants showed better performance in the post-test of inference. Conversely, only 36% of the participants from the control group could show improvement in their inference skills. Thus, it can be asserted that the experimental group made significant improvements in inference skills after learning English with the help of AI-based Apps.

## 4.4 Comprehension

### 4.4.1 Comprehension Pre-Test (Experimental Group)

Reading Comprehension was the 4th observation of the current study and like other observations, it was also tested through a pre-test to have an idea about participants' comprehension skills. So, before the treatment period, the participants from both groups were asked to read three different paragraphs. Each paragraph was followed by 5 questions. The score of the participants was recorded in the form of an average. The following table presents the results of participants from the experimental group in the pre-test of comprehension.

**Table: 19**

*Pre-Test of Comprehension Experimental Group*

Participants	Comprehension 1	Comprehension 2	Comprehension 3	Average
1	2	2	3	2.3
3	1	2	2	1.6
5	3	3	2	2.6
7	4	2	3	3
9	2	1	2	1.6
11	3	2	3	2.6
13	2	2	2	2
15	2	2	2	2
17	2	2	2	2
19	1	1	2	1.3
21	2	2	2	2
23	2	2	2	2
25	2	0	1	1
27	0	0	1	0
29	3	2	3	2.6
31	2	1	2	1.6
33	3	2	3	2.6
35	3	2	2	2.3
37	1	2	2	1.6

Participants	Comprehension 1	Comprehension 2	Comprehension 3	Average
39	2	2	2	2
41	2	1	1	1.3
43	3	2	2	2.3
45	2	2	2	2
47	3	2	2	2.3
49	2	2	2	2

Table 19 consists of the results of the pre-test of comprehension and gives a comprehensive detail of the average score achieved by the participants from the experimental group. The lowest score in the test was found to be 0 whereas the highest score recorded in the pre-test was 3. Thus, the mean of participants' performance in the comprehension pretest was 1.94 whereas the median was calculated to be 2. However, the varying performance of the participants from the experimental group in the pre-test can be understood through the following graph:

**Figure: 24**

*Participants' Performance in Comprehension Pre-Test (Experimental Group)*

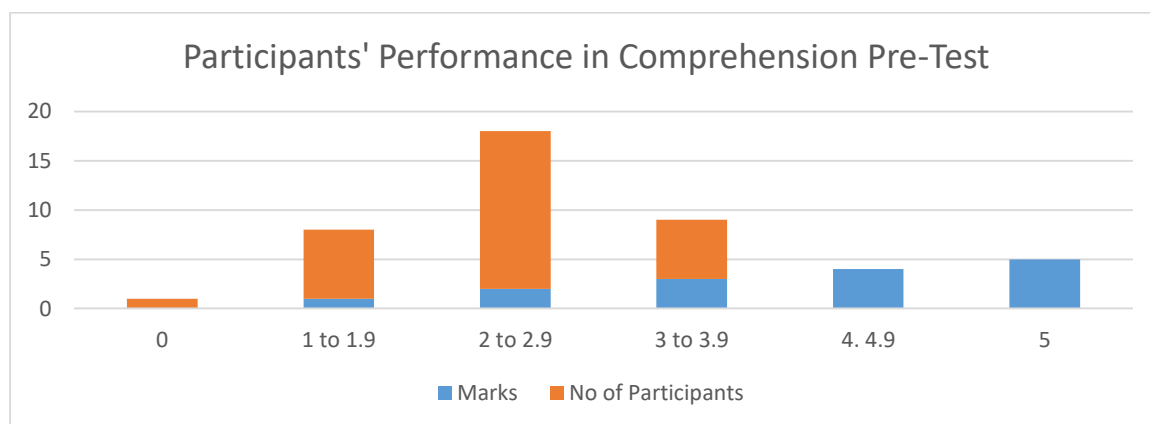


Figure 24 shows that one of the participants from the experimental group scored 0 in the comprehension pre-test, and 7 of the participants scored in the 2nd range i.e. 1 to 1.9 score. 17 of the participants performed within the 3rd range of score i.e. 2 to 2.9. Only 1 participant scored in the 4th range which is 3 to 3.9 whereas

none of the participants could score in the last two ranges i.e. 4 to 4.9 and 5. The data indicated that 68% of the participants could perform within the 3rd range i.e. 2 to 2.9 score in the pre-test of comprehension.

#### 4.4.2 Post-Test of Comprehension (Experimental Group)

After the treatment period, a post-test of comprehension was conducted for both groups to have an idea about the improvement in comprehension skills. The participants were again asked to read 3 different paragraphs and answer the questions given at the end of each paragraph. The results of the participants in the comprehension post-test are presented in the following table:

**Table: 20**

*Post-Test of Comprehension (Experimental Group)*

Participants	Comprehension	Comprehension	Comprehension	Average
	1	2	3	
1	4	5	4	4.3
3	3	4	4	3.6
5	3	3	4	3.3
7	4	4	5	4.3
9	3	3	4	3.3
11	4	5	4	4.3
13	4	4	4	4
15	4	4	5	4.3
17	4	4	4	4
19	4	5	4	4.3
21	3	5	4	4
23	4	4	4	4
25	4	3	4	3.6
27	4	4	4	4
29	5	5	5	5
31	4	4	4	4
33	4	3	4	3.6

Participants	Comprehension 1	Comprehension 2	Comprehension 3	Average
35	3	4	4	3.6
37	4	5	4	4.3
39	4	4	5	4.3
41	3	4	4	3.6
43	4	4	5	4.3
45	3	3	4	3.3
47	4	4	5	4.3
49	4	4	5	4.3

Table 20 consists of participants' results in post-tests of comprehension. The data indicated that the participants from the experimental group performed at varying levels and achieved different scores. The lowest score in the post-test of comprehension was counted as 3.3 whereas the highest score was 5. The mean value of the performance of the participants from the experimental group in this test was recorded as 4 whereas the median was also counted as 4. However, the performance of the participants from the experimental group can be understood through the following figure:

**Figure: 25**

*Participants' Performance in Comprehension Post-Test (Experimental Group)*

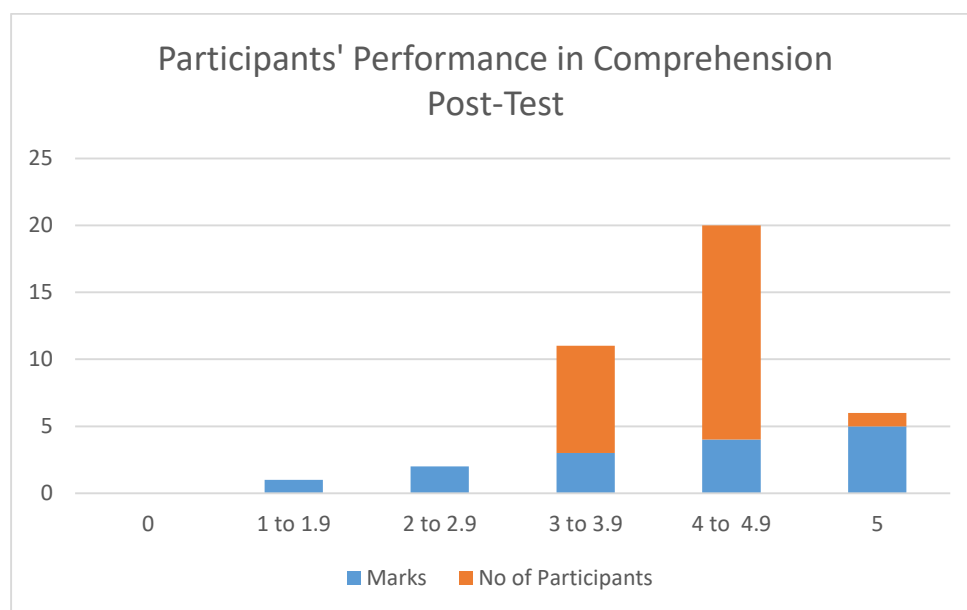


Figure 25 presents the details of participants' performance in the post-test of comprehension. The data indicated that none of the participants from the experimental group scored within the 1st three ranges i.e. 0, 1 to 1.9 and 2 to 2.9. Then, 8 of the participants scored within the 4th range i.e. 3 to 3.9, and 16 of the participants scored 4 to 4.9. Only one participant could achieve the highest score in comprehension post-test i.e. 5. Thus, the data indicated that the majority of the participants from the experimental group achieved scores in the 2nd highest range i.e. 4 to 4.9.

#### 4.4.3 Comparison of Pre and Post-Test of Comprehension (Exp. Group)

After the completion of pre and post-tests of reading comprehension, their results were compared to have an idea about participants' improvement in reading comprehension. The following table compares the results of both the tests:

**Table: 21**

*Comparison of Pre and Post-Test of Comprehension (Experimental Group)*

P. No	COMP1		COMP2		COMP 3		Average in Pre- test	Average in Post- test	Diff.	% of Improvement
	Pre Post Test		Pre Post Test		Pre Post Test					
1	2	4	2	5	3	4	2.3	4.3	2	86%
3	1	3	2	4	2	4	1.6	3.6	2	120%
5	3	3	3	3	2	4	2.6	3.3	1	25%
7	4	4	2	4	3	5	3	4.3	1.3	44%
9	2	3	1	3	2	4	1.6	3.3	1.6	100%
11	3	4	2	5	3	4	2.6	4.3	1.6	63%
13	2	4	2	4	2	4	2	4	2	100%
15	2	4	2	4	2	5	2	4.3	2.3	117%
17	2	4	2	4	2	4	2	4	2	100%
19	1	4	1	5	2	4	1.3	4.3	3	225%
21	2	3	2	5	2	4	2	4	2	100%
23	2	4	2	4	2	4	2	4	2	100%
25	2	4	0	3	1	4	1	3.6	2.6	267%

27	0	4	0	4	1	4	0	4	3.6	1100%
29	3	5	2	5	3	5	2.6	5	2.3	88%
31	2	4	1	4	2	4	1.6	4	2.3	140%
33	3	4	2	3	3	4	2.6	3.6	1	38%
35	3	3	2	4	2	4	2.3	3.6	1.3	57%
37	1	4	2	5	2	4	1.6	4.3	2.6	160%
39	2	4	2	4	2	5	2	4.3	2.3	117%
41	2	3	1	4	1	4	1.3	3.6	2.3	175%
43	3	4	2	4	2	5	2.3	4.3	2	86%
45	2	3	2	3	2	4	2	3.3	1.3	67%
47	3	4	2	4	2	5	2.3	4.3	2	86%
49	2	4	2	4	2	5	2	4.3	2.3	117%

Table 21 presents a comprehensive picture of participants' performance in the pre and post-tests of comprehension. The data indicated that all the participants from the experimental group improved their reading comprehension skills. The lowest percentage of improvement was counted to be 25% whereas the highest percentage of improvement was 1100. 3 of the participants improved by 25 to 50%, 3 of the participants improved by 51 to 75 %, 9 of the participants improved by 76 to 100% and 10 of the participants improved by more than 100%. So, the data indicated that 100% of the participants from the experimental group improved their reading comprehension during and after the treatment period.

#### 4.4.4 Pre-Test of Comprehension (Control Group)

Like the participants from the experimental group, the participants from the control group were also asked to attempt a pre-test of comprehension so that their comprehension skills might be tested before the experiment started. So, the participants from the control group attempted the same test as was taken by the participants from the experimental group. The performance of the participants from the control group in the comprehension pre-test was recorded and it is presented in the following table:

**Table: 22***Pre-Test of Comprehension (Control Group)*

Participants	Comprehension	Comprehension	Comprehension	Average
	1	2	3	
2	3	3	3	3
4	2	2	1	1.6
6	4	2	3	3
8	3	2	3	2.6
10	2	2	2	2
12	3	2	2	2.3
14	2	3	2	2.3
16	3	2	2	2.3
18	3	2	2	2.3
20	3	2	2	2.3
22	3	2	1	2
24	1	2	2	1.6
26	0	2	2	1.3
28	2	2	2	2
30	1	2	1	1.3
32	3	2	2	2.3
34	3	2	2	2.3
36	2	1	2	1.6
38	3	2	2	2.3
40	2	1	2	1.6
42	3	2	2	2.3
44	3	1	2	2
46	2	2	2	2
48	2	0	1	1
50	3	2	1	2

Table 22 consists of the results of the comprehension pre-test taken by the participants from the control group. The participants performed in the test at varying levels securing 1 as the lowest and 3 as the highest score. Here the mean value of students' performance was counted to be 2.0 and median was also counted as 2.0. However, details about the performance of the participants in the comprehension pre-test can be understood through the following figure:

**Figure: 26**

*Participants' Performance in Comprehension Pre-Test (Control Group)*

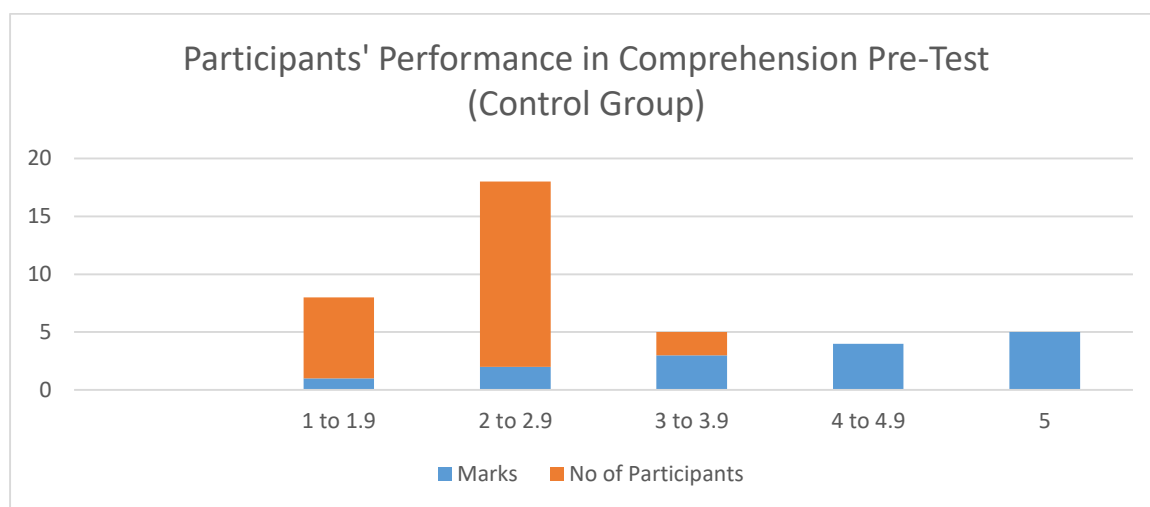


Figure 26 presents a comprehensive detail about the varying levels of performance by the participants from the control group in the comprehension pre-test. The data indicated that 7 of the participants from the control group could score in the first range i.e. 1 to 1.9. Then, 16 of the participants scored within the 2nd range i.e. 2 to 2.9. Only 2 participants could obtain a score in the 3rd range i.e. 3 to 3.9. The data indicated that none of the participants from the control group could score in the last 2 highest ranges i.e. 4 to 4.9 and 5. Thus, it can be asserted that most of the participants from the control group scored in the 2nd range of marks i.e. 2 to 2.9.

#### 4.4.5 Post-Test of Comprehension (Control Group)

After the treatment period, the participants from the control group were also asked to take a post-test of comprehension so that their performances in pre and post-tests could be compared to have an idea of whether they improved or not. The results

of the post-test taken by the participants from the control group are presented in the table below:

**Table: 23**

*Post-Test of Comprehension (Control Group)*

Participants	Comprehension	Comprehension	Comprehension	Average
	1	2	3	
2	3	3	2	2.6
4	3	2	2	2.3
6	4	3	3	3.3
8	1	2	2	1.6
10	2	2	3	2.3
12	2	1	2	1.6
14	1	3	2	2
16	3	2	1	2
18	2	2	2	2
20	4	3	3	3.3
22	2	2	2	2
24	2	2	3	2.3
26	1	3	3	2.3
28	1	2	2	1.6
30	2	2	1	1.6
32	2	2	2	2
34	3	2	2	2.3
36	2	2	1	1.6
38	3	2	2	2.3
40	2	2	2	2
42	2	0	1	1
44	2	2	2	2
46	2	2	2	2
48	2	2	2	2
50	3	3	2	2.6

Table 23 provides the details regarding participants' results in the post-test of comprehension. The participants from the control group read 3 passages and answered the questions given at the end of each paragraph. The final result of the participants was presented through average score. The data indicated that the participants scored in different ranges though the lowest score was noted as 1 and the highest was noted as 3.3. The mean value of control group participants' performance in the post-test of comprehension was 2.10 whereas the median was 2. However, the overall performance of the participants from the control group in comprehension post-test is presented through the following figure:

**Figure: 27**

*Participants' Performance in Comprehension Post-Test (Control Group)*

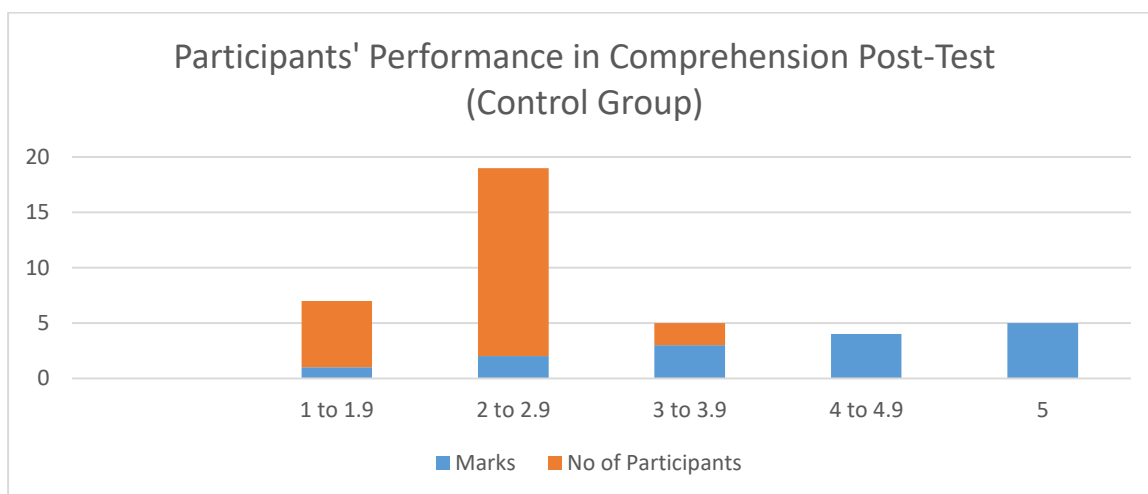


Figure 27 presents the score achieved by the participants in 5 different ranges starting from points 1 to 5. The data indicated that 6 of the participants scored within the 1st range i.e. 1 to 1.9 whereas 17 of the participants could score within the 2nd range i.e. 2 to 2.9. Only 2 of the participants could perform within the 3rd range i.e. 3 to 3.9 whereas, none of the participants could score in the 4th and 5th range of scores i.e. 4 to 4.9 and 5. Thus, the situation indicated that most of the participants scored in the 2nd range i.e. 2 to 2.9.

#### 4.4.6 Comparison of Pre and Post-Test of Comprehension (Cont. Group)

Pre and post-tests of comprehension were conducted to have an idea about participants' improvement in comprehension skills after the treatment period, the table below presents a comprehensive detail of participants' performances in both the tests

and it also compares the performance of the participants in both the tests by indicating the difference in both the performances.

**Table: 24**

*Comparison of Pre and Post-Test of Comprehension (Control Group)*

P. No	COMP1		COMP2		COMP3		Average score in Pre-Test	Average score in Pre-Test	Diff. in Ave.	% of Imp.
	Pre	Post	Pre	Post	Pre	Post				
2	3	3	3	3	3	2	3	2.6	-0.3	-11%
4	2	3	2	2	1	2	1.6	2.3	0.6	40%
6	4	4	2	3	3	3	3	3.3	0.3	11%
8	3	1	2	2	3	2	2.6	1.66	-1	-38%
10	2	2	2	2	2	3	2	2.3	0.3	17%
12	3	2	2	1	2	2	2.3	1.6	-0.6	-29%
14	2	1	3	3	2	2	2.3	2	-0.3	-14%
16	3	3	2	2	2	1	2.3	2	-0.3	-14%
18	3	2	2	2	2	2	2.3	2	-0.3	-14%
20	3	4	2	3	2	3	2.3	3.3	1	43%
22	3	2	2	2	1	2	2	2	0	0%
24	1	2	2	2	2	3	1.6	2.3	0.6	40%
26	0	1	2	3	2	3	1.3	2.3	1	75%
28	2	1	2	2	2	2	2	1.6	-0.3	-17%
30	1	2	2	2	1	1	1.3	1.6	0.3	25%
32	3	2	2	2	2	2	2.3	2	-0.3	-14%
34	3	3	2	2	2	2	2.3	2.3	0	0%
36	2	2	1	2	2	1	1.6	1.6	0	0%
38	3	3	2	2	2	2	2.3	2.3	0	0%
40	2	2	1	2	2	2	1.6	2	0.3	20%
42	3	2	2	0	2	1	2.3	1	-1.3	-57%
44	3	2	1	2	2	2	2	2	0	0%
46	2	2	2	2	2	2	2	2	0	0%
48	2	2	0	2	1	2	1	2	1	100%
50	3	3	2	3	1	2	2	2.6	0.6	33%

Table 24 compares the performance of the participants from the control group in comprehension pre and post-tests. The data indicated that 15 of the participants had poorer scores in the post-test because they scored in minus i.e. -57 to 0% which indicated that 60% of the participants could not improve their reading comprehension through the phase of the experiment. Thus, only 10 participants from the control group showed improvement in reading comprehension by 11 to 100%. But 3 of the participants among these 10 participants did not show any significant improvement because their improvement was below 25% which was the lowest improvement in the experimental group. Thus, it can be asserted that only 28% of the participants from the control group improved their reading comprehension skills.

#### 4.4.7 Comparison of Improvement in Comprehension Skills b/w Experimental and Control Group

After the detailed analyses of the performances of both the groups namely experimental and control groups, the following table compares the level of improvement of comprehension skills b/w both the groups:

**Table: 25**

*Comparison of Improvement b/w both the Groups (Comprehension)*

<b>Observation</b>	<b>Experimental Group</b>	<b>Control Group</b>	<b>Group which Improved</b>	<b>Difference</b>
Comprehension Skills	100%	28%	Experimental	72%

The data in Table 25 indicated that all participants from the experimental group made significant improvement in their reading comprehension by using AI-based Apps whereas the participants from the control group could not show that much progress in improving comprehension skills. Thus, only 28% of the participants from the control group could improve their comprehension skills. The data indicated that there was a difference of 72% improvement between both groups.

The results indicate that English language learners (ELLs) can improve their reading and writing skills using AI tools but one shouldn't be oblivious to the fact that

the development of inference and comprehension skills involves complex and cognitive processes in which the teacher's role is paramount. However, teachers can use AI and digital adaptive tools as support (Klein, 2023). So, it can be asserted that AI-powered tools might help teachers in the assessment and evaluation of different language skills but inference and comprehension skills call for special attention and practice. As far as comprehension drills and practice are concerned, the present study highlights that inference and comprehension skills can be practiced using AI tools with positive results.

## 4.5 Word Processing/Recognition

### 4.5.1 Word Processing/Recognition Pre-Test Experimental Group

Word Processing (WP) or recognition can be taken as a part of reading because it refers to learners' ability to identify different words from the given text. The current study followed the idea of assessing students' ability to recognize different words from a text based on the model presented by Srisang & Everatt (2021). So, the participants in the current research were asked to identify and separate the words through a slash (/) from a list of words written without any spaces.

For example: unethicalluniqueindependentimpositionmiserable

Unethical/unique/independent/imposition/miserable

So, this task was also included in the pre and post-tests to have an idea about participants' ability to identify different words from a given text. Both the groups namely experimental and control were given a question in pre and post-tests to identify different words written in a line. The participants were required to identify and write the words by separating them with a slash (/). The participants were required to separate words from 10 different lines and each line had 1 score. Thus, the performance of the participants in the WP was assessed out of 10 marks in total. The performance of the participants from the experimental group in the pre-test of word processing is presented in the following table:

**Table: 26**

*Participants Score in Pre-Test of WP (Exp. Group)*

Participants	Total Marks	Marks Obtained
1	10	8
3	10	5
5	10	3
7	10	5
9	10	2
11	10	2
13	10	7
15	10	8
17	10	6
19	10	6
21	10	6
23	10	5
25	10	5
27	10	7
29	10	5
31	10	5
33	10	6
35	10	6
37	10	8
39	10	5
41	10	5
43	10	6
45	10	5
47	10	6
49	10	2

Table 26 consists of the results of the Word Processing (WP) pre-test taken by the participants from the experimental group. The data indicated that the participants

secured different marks ranging from 1 to 8. The lowest score was found to be 2 whereas the highest score was 8. The mean value of participants' scores in the pre-test of WP was counted as 5.36 whereas the median was 5. The details of participants' performance in the WP pre-test can be understood through the following graph:

**Figure: 28**

*Participants' Range of Score in Pre-Test of Word Processing (Exp. Group)*

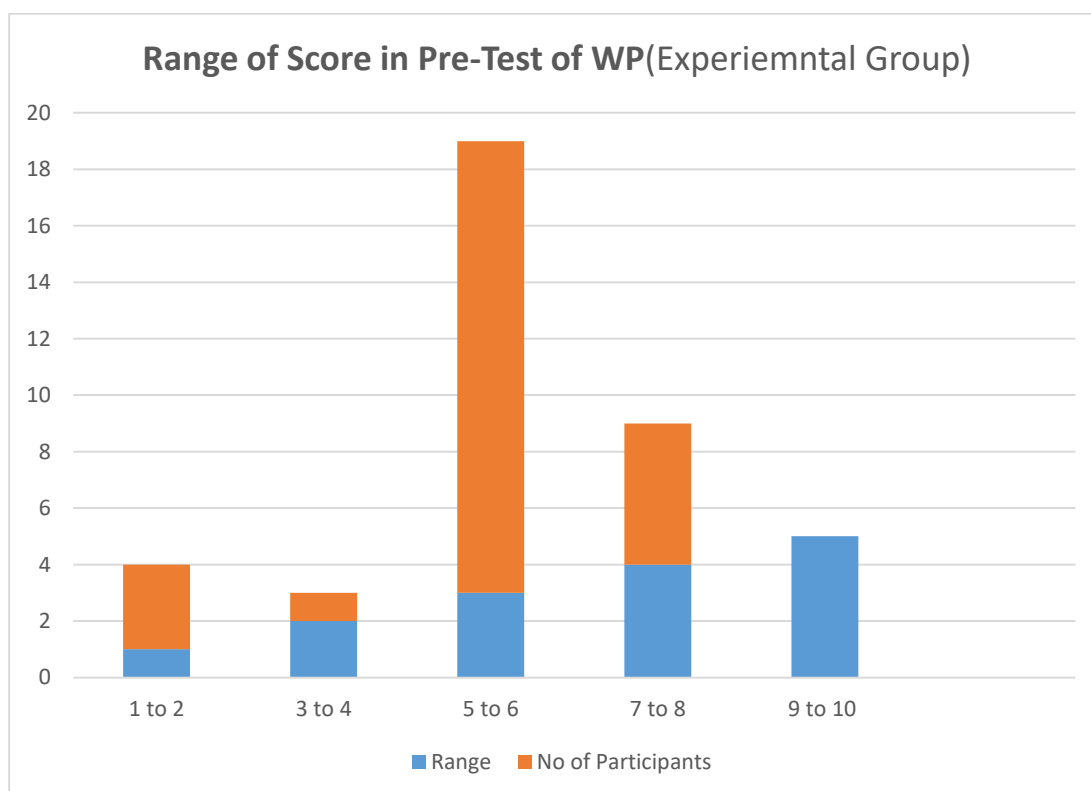


Figure 28 presents a comprehensive detail of participants' scores in the WP pre-tests though 5 ranges of marks. The data indicated that only 3 of the participants from the experimental group scored within the 1st range i.e. 1-2 scores. 1 of the participants scored in the range of 3-4 scores. 16 of the participants could achieve a score within the 3rd range i.e. 5-6 and 5 of the participants scored in the 4th range i.e. 7-8. The data indicated that none of the participants from the experimental group scored in the highest range i.e. 9-10 marks. Thus, it can be asserted that most of the participants from the experimental group scored in the 3rd range of score i.e. 5-6 marks.

#### 4.5.2 Word Processing/Recognition Post-Test (Experimental Group)

After the treatment period, both groups were required to take a post-test of WP. The post-test of WP was again developed in the same pattern as the pre-test. The participants again identified and wrote words from 10 different lines consisting of a variety of words. Each line had 1 score. The performance of the participants from the experimental group in the post-test of WP is presented in the following table:

**Table: 27**

*Participants Score in Post-Test of Word Processing (Experimental Group)*

<b>Participants</b>	<b>Word Processing Total Marks</b>	<b>Word Processing Marks Obtained</b>
1	10	10
3	10	7
5	10	7
7	10	8
9	10	6
11	10	8
13	10	9
15	10	10
17	10	9
19	10	9
21	10	10
23	10	9
25	10	9
27	10	7
29	10	9
31	10	9
33	10	9
35	10	8

Participants	Word Processing Total Marks	Word Processing Marks Obtained
37	10	9
39	10	9
41	10	9
43	10	8
45	10	8
47	10	10
49	10	7

Table 27 consists of the score achieved by the participants from the experimental group in the post-test of WP. The data indicated that the participants showed better results in comparison to the pre-test. The lowest score in the post-test of WP was counted to be 6 whereas the highest score was 10. Thus, the mean value of participants' scores in this test was 8.52 and the median was counted as 9. If divided into 5 different levels, the participants showed the following results:

**Figure: 29**

*Participants' Range of Score in Post-Test of Word Processing (Exp. Group)*

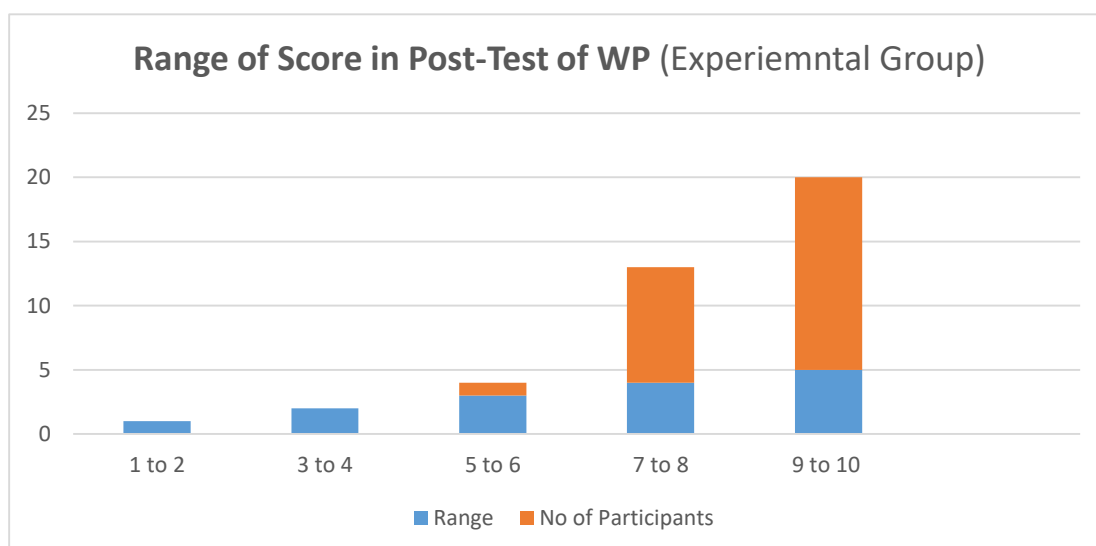


Figure 29 indicates that the participants from the experimental group scored better in the post-test of WP. None of the participants scored in 1st two ranges of score i.e. 1-2 and 3-4. Only one of the participants scored in the 3rd range i.e. 5-6 score. 9

of the participants could score in the 4th range i.e. 7-8 whereas 15 of the participants scored within the highest range of score i.e. 9-10. Thus, it can be asserted that most of the participants from the experimental group scored within the highest range of scores.

#### 4.5.3 Word Processing/Recognition Pre and Post-Test Comparison (Experimental Group)

The participants from the experimental group showed the following results in word processing post-test.

**Table: 28**

*Comparison of WP Pre and Post-Test Score (Exp. Group)*

Participants	Total Marks	Marks Obt. In Pre-Test	Marks Obt. In Post-Test	Difference
1	10	8	10	2
3	10	5	7	2
5	10	3	7	4
7	10	5	8	3
9	10	2	6	4
11	10	2	8	6
13	10	7	9	2
15	10	8	10	2
17	10	6	9	3
19	10	6	9	3
21	10	6	10	4
23	10	5	9	4
25	10	5	9	4
27	10	7	7	0
29	10	5	9	4
31	10	5	9	4
33	10	6	9	3

Participants	Total Marks	Marks Obt. In Pre-Test	Marks Obt. In Post-Test	Difference
35	10	6	8	2
37	10	8	9	1
39	10	5	9	4
41	10	5	9	4
43	10	6	8	2
45	10	5	8	3
47	10	6	10	4
49	10	2	7	5

Table 28 consists of the comparison of the results of pre and post-tests taken by the participants from the experimental group. The data indicated that 1 of the participants achieved the same score in pre and post-tests of WP and did not show any improvement in WP whereas 24 of the participants from the experimental group improved by 1-6 marks after the treatment period. So, it can be asserted that 96% of the participants from the experimental group made significant progress in WP.

#### 4.5.4 Word Processing/Recognition Pretest (Control Group)

The participants from the control group also took the same pre and post-tests of WP during the current research. The performance of the participants from the control group is presented through the following table:

**Table: 29**

*Participants Score in Pre-Test of Word Processing (Control Group)*

Participants	Total Marks	Marks Obtained
2	10	2
4	10	4
6	10	4
8	10	2

Participants	Total Marks	Marks Obtained
10	10	7
12	10	0
14	10	3
16	10	5
18	10	6
20	10	5
22	10	6
24	10	1
26	10	1
28	10	6
30	10	2
32	10	5
34	10	4
36	10	4
38	10	6
40	10	7
42	10	6
44	10	1
46	10	8
48	10	6
50	10	2

The data in Table 29 indicated that the participants from the control group performed in the WP pre-test at varying levels. However, the lowest score achieved in this test was counted as 0 whereas the highest was 8. Thus, the mean value of students' performance in this test was counted as 4.12 and the median was counted as 4. The detail of marks obtained by the participants can be understood through the following graph:

**Figure: 30**

*Participants' Range of Score in Pre-Test of Word Processing (Control Group)*

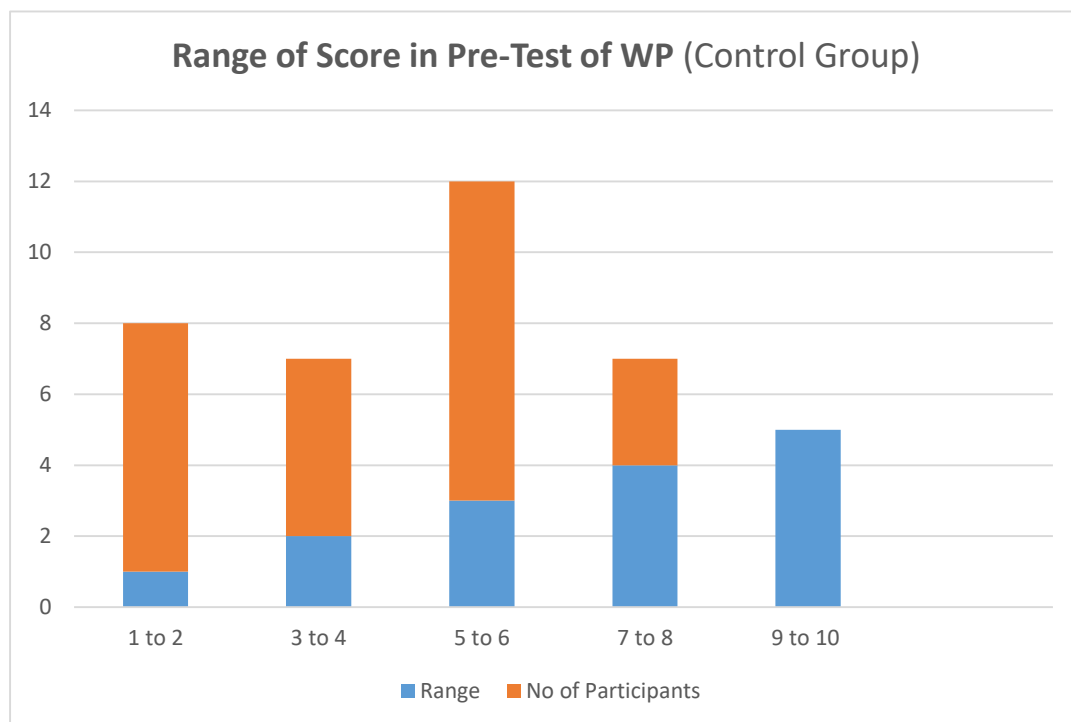


Figure 30 presents the scores achieved by the participants from the control group in 5 different ranges based on the total marks of the questions they attempted in the WP pre-test. The data indicated that 1 of the participants secured a 0 score in the WP pre-test. 7 of the participants could score within the 1st range of marks i.e. 1-2. Then, 5 of the participants scored within the 2nd range i.e. 3-4 whereas 9 of the participants achieved scores within the 3rd range i.e. 5-6 marks. Only 3 of the participants scored in the 4th range i.e. 7-8 and none of the participants from the control group could reach the highest level of score in the pre-test of WP i.e. 9-10. Thus, the data indicated that most of the participants could score from the 1st to 3rd range.

#### 4.5.5 Word Processing/Recognition Post-Test (Control Group)

Like the participants from the experimental group, the participants from the control group also took a post-test of WP. The participants from the control group achieved different scores in the post-test of WP. The following table presents the details of marks achieved by each participant from the control group:

**Table: 30***Participants Score in Post-Test of Word Processing (Control Group)*

<b>Participants</b>	<b>Marks</b>	<b>Marks Obtained</b>
2	10	7
4	10	6
6	10	7
8	10	4
10	10	4
12	10	6
14	10	5
16	10	5
18	10	4
20	10	8
22	10	5
24	10	4
26	10	5
28	10	8
30	10	3
32	10	7
34	10	3
36	10	3
38	10	4
40	10	8
42	10	8
44	10	6
46	10	7
48	10	2
50	10	7

Table 30 indicates that the participants from the control group obtained different marks. The lowest score in this data was counted to be 2 whereas the highest was 8. Other performances were between 2 to 8. Thus, the mean value of the score of these participants was 5.44 whereas the median was counted as 5. However, the

following graph can be considered for the details about the marks obtained by the participants from the control group in the post-test of WP.

**Figure: 31**

*Participants' Range of Score in Post-Test of Word Processing (Control Group)*

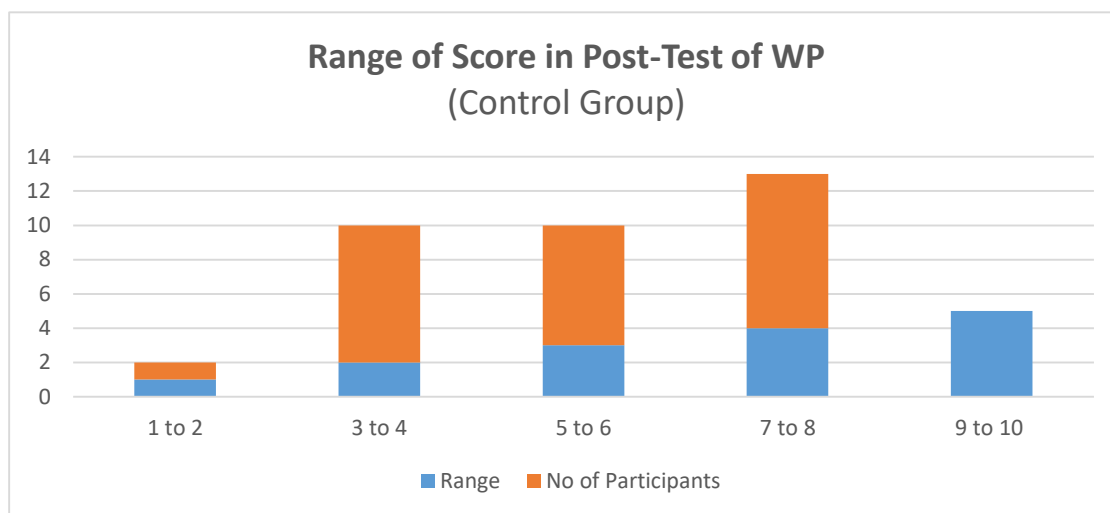


Figure 31 indicates that the participants from the control group could obtain marks in 4 different ranges starting from 1 to 8. The data indicated that only 1 of the participants could achieve 1 score in the 1st range of marks i.e. 1-2. Then, 8 of the participants performed within the 2nd range of marks and achieved scores within the range of 3-4 whereas 7 of the participants were found to score within the 3rd range i.e. 5-6 and 9 of the participants could obtain marks in the 4th range i.e. 7-8. The data indicated that none of the participants from the control group could achieve the highest level of marks in the post-test of WP i.e. 9-10 marks. Thus, it can be asserted that most of the participants from the control group could score within the 1st to 4th range but none of them could achieve the maximum marks from the WP post-test i.e. 10/10.

#### 4.5.6 Word Processing/Recognition Pre and Post-Test Comparison (Control Group)

Pre and post-tests of WP were conducted to have an idea to evaluate the participants' performance in the identification of different words. After the detailed analysis of the results sought through WP pre and post-tests, the results of both tests

are compared through the following table to have an idea about the improvement of the participants' performance in WP:

**Table: 31**

*Comparison of WP Pre and Post-Test Score (Experimental Group)*

Participants	Total Marks	Pre-Test Marks	Post-Test Marks	Difference
2	10	2	7	5
4	10	4	6	2
6	10	4	7	3
8	10	2	4	2
10	10	7	4	-3
12	10	0	6	6
14	10	3	5	2
16	10	5	5	0
18	10	6	4	-2
20	10	5	8	3
22	10	6	5	-1
24	10	1	4	3
26	10	1	5	4
28	10	6	8	2
30	10	2	3	1
32	10	5	7	2
34	10	4	3	-1
36	10	4	3	-1
38	10	6	4	-2
40	10	7	8	1
42	10	6	8	2
44	10	1	6	5
46	10	8	7	-1
48	10	6	2	-4
50	10	2	7	5

Table 31 presents a comprehensive detail about the participants' performance in the pre and post-tests. It further highlights the difference in the score achieved by the participants from the control group in WP pre and post-tests. The data indicates that only 16 of the participants could improve by 1 to 6 marks and most of the participants from this group scored in the 2nd, 3rd and 4th range of score. The data indicated that none of the participants could improve up to the extent that he could achieve the highest range of scores. Thus, it can be asserted that only 64% of the participants from the control group improved in WP skills but 0% of them could reach the highest level of score in this test.

#### 4.5.7 Comparison of Improvement in Word Processing b/w Experimental and Control Group

After the detailed analysis of participants' performance in both pre and post-tests of WP, the following table compares the level of improvement in WP by the participants of both groups:

**Table: 32**

*Comparison of Improvement in WP b/w Experimental and Control Group*

Observation	Experimental Group	Control Group	Group which Improved	Difference
Word Processing	96%	64%	Experimental	32%

Table 32 indicates that 92% of the participants from the experimental group showed improvement after the treatment period whereas only 64% of the participants from the control group could improve in WP skill. Thus, there was a difference of 32% in improvement which is significant. Moreover, it can be asserted that the participants who were taught the English language through AI-based applications were at an advantage and they improved more than the participants of the control group.

The results indicated regular reading practice with the help of AI-based Apps and tools is effective in developing word processing and recognition in ELLs. According to Chamba & Ramirez-Avila (2021), students' ability to recognise words

perfectly helps develop comprehension skills in ELLs. So, this area should be given key importance by the language teachers and ELLs.

## 4.6 Vocabulary

### 4.6.1 Vocabulary Pre-Test (Experimental Group)

Vocabulary development in second language learners is an important aspect of language learning. So, the pre and post-tests of the current study also had a question to assess participants' level of vocabulary. Hence, the pre and post-tests were developed keeping the level of participants in view. Thus, the vocabulary items were taken from the Textbook of English used for the Intermediate students. This book is taught in the Pakistani colleges at the intermediate level. Vocabulary pre-test consisted of 10 items each carrying 1 point. The participants from the experimental group showed the following results in their vocabulary pre-test.

**Table: 33**

*Vocabulary Pre-Test (Experimental Group)*

Participants	Total Marks	Marks Obtained
1	10	6
3	10	1
5	10	3
7	10	2
9	10	4
11	10	5
13	10	6
15	10	6
17	10	4
19	10	5
21	10	4
23	10	4
25	10	5
27	10	5

Participants	Total Marks	Marks Obtained
29	10	6
31	10	7
33	10	5
35	10	6
37	10	6
39	10	6
41	10	4
43	10	7
45	10	6
47	10	6
49	10	3

Table 33 consists of the results of the participants from the experimental group in the pre-test of vocabulary. The data indicated that the participants from the experimental group obtained different marks ranging from 1 to 7. Thus, the lowest score was found to be 1 and the highest was 7 in the vocabulary pre-tests. As far as the mean value of the score of participants of this group is concerned, it was counted as 4.88 whereas the median was counted as 5. The following graph depicts the score of the participants from the experimental group in 5 different ranges.

**Figure: 32**

*Participants' Range of Score in Pre-Test of Vocabulary*

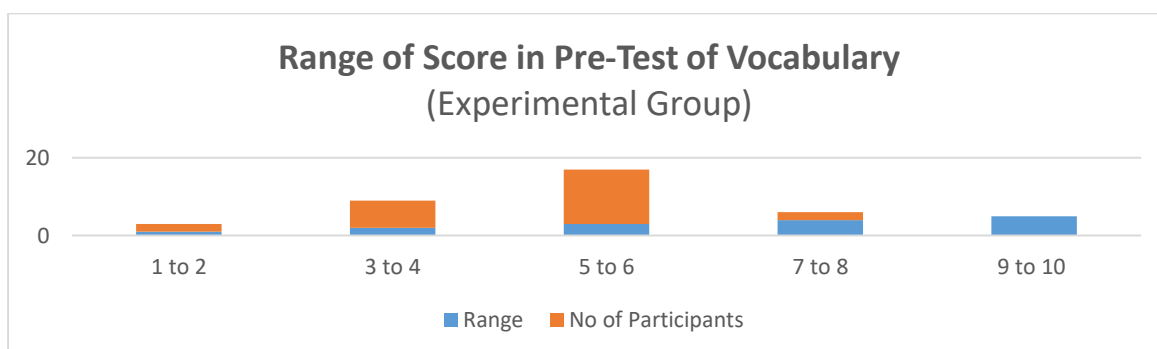


Figure 32 presents a comprehensive picture of the range of scores in which different participants from the experimental group scored in the vocabulary pre-test.

The participants could score only in 1st four ranges whereas none of the participants from the experimental group scored in the highest range of score. The data indicated that only 2 participants scored in the 1st range i.e. 1-2 marks. 7 of the participants scored in the 2nd range i.e. 3-4 marks. 14 of the participants could obtain marks in the 3rd range i.e. 5-6 marks and 2 of the participants scored in the 4th range i.e. 6-7 whereas none of the participants could reach the highest level of marks i.e. 9-10 marks. Thus, the data indicated that most of the participants from the experimental group achieved 50 to 60% marks in the vocabulary pre-test.

#### 4.6.2 Vocabulary Post-Test (Experimental Group)

After the treatment period, a vocabulary post-test was conducted to have an idea about the participants' improvement after the treatment. In the vocabulary post-test, participants from the experimental group were found to score at different levels ranging from 7 to 10. Thus, the lowest score in the post-test of vocabulary was counted to be 7 whereas the highest was 10 i.e. maximum. The following table presents the details about the scores of participants in the vocabulary post-test.

**Table: 34**

*Vocabulary Post-Test (Experimental Group)*

Participants	Total Marks	Marks Obtained
1	10	10
3	10	7
5	10	8
7	10	8
9	10	7
11	10	8
13	10	9
15	10	10
17	10	9
19	10	8
21	10	8
23	10	7

Participants	Total Marks	Marks Obtained
25	10	9
27	10	10
29	10	8
31	10	9
33	10	8
35	10	8
37	10	10
39	10	9
41	10	8
43	10	10
45	10	9
47	10	9
49	10	8

Table 34 indicates that the participants from the experimental group achieved different marks in the vocabulary post-test. The data indicated that the participants scored between 70 to 100% in the vocabulary post-test. The mean value of the participants' score in this test from the experimental group was counted as 8.56 and the median was counted as 8. However, the detail of the participants' range of scores is presented in the following figure:

**Figure: 33**

*Participants' Range of Score in the Post-Test of Voc. (Exp. Group)*

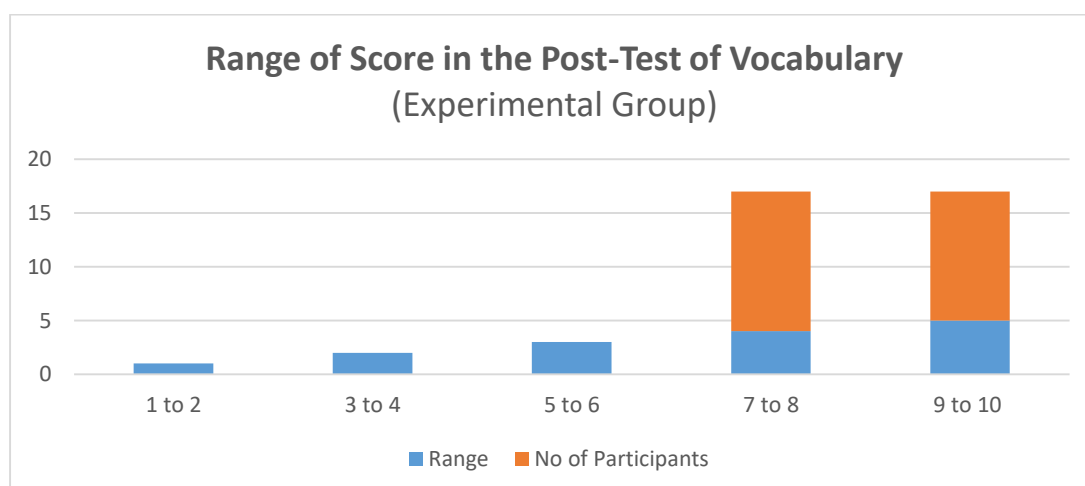


Figure 33 indicates that all of the participants from the experimental group scored within the highest ranges of score i.e. 7-8 and 9-10. The data indicated that none of the participants from the experimental group scored in the first three ranges i.e. 1-2, 3-4 and 5-6. Thus, it can be asserted that 52% of the participants from the experimental group obtained 70 to 80% scores whereas 48% of them got 90 to 100% marks in the post-test of vocabulary.

#### 4.7.3 Vocabulary Pre and Post-Test Comparison (Experimental Group)

After a detailed analysis of pre and post-test results of vocabulary achieved by the participants from the experimental group, the next table presents the comparison of the marks obtained by the participants in the pre and post-tests:

**Table: 35**

*Vocabulary Pre and Post-Test Comparison (Exp. Group)*

Participants	Total Marks	Pre-Test	Post-Test	Difference
1	10	6	10	4
3	10	1	7	6
5	10	3	8	5
7	10	2	8	6
9	10	4	7	3
11	10	5	8	3
13	10	6	9	3
15	10	6	10	4
17	10	4	9	5
19	10	5	8	3
21	10	4	8	4
23	10	4	7	3
25	10	5	9	4
27	10	5	10	5
29	10	6	8	2
31	10	7	9	2
33	10	5	8	3
35	10	6	8	2

Participants	Total Marks	Pre-Test	Post-Test	Difference
37	10	6	10	4
39	10	6	9	3
41	10	4	8	4
43	10	7	10	3
45	10	6	9	3
47	10	6	9	3
49	10	3	8	5

Table 35 presents a comprehensive detail of participants' performance in the pre-, and post-tests of vocabulary and compares the results to indicate the difference in score in both the tests. The data indicated that the participants from the experimental group improved after the treatment by 2 to 6 marks in the post-test performance. Thus, the data indicated that all of the participants from the experimental group improved their level of vocabulary after the treatment period.

#### 4.6.4 Vocabulary Pre-Test (Control Group)

Like the participants of the experimental group, the participants from the control group also took the pre and post-tests of vocabulary. The same tests were conducted for both groups in the same setting. The following table presents the results of the participants from the control group in the pre-test of vocabulary.

**Table: 36**

*Vocabulary Pretest (Control Group)*

Participants	Total Marks	Marks Obtained
2	10	4
4	10	2
6	10	1
8	10	3
10	10	4
12	10	2

Participants	Total Marks	Marks Obtained
14	10	5
16	10	3
18	10	3
20	10	4
22	10	5
24	10	4
26	10	1
28	10	3
30	10	3
32	10	7
34	10	5
36	10	4
38	10	7
40	10	5
42	10	8
44	10	7
46	10	5
48	10	4
50	10	4

Table 36 indicates that the participants from the control group obtained different marks in vocabulary pre-tests ranging from 1 to 8. Thus. It can be asserted that the lowest score on the vocabulary test was 1 and the highest score was 8. None of the participants could achieve the maximum marks in the vocabulary test. The mean value of the score in this test was 4.12 whereas the median we 4. However, the detail regarding the range of scores achieved by the participants in the vocabulary pre-test is presented in the following figure:

**Figure: 34**

*Participants' Range of Score in Pre-Test of Vocabulary (Control Group)*

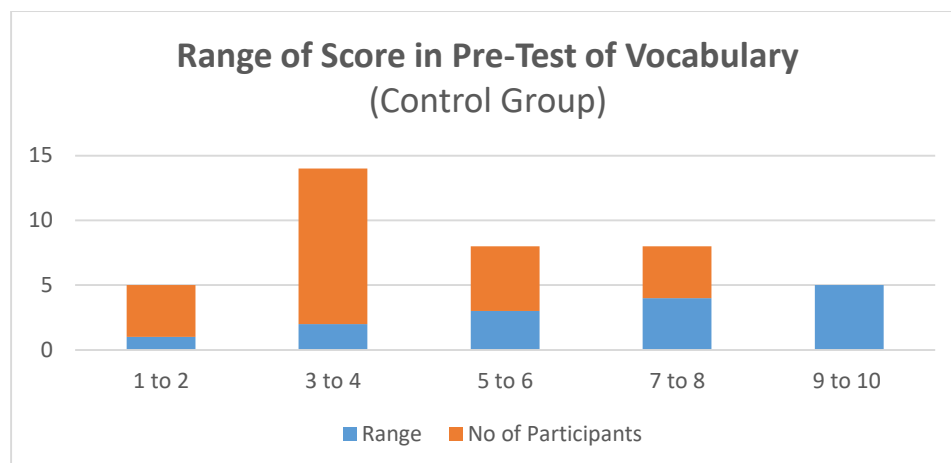


Figure 34 presents the details of participants' performance in different ranges of scores in the pre-test of vocabulary taken by the participants from the control group. The data indicated that 4 of the participants from the control group scored within the 1st range i.e. 1-2. Then, 12 of the participants could score in the 2nd range of marks i.e. 3-4 and 5 of the participants from the control group got marks in the 3rd range of score i.e. 5-6 marks whereas 4 of them could obtain marks within the 4th range i.e. 7-8. The data indicated that none of the participants achieved marks within the highest range of marks i.e. 9-10. Moreover, most of the participants from this group scored in the 2nd range i.e. 3-4 marks.

#### 4.6.5 Vocabulary Post-Test (Control Group)

After the treatment period, the participants from the control group also took a vocabulary post-test. All the participants from the control group obtained different marks in the post-test of vocabulary. The detailed result of the participants is presented in the table below:

**Table: 37**

*Vocabulary Post-Test (Control Group)*

Participants	Total Marks	Marks Obtained
2	10	5
4	10	5
6	10	6
8	10	3

Participants	Total Marks	Marks Obtained
10	10	4
12	10	5
14	10	5
16	10	5
18	10	3
20	10	3
22	10	4
24	10	5
26	10	3
28	10	4
30	10	2
32	10	8
34	10	7
36	10	4
38	10	6
40	10	5
42	10	9
44	10	7
46	10	7
48	10	7
50	10	5

Table 37 provides the details of the post-test vocabulary test taken by the participants from the control group. The data indicated that the participants scored at different levels ranging from 2 to 9. Thus, the lowest score was counted as 2 whereas the highest score was 9. The mean value of the score in this test was 5.8 whereas the median was 5. The detail of marks in different ranges can be understood through the following graph:

**Figure: 35**

*Participants' Range of Score in Post-Test of Vocabulary (Control Group)*

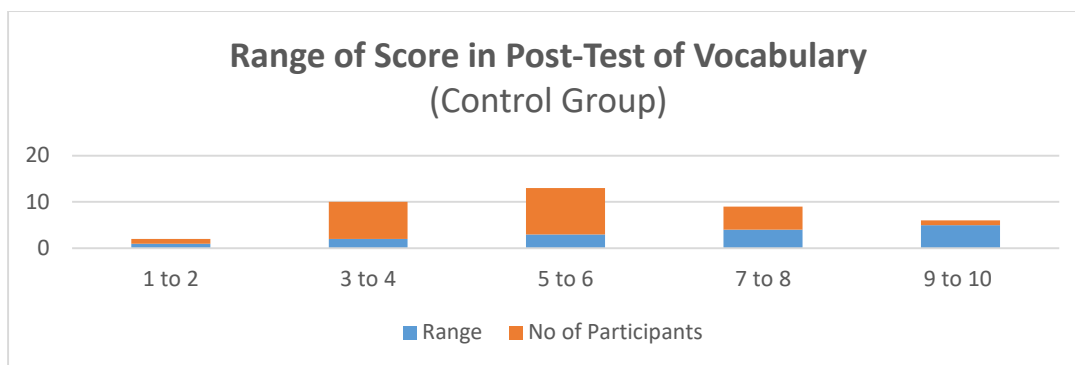


Figure 35 indicates that the participants from the control group scored within 5 different ranges. The data indicated that 1 of the participants scored in the 1st range of marks i.e. 1-2. 8 of the participants could score in the 2nd range of marks i.e. 3-4. 10 of the participants from the control group got marks in the 3rd range scoring within 5-6 and 5 of the participants scored in the 4th range i.e. 7-8 whereas only 1 of the participants got marks within the highest range i.e. 9-10. Thus, the data indicated that most of the participants from the control group obtained marks in the 2nd and 3rd range of marks i.e. 3-4 and 5-6.

#### 4.6.6 Vocabulary Pre and Post-Test Comparison (Control Group)

After the detailed analysis of participants' scores in pre and post-tests of vocabulary, the following table compares the results of pre and post-tests of vocabulary to have an idea about the improvement of the participants from the control group in the vocabulary development:

**Table: 38**

*Comparison of Participants' Scores in Vocabulary Pre and Post-Test  
(Control Group)*

Participants	Total Marks	Marks Obt. In Pre-Test	Marks Obt. In Post-Test	Difference
2	10	4	5	1
4	10	2	5	3
6	10	1	6	5
8	10	3	3	0
10	10	4	4	0
12	10	2	5	3

<b>Participants</b>	<b>Total Marks</b>	<b>Marks Obt. In Pre-Test</b>	<b>Marks Obt. In Post-Test</b>	<b>Difference</b>
14	10	5	5	0
16	10	3	5	2
18	10	3	3	0
20	10	4	3	-1
22	10	5	4	-1
24	10	4	5	1
26	10	1	3	2
28	10	3	4	1
30	10	3	2	-1
32	10	7	8	1
34	10	5	7	2
36	10	4	4	0
38	10	7	6	-1
40	10	5	5	0
42	10	8	9	1
44	10	7	7	0
46	10	5	7	2
48	10	4	7	3
50	10	4	5	1

Table 38 compares the results of pre and post-vocabulary tests taken by the participants from the control group. The data indicated that 56% of the participants improved their vocabulary with the difference of 1 to 5 marks whereas 44% of the participants from this group made no progress. Most importantly, among the improving participants from the control group, 10 of the participants showed very low progress as they improved by 1-2 marks and such progress cannot be regarded as significant.

#### 4.6.7 Comparison of Improvement in Vocabulary b/w both Groups

After the detailed analysis of participants' results in pre and post-tests of vocabulary, the following table compares the level of improvement in both groups:

**Table: 39***Comparison of Improvement in Vocabulary b/w both Groups*

<b>Observation</b>	<b>Experimental Group</b>	<b>Control Group</b>	<b>Group which Improved</b>	<b>Difference</b>
Vocabulary	100%	56%	Experimental	44%

Table 39 indicates that 100% of the participants from the experimental group improved in vocabulary whereas only 56% of the participants from the control group could improve their vocabulary. So, there is a difference of 44% in improvement between both groups. Thus, it can be asserted that the experimental group which learnt English through the use of AI-based applications made significant improvement in developing vocabulary whereas the progress made by the control group in developing vocabulary was insignificant and low.

Thus, the data indicates that reading practice through AI-harnessed Apps is useful in developing vocabulary in English language learners. The participants from the experimental group showed encouraging results in the post-tests indicating that they were at the advantage because of using AI-based Apps for reading. Wei-Xun & Jia-Ying (2024) also came up with the same findings when they investigated the impact of AI-driven Apps on developing vocabulary among English language learners.

## **4.7 Sentence Correction**

### **4.7.1 Sentence Correction Pre-Test (Experimental Group)**

The pre and post-tests consisted of a question on sentence correction to have an idea about participants' language knowledge. Thus, the participants were required to correct 10 incorrect sentences which had errors based on parts of speech. Each sentence carried 1 point and the participants were awarded marks out of 10. The table below presents the results of the pre-test of sentence correction as taken by the participants from the experimental group.

**Table: 40***Sentence Correction Pre-Test (Exp. Group)*

<b>Participants</b>	<b>Total Marks</b>	<b>Marks Obtained</b>
1	10	7

Participants	Total Marks	Marks Obtained
3	10	3
5	10	3
7	10	5
9	10	7
11	10	7
13	10	5
15	10	9
17	10	4
19	10	4
21	10	4
23	10	4
25	10	2
27	10	7
29	10	7
31	10	3
33	10	5
35	10	8
37	10	8
39	10	5
41	10	6
43	10	7
45	10	5
47	10	6
49	10	4

Table 40 indicates that the participants from the experimental group obtained different marks in the pre-test of sentence correction. The lowest score in the test was counted to be 2 whereas the highest score was 9 out of 10 marks. The mean value of the score was counted as 5.4 and the median was 5. However, the range of marks obtained by different participants is presented in the following figure:

**Figure: 36**

*Participants' Range of Score in Post-Test of Sentence Correction  
(Experimental Group)*

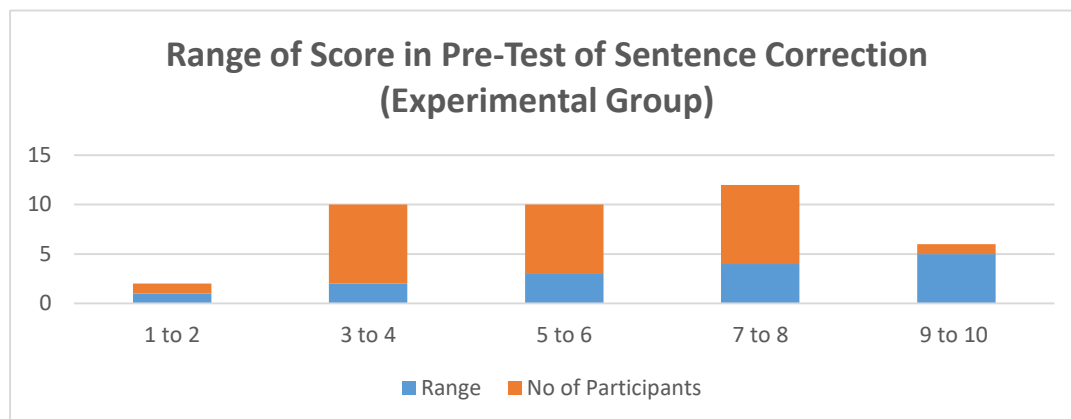


Figure 36 presents a comprehensive picture of experimental group participants' performance in the sentence correction pre-test. The participants scored in 5 different ranges of marks. 1 of the participants from the experimental group scored within the first range i.e. 1-2 marks. 8 of the participants from this group obtained marks in the 2nd range i.e. 3-4 marks. 7 of the participants scored in the 3rd range i.e. 5-6. Then, 8 of the participants were able to score in the 4th range of marks i.e. 7-8 marks and only 1 of the participants scored in the highest range of marks i.e. 9-10. Thus, the data indicated that most of the participants from the experimental group scored in the 2nd, 3rd and 4th range of marks ranging from 3 to 8 marks out of 10.

#### 4.7.2 Sentence Correction Post-Test (Experimental Group)

After the treatment phase, a post-test of sentence correction was also conducted for both groups. The sentence correction post-test consisted of 10 incorrect sentences with a single mistake. Like the pre-test of sentence correction, the post-test of sentence correction also had a weightage of 10 marks in total. The participants from the Experimental group obtained different marks which are presented in the following table:

**Table: 41**

*Sentence Correction Post-Test (Experimental Group)*

Participants	Total Marks	Marks Obtained
1	10	8
3	10	6
5	10	9
7	10	8
9	10	8
11	10	9
13	10	9
15	10	10
17	10	8
19	10	8
21	10	8
23	10	7
25	10	7
27	10	9
29	10	9
31	10	8
33	10	9
37	10	9
39	10	8
41	10	9
43	10	9
45	10	9
47	10	9
49	10	9

Table 41 consists of the results of the sentence correction post-test which was taken by the participants of the experimental group. The data indicated that the participants from the experimental group got different marks in this test. The lowest score in the post-test of sentence correction taken by the participants of the experimental group was counted as 6 whereas the highest score was 10. Thus, the mean value of the score in this test was counted to be 8.4 and the median was counted

as 9. The details of participants' scores in the post-test of correction can be considered through the following graph:

**Figure: 37**

*Participants' Range of Score in Post-Test of Sentence Correction  
(Experimental Group)*

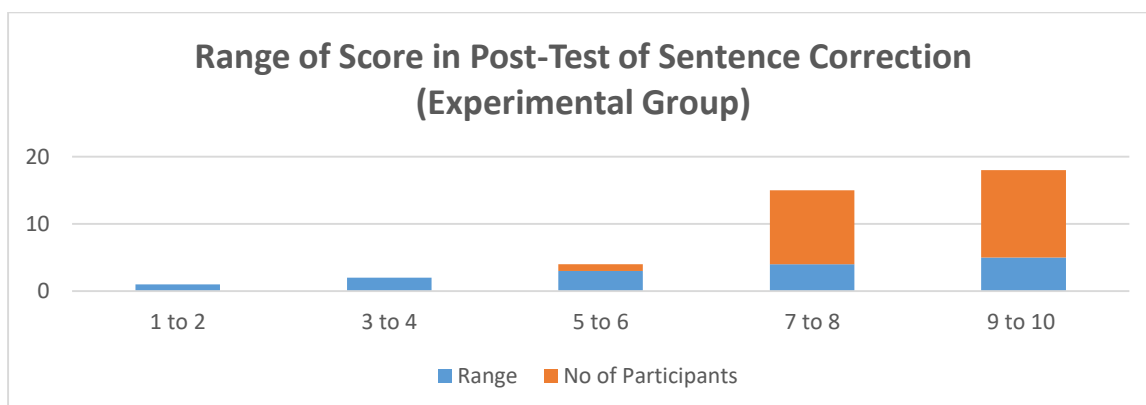


Figure 37 informs that the participants from the experimental group scored within the last 3 ranges of score and none of the participants performed within 1st two ranges i.e. 1-2 and 3-4. Thus, the data indicated that only 1 of the participants from the experimental group scored in the 3rd range i.e. 5-6. Then, 11 of the participants scored in the 4th range of marks i.e. 7-8 whereas 13 of the participants got the maximum score in the post-test of sentence correction. Thus, it can be asserted that most of the participants from the experimental group scored within the highest ranges of score i.e. 7-8 and 9-10.

#### 4.7.3 Comparison of Sentence Correction Pre and Post-Test (Exp. Group)

After a detailed analysis of sentence correction pre and post-tests, the following table compares both the results to have an idea about participants' improvement in sentence correction.

**Table: 42**

*Comparison of Sentence Correction Pre/Post-Test (Exp. Group)*

Participants	Marks Obtained in SC Pre-Test	Marks Obtained in SC Post-test	Difference
1	5	8	3
3	3	6	3
5	3	9	6
7	5	8	3
9	7	8	1
11	7	9	2
13	5	9	4
15	9	10	1
17	4	8	4
19	4	8	4
21	4	8	4
23	4	7	3
25	2	7	5
27	7	9	2
29	7	9	2
31	3	8	5
33	5	9	4
35	8	8	0
37	8	9	1
39	5	8	3
41	6	9	3
43	7	9	2
45	5	9	4
47	6	9	3
49	4	9	5

Table 42 presents the comparison of the marks obtained by the participants of the experimental group in the pre and post-tests of sentence correction. The data indicated that only 1 of the participants showed no progress in sentence correction but his score in both pre and post-tests of sentence correction is significant with 80% marks in this question. All the other participants from the experimental group

improved by 1 to 6 scores in sentence correction. Thus, it can be asserted that 96% of the participants from the experimental group improved in highly significant sentence correction.

#### 4.7.4 Sentence Correction Pre-Test (Control Group)

Like the participants of the experimental group, the participants from the control group also took the same pre-test of sentence correction before the treatment period. The participants from the control group secured different marks in this test. The detail of the marks is presented through the following table:

**Table: 43**

*Sentence Correction Pre-Test (Control Group)*

Participants	Total Marks	Marks Obtained
2	10	5
4	10	4
6	10	4
8	10	3
10	10	8
12	10	3
14	10	5
16	10	4
18	10	5
20	10	3
22	10	7
24	10	7
26	10	4
28	10	3
30	10	5
32	10	6
34	10	5
36	10	5
38	10	4

Participants	Total Marks	Marks Obtained
40	10	5
42	10	6
44	10	8
46	10	6
48	10	4
50	10	6

Table 43 consists of the marks as achieved by the participants from the control group in the sentence correction pre-test. The participants got different marks ranging from 3 to 8 out of 10. The lowest score was counted to be 3 and the highest was 8. Thus, the mean value was counted to be 5 and the median was also counted as 5. However, the participants obtained scores in different ranges which can be understood through the following figure:

**Figure: 38**

*Participants' Range of Score in Pre-Test of SC (Control Group)*

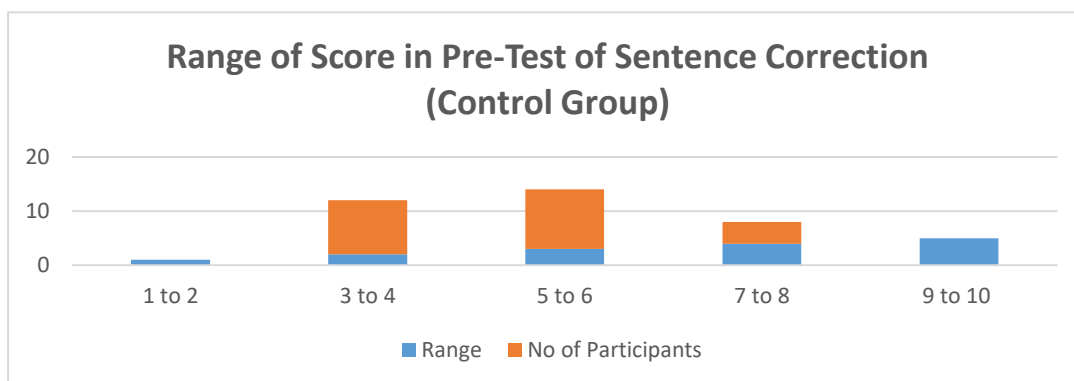


Figure 38 indicates that the participants from the control group scored within 3 ranges. None of the participants scored in the 1st range of marks i.e. 1-2 whereas 10 of the participants scored in the 2nd range of marks i.e. 3-4 and 11 of the participants scored within the 3rd range i.e. 5-6. Then, 4 of the participants could score in the 4th range of marks i.e. 7-8 and none of the participants could reach the highest level i.e. 9-10 in the sentence correction pre-test. The data indicated that most of the participants from the control group scored within 2nd and 3rd range of marks i.e. 3-4 and 5-6.

#### 4.7. 5 Sentence Correction Post-Test (Control Group)

The participants from the control group also took the post-test of sentence correction after the treatment phase. It was the same test as was taken by the participants from the experimental group. The participants from the control group obtained different marks in this test. The detail of the marks is presented through the following table:

**Table: 44**

*Sentence Correction Post-Test (Control Group)*

Participants	Total Marks	Marks Obtained
2	10	6
4	10	3
6	10	5
8	10	5
10	10	6
12	10	4
14	10	6
16	10	4
18	10	6
20	10	3
22	10	7
24	10	6
26	10	5
28	10	5
30	10	4
32	10	6
34	10	7
36	10	4
38	10	6
40	10	4
42	10	6
44	10	8

Participants	Total Marks	Marks Obtained
46	10	6
48	10	7
50	10	6

Table 44 consists of the results of the participants from the control group in the post-test of sentence correction. The data indicated that the participants got marks from 3 to 8 out of 10. Thus, the lowest score was counted as 3 whereas the highest was counted to be 8. Thus, the mean value of the score achieved by the participants of this group was counted as 5.4 and the median was counted as 6. Moreover, the participants from the control group got scores in this test in different ranges. The detail of these ranges can be further understood by the following figure:

**Figure: 39**

*Participants' Range of Score in Post-Test of Sentence Correction  
(Control Group)*

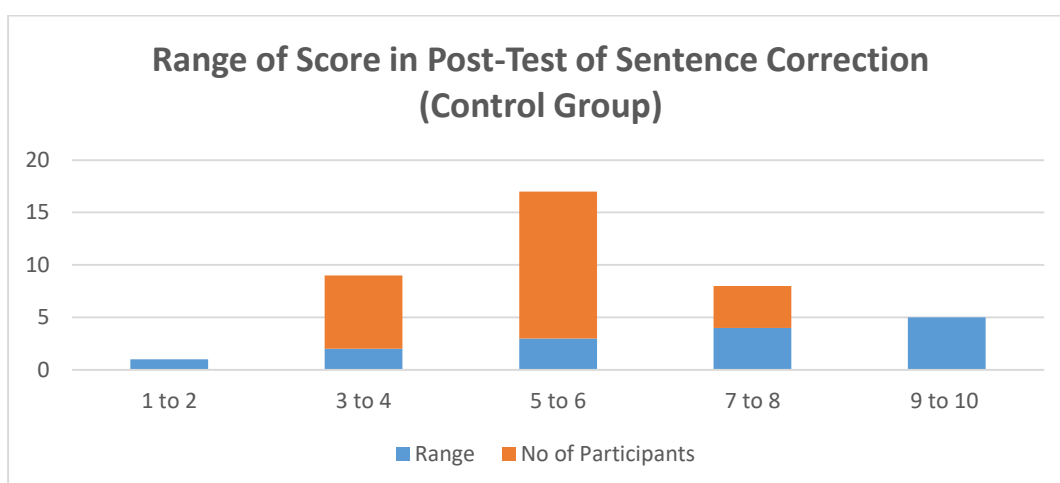


Figure 39 indicates the participants from the control group scored in different ranges of marks. The data indicated that none of the participants scored in the 1st range of marks i.e. 1-2. 7 of the participants obtained marks within the 2nd range of marks i.e. 3-4 and 14 of the participants scored in the 3rd range of marks i.e. 5-6. Moreover, only 4 of the participants from the control group scored in the 4th range of marks i.e. 7-8 whereas none of the participants from this group got marks in the highest range of marks i.e. 9-10. Thus, the data indicated that 84% of the participants from the control

group scored in the 2nd and 3rd range of scores that is 3-4 and 5-6. This means that most of the participants scored in the range of 30 to 60% of total marks in sentence correction post-test.

#### 4.7.6 Comparison of Sentence Correction Pre and Post-Test (Cont Group)

After analyzing participants' scores in pre and post-tests of sentence correction, the next table presents the comparison of participants' scores in pre and post-tests to estimate the progress made by the participants from the control group in sentence correction.

**Table: 45**

*Comparison of Sentence Correction Pre and Post-Test (Cont. Group)*

Participants	Marks Obtained in SC Pre-Test	Marks Obtained in SC Post-test	Difference
2	5	6	1
4	4	3	-1
6	4	5	1
8	3	5	2
10	8	6	-2
12	3	4	1
14	5	6	1
16	4	4	0
18	5	6	1
20	3	3	0
22	7	7	0
24	7	6	-1
26	4	5	1
28	3	5	2
30	5	4	-1
32	6	6	0
34	5	7	2
36	5	4	-1
38	5	6	1

Participants	Marks Obtained in SC Pre-Test	Marks Obtained in SC Post-test	Difference
40	5	4	-1
42	6	6	0
44	8	8	0
46	6	6	0
48	4	7	3
50	6	6	0

Table 45 indicates that most of the participants from the control group could not improve their language knowledge and could not show any improvement in sentence correction. The data indicated that 56% of the participants from this group showed either the same or poorer performance in the post-test of sentence correction whereas 44% of the participants from the control group showed improvement by the margin of 1 to 3 marks only. Thus, it can be asserted that only 44% of the participants improved their language knowledge and improved their ability to correct sentences based on their language knowledge.

#### 4.7.7 Improvement in Sentence Correction b/w both Groups

After the detailed analysis of pre and post-tests of sentence correction, the following table compares the level of improvement in the participants of both groups to estimate which group was at the advantage after the treatment.

**Table: 46**

*Comparison of Improvement in Sentence Correction b/w both Groups*

Observation	Experimental Group	Control Group	Group which Improved	Difference
Sentence Correction	96%	56%	Experimental	40%

Table 46 compares the level of improvement between both the groups namely the experimental and control groups. The data indicated that 96% of the participants from the experimental group improved in sentence correction whereas only 56% of

the participants from the control group improved in this area. Thus, there was a difference of 40% between both groups in sentence correction and it can be asserted that the participants from the experimental group who were taught the English language through AI-based apps were at an advantage.

Thus, it can be asserted that the AI-based Apps play their part as instructors sometimes. Grammar teaching requires the continuous supervision of a tutor who keeps on indicating and rectifying grammar errors. This activity helps students improve their grammar and language knowledge. A continuous reading of English text enhances language knowledge but, some kind of tutoring is also required to identify students' grammar errors when they reproduce language either through writing or speaking. Thus, AI-harnessed Apps are helpful for instantaneous feedback on learners' grammar, vocabulary and pronunciation (Pearson, 2023).

## 4.8 Discourse Completion Tasks (DCTs)

### 4.8.1 Discourse Completion Tasks (DCTs) Pre-Test (Exp. Group)

The participants in the current research were required to attempt a question on discourse completion tasks in pre and post-tests. This task had 10 incomplete sentences; the participants had to complete them by writing another clause. Each item in this test carried 1 score and the total marks in this question were 10. The participants from the experimental group got different marks on this question. The detail of the marks is presented through the following table:

**Table: 47**

*DCTs Pre-Test (Experimental Group)*

Participants	Total Marks	Marks Obtained
1	10	4
3	10	3
5	10	1
7	10	3
9	10	6

<b>Participants</b>	<b>Total Marks</b>	<b>Marks Obtained</b>
11	10	2
13	10	5
15	10	4
17	10	3
19	10	1
21	10	5
23	10	0
25	10	3
27	10	3
29	10	5
31	10	3
33	10	5
35	10	2
37	10	2
39	10	2
41	10	2
43	10	3
45	10	4
47	10	4
49	10	4

Table 47 consists of the marks of the DCTs pre-test taken by the participants of the experimental group. The data indicated that the participants from the experimental group obtained different marks on this question. The lowest score was counted as 0 whereas the highest score was 6. The mean value of students' scores in this question was counted as 3.16 and the median was calculated as 3. However, the detail of marks in different ranges can be understood through the following graph:

**Figure: 40**

*Participants' Range of Score in Pre-Test of DCTs (Exp. Group)*

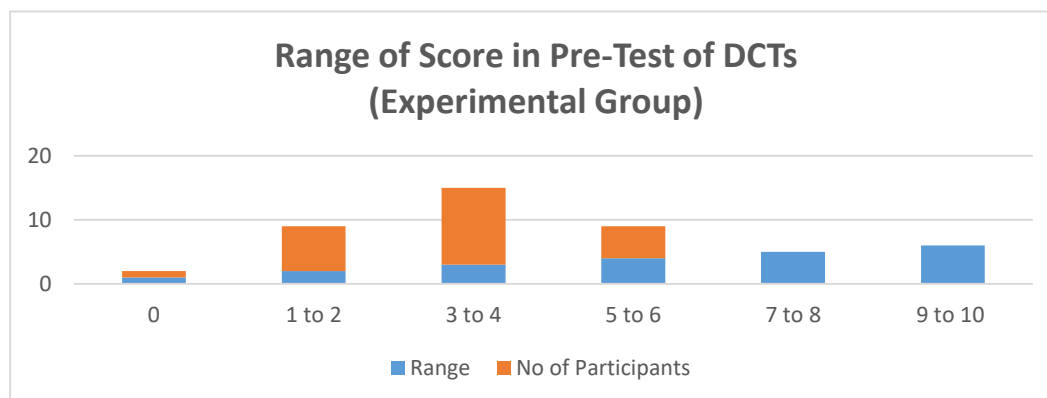


Figure 40 indicates that the participants from the experimental group scored in different ranges in the pre-test of the discourse completion tasks. The data indicated that 1 of the participants from the experimental group got a 0 score in the pre-test of DCT. 7 of the participants got marks in the range of 1-2 marks. 12 of the participants scored within the range of 3-4 marks whereas 5 of the participants from the experimental group got marks in the range of 5-6 marks. Moreover, the data indicated that none of the participants from this group could score in the last 2 ranges i.e. 7-8 and 9-10. Thus, it can be asserted that most of the participants from the experimental group performed within the range of 1-2 and 3-4 marks.

#### 4.8.2 Discourse Completion Tasks (DCTs) Post-Test (Exp. Group)

The participants were required to take a post-test of DCTs so that their scores in pre and post-tests could be compared to have an idea about the improvement made by the participants after the treatment period. The participants from the experimental group got different marks on this test. The detail of the marks is presented through the following table:

**Table: 48**

*DCTs Post-Test (Experimental Group)*

Participants	Total Marks	Marks Obtained
1	10	7
3	10	5
5	10	7

Participants	Total Marks	Marks Obtained
7	10	7
9	10	7
11	10	8
13	10	7
15	10	8
17	10	7
19	10	6
21	10	7
23	10	4
25	10	8
27	10	7
29	10	9
31	10	6
33	10	8
35	10	5
37	10	7
39	10	6
41	10	5
43	10	8
45	10	8
47	10	8
49	10	7

Table 48 consists of the marks obtained by the participants from the experimental group in the post-test of DCTs. The data indicated that the participants got different marks ranging from 4 to 9 out of 10 marks. Thus, the lowest score was counted as 4 and the highest score was counted as 9. The mean value of participants' performance in this test was calculated as 6.88 whereas the median was 7. As far as

the range of scores achieved by different participants is concerned, the following figure provides a detailed summary of the overall result in the post-test of DCTs:

**Figure: 41**

*Participants' Range of Score in Post-Test of DCTs (Experimental Group)*

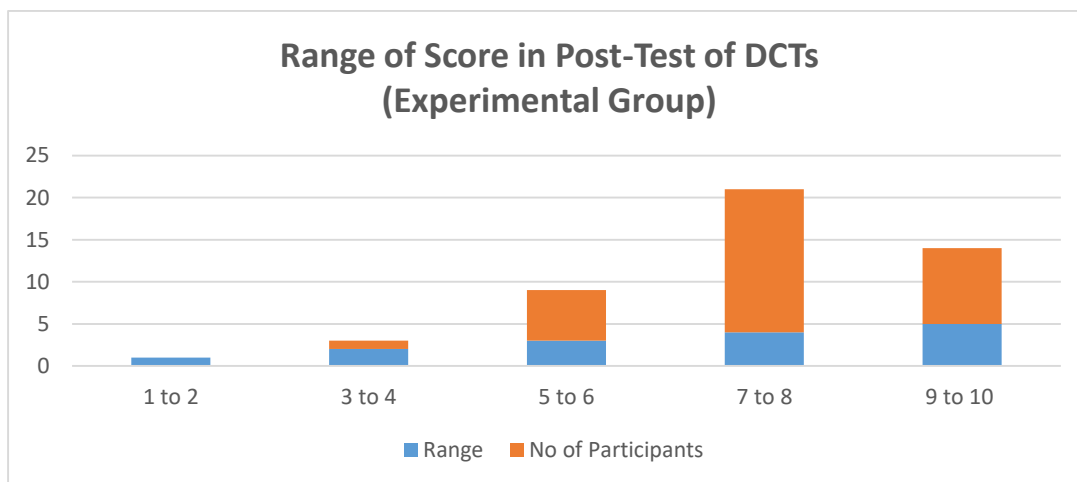


Figure 41 presents a comprehensive detail of marks achieved by different participants in the post-test of DCTs. The data indicated that none of the participants scored in the 1st range of marks i.e. 1-2 marks. 1 of the participants scored in the 2nd range of marks i.e. 3-4 marks. 6 of the participants scored within the 3rd range of marks i.e. 5-6 and 17 of the participants got marks within the 4th range i.e. 7-8 whereas only 1 of the participants scored in the highest range of score i.e. 9-10 marks. Thus the data indicated that most of the participants from the experimental group scored in the last 2 ranges of marks i.e. are the ranges of highest marks in the sequence.

#### 4.8.3 Comparison of Participants' Score in DCTs Pre and Post-Tests (Experimental Group)

After the detailed analysis of pre and post-tests of DCTs as taken by the participants of the experimental group, the next table compares the results of both tests to have an idea about participants' improvement in DCTs:

**Table: 49**

*Comparison of Participants' Score in DCTs (Exp. Group)*

Participants	DCTs Pre	DCTs Post	Difference
1	4	7	3
3	3	5	2
5	1	7	6
7	3	7	4
9	6	7	1
11	2	8	6
13	5	7	2
15	4	8	4
17	3	7	4
19	1	6	5
21	5	7	2
23	0	4	4
25	3	8	5
27	3	7	4
29	5	9	4
31	3	6	3
33	5	8	3
35	2	5	3
37	2	7	5
39	2	6	4
41	2	5	3
43	3	8	5
45	4	8	4
47	4	8	4
49	4	7	3

Table 49 indicates that the participants from the experimental group achieved better marks in the post-test and all the participants from this group improved in DCTs by 1 to 6 marks. Thus, it can be asserted that 100% of participants from the experimental group improved in DCTs though the improvement by 1 to 3 marks cannot be regarded as significant.

#### 4.8.4 Discourse Completion Tasks (DCTs) Pre-Test (Control Group)

The participants from the control group also took pre and post-tests of DCTs along with the participants of the experimental group. The participants from the control group obtained varying marks. However, the following table presents the details of the marks obtained by the participants from the control group in the pre-test of DCTs:

**Table: 50**

*DCTs Pre-Test (Control Group)*

Participants	Total Marks	Marks Obtained
2	10	0
4	10	1
6	10	3
8	10	0
10	10	7
12	10	2
14	10	2
16	10	4
18	10	4
20	10	2
22	10	5
24	10	1
26	10	1
28	10	1
30	10	1
32	10	3
34	10	2
36	10	2
38	10	1
40	10	2
42	10	0
44	10	2

Participants	Total Marks	Marks Obtained
46	10	3
48	10	5
50	10	0

Table 50 consists of the results of the participants from the control group in the pre-test of DCTs. The data indicated that the participants got different marks on this test. The lowest score was counted as 0 whereas the highest was 7. The mean value of the score of the participants in this test was counted as 2.16 whereas the median was found to be 2.0. The details of participants' overall performance from the control group in the DCTs pre-test can be understood through the following figure:

**Figure: 42**

*Participants' Range of Score in Pre-Test of DCTs (Control Group)*

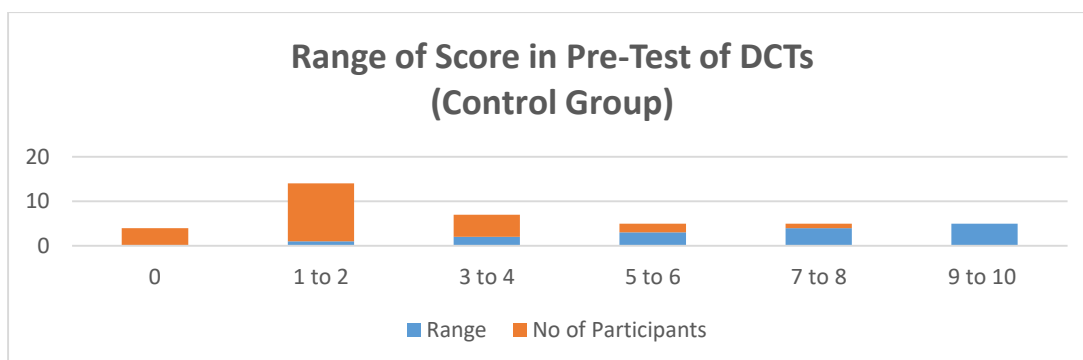


Figure 42 indicated that 4 of the participants from the control group got 0 in the pre-test of DCTs whereas 13 of the participants got marks in the range of 1-2 marks. 5 of the participants scored within the range of 3-4 marks and only 2 participants could score within the range of 5-6 whereas 1 of the participants could score within the range of 7-8 marks. The data indicated that most of the participants from the control group could score within the range of 1-2 marks which is the lowest range of marks.

#### 4.8.5 Discourse Completions Tasks Post-Test (Control Group)

After the treatment period, the participants from the control group also took a post-test of DCTs. It was the same test that was taken by the participants from the

experimental group. The participants from the control group showed different levels of performance in the post-test of DCTs. The following table presents the detail of marks obtained by the participants in the post-test of DCTs.

**Table: 51**

*Participants' Performance in DCTs Post-Test (Control Group)*

Participants	Total Marks	Marks Obtained
2	10	3
4	10	3
6	10	4
8	10	1
10	10	7
12	10	2
14	10	3
16	10	3
18	10	3
20	10	2
22	10	4
24	10	3
26	10	1
28	10	2
30	10	3
32	10	2
34	10	2
36	10	2
38	10	3
40	10	3
42	10	2
44	10	4
46	10	4
48	10	3
50	10	3

Table 51 provides the details of marks obtained by the participants of the control group. The data indicated that the participants obtained different marks in this test ranging from 1 to 7 marks. Thus, the lowest score in this test was counted to be 1 whereas the highest was 7. The mean value of students' score in this test was 2.88 whereas the median was 3.0. However, the participants from the control group performed at different levels and their performance in the post-test of DCTs can be considered through the following figure:

**Figure: 43**

*Participants' Range of Score in Post-Test of DCTs (Control Group)*

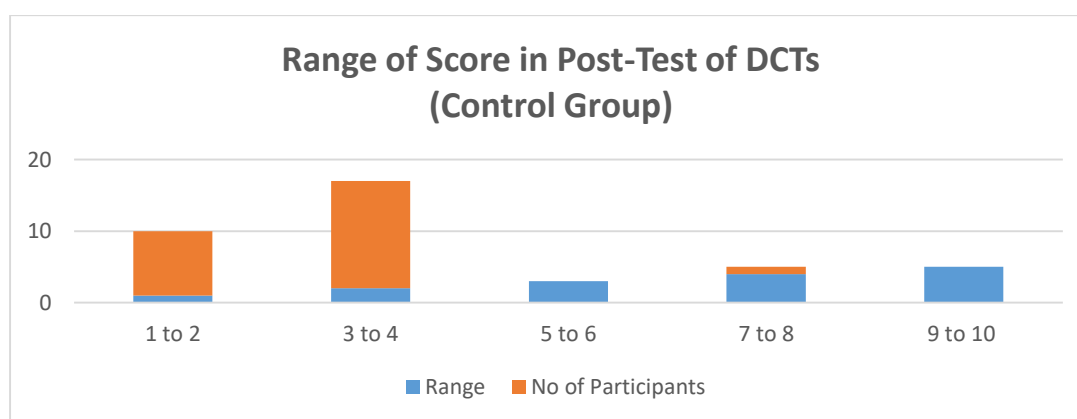


Figure 43 informs that the participants could obtain marks in different ranges in the post-test of DCTs. Thus, the data indicated that 9 of the participants scored in the 1st range of marks i.e. 1-2 and 15 of the participants from the control group scored within the 2nd range of marks i.e. 3-4. None of the participants could score within the 3rd range of marks i.e. 5-6 and only 1 of the participants got marks in the 4th range of marks i.e. 7-8. None of the participants could score within the highest range of score i.e. 9-10. Thus, it can be asserted that 96% of the participants from the control group performed within the first 2 ranges i.e. 1-2 and 3-4.

#### 4.8.6 Comparison of Participants' Score in DCTs Pre and Post-Tests (Control Group)

After the detailed analysis of marks obtained by the participants of the control group in the post-test of DCTs, the next table compares these marks to indicate the difference in the marks of pre and post-tests of DCTs.

**Table: 52***Comparison of DCTs Pre and Post-Tests Score (Control Group)*

<b>Participants</b>	<b>DCTs Pre</b>	<b>DCTs Post</b>	<b>Difference</b>
2	0	3	3
4	1	3	2
6	3	4	1
8	0	1	1
10	7	7	0
12	2	2	0
14	2	3	1
16	4	3	-1
18	4	3	-1
20	2	2	0
22	5	4	-1
24	1	3	2
26	1	1	0
28	1	2	1
30	1	3	2
32	3	2	-1
34	2	2	0
36	2	2	0
38	1	3	2
40	2	3	1
42	0	2	2
44	2	4	2
46	3	4	1
48	5	3	-2
50	0	3	3

Table 52 provides the comparison of participants' performance in the pre and post-tests of DCTs. The data indicated that 5 of the participants scored in minus in the post-tests whereas 6 of the participants got the same score in the post-test showing no

improvement whereas 14 of the participants from the control group improved by the margin of 1 to 3 marks in the post-test of DCTs. Thus, it can be asserted that 56% of the participants from the control group slightly improved in the DCTs. But, this improvement cannot be regarded as significant because they improved by the margin of 1 to 3 marks only and most of them scored within the range of 40% marks only.

#### 4.8.7 Comparison of Improvement in DCTs b/w both Groups

After the analysis of pre and post-test results of DCTs, the next table compares the level of improvement in both groups with the following findings:

**Table: 53**

*Comparison of Improvement in DCTs b/w both Groups*

<b>Observation</b>	<b>Experimental Group</b>	<b>Control Group</b>	<b>Group which Improved</b>	<b>Difference</b>
Discourse Completion Tasks	96%	56%	Experimental	40%

Table 53 informs that 96% of the participants from the experimental group improved in DCTs whereas only 56% of the participants from the control group were found to make slight improvements in the DCTs. Thus, it can be asserted that the participants who learned English through AI-harnessed Apps improved significantly in DCTs and they were found to be at an advantage.

### 4.9 Paragraph Writing Pre-Test

#### 4.9.1 Paragraph Writing Pre-Test (Experimental Group)

The pre and post-tests included a question on paragraph writing also. The participants were required to write a paragraph in the English language in 100 words. The weightage for this question was 10 and the participants' performance was assessed accordingly. This task was included to assess participants' language knowledge and their ability to apply it to writing text in the English language. The participants from the experimental group got different marks in the pre-test of paragraph writing. The following table presents their marks in the pre-test of paragraph writing:

**Table: 54***Paragraph Writing Pre-Test (Experimental Group)*

<b>Participants</b>	<b>Total Marks</b>	<b>Marks Obtained</b>
1	10	5
3	10	1
5	10	1
7	10	1
9	10	2
11	10	0
13	10	1
15	10	4
17	10	1
19	10	1
21	10	3
23	10	1
25	10	2
27	10	3
29	10	3
31	10	1
33	10	1
35	10	1
37	10	4
39	10	2
41	10	1
43	10	2
45	10	2
47	10	3
49	10	2

Table 54 consists of the marks obtained by the participants of the experimental group in the pre-test of paragraph writing. The data indicated that the participants could secure 0 to 5 marks out of 10 in the pre-test of paragraph writing. Thus, the

lowest score was counted to be 0 whereas the highest score was 5. The mean value of participants' scores in this test was counted as 1.92 and the median was calculated as 2.0. The detail of range marks obtained by the participants in this question is presented in the following figure:

**Figure: 44**

*Participants' Range of Score in Pre-Test of Paragraph Writing (Exp. Group)*

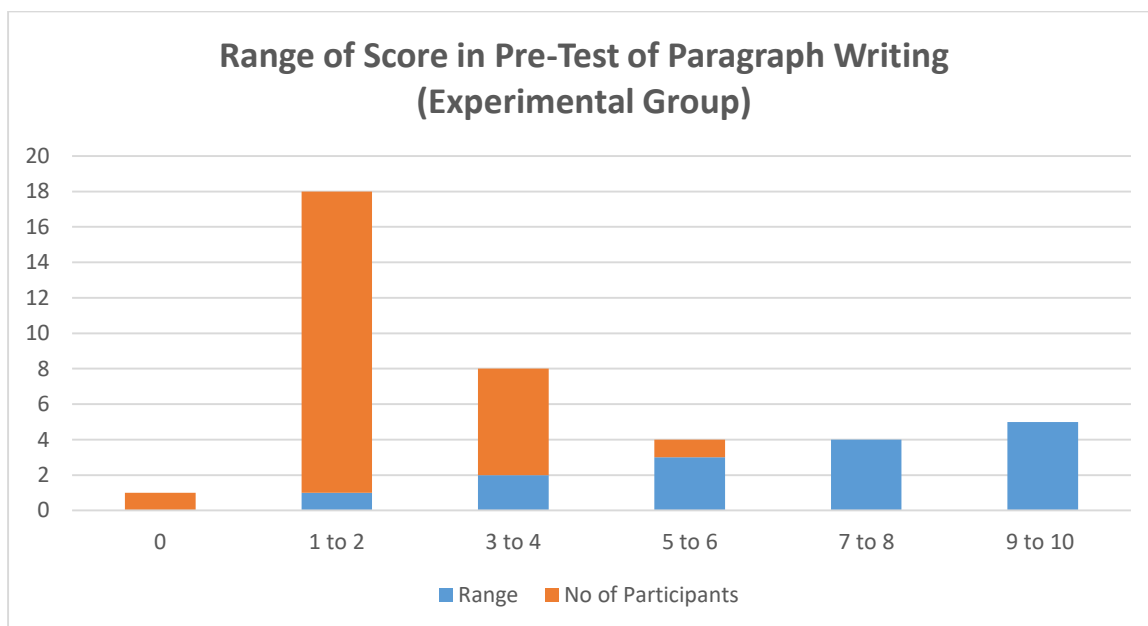


Figure 44 shows that the participants from the experimental group scored in different ranges of marks. 1 of the participants scored 0 whereas 17 of the participants got marks within the range of 1-2, 6 of the participants could score within the range of 3-4 marks and only 1 participant could secure marks within the range of 5-6. The data indicated that none of the participants could score in the last 2 ranges of marks i.e. 7-8 and 9-10. Thus, it can be asserted that most of the participants from this group scored within the range of 1-2 marks which is the lowest range of marks in figure 33.

#### 4.9.2 Paragraph Writing Post-Test (Experimental Group)

A post-test of paragraph writing was also conducted after the treatment phase to have an idea about participants' improvement in paragraph writing. The participants from the experimental group performed at varying levels in this test. The detail of the marks obtained by the participants from the experimental group is presented in the following table:

**Table: 55***Paragraph Writing Post-Test (Experimental Group)*

<b>Participants</b>	<b>Total Marks</b>	<b>Marks Obtained</b>
1	10	8
3	10	4
5	10	7
7	10	7
9	10	7
11	10	7
13	10	6
15	10	7
17	10	8
19	10	4
21	10	6
23	10	4
25	10	9
27	10	8
29	10	7
31	10	6
33	10	8
35	10	7
37	10	7
39	10	7
41	10	6
43	10	7
45	10	8
47	10	9
49	10	6

Table 55 consists of the marks obtained by the participants of the experimental group in the post-test of paragraph writing. The data indicated that the participants could secure from 4 to 9 marks out of 10 in this test. Thus, the lowest score was

counted to be 4 whereas the highest score was 9. The mean value was counted as 6.80 and median was calculated as 7.0. As far as the range of marks is concerned, the next figure provides the details about participants' scores in the post-test of paragraph writing:

**Figure: 45**

Participants' Range of Score in Post-Test of Paragraph Writing (Exp. Group)

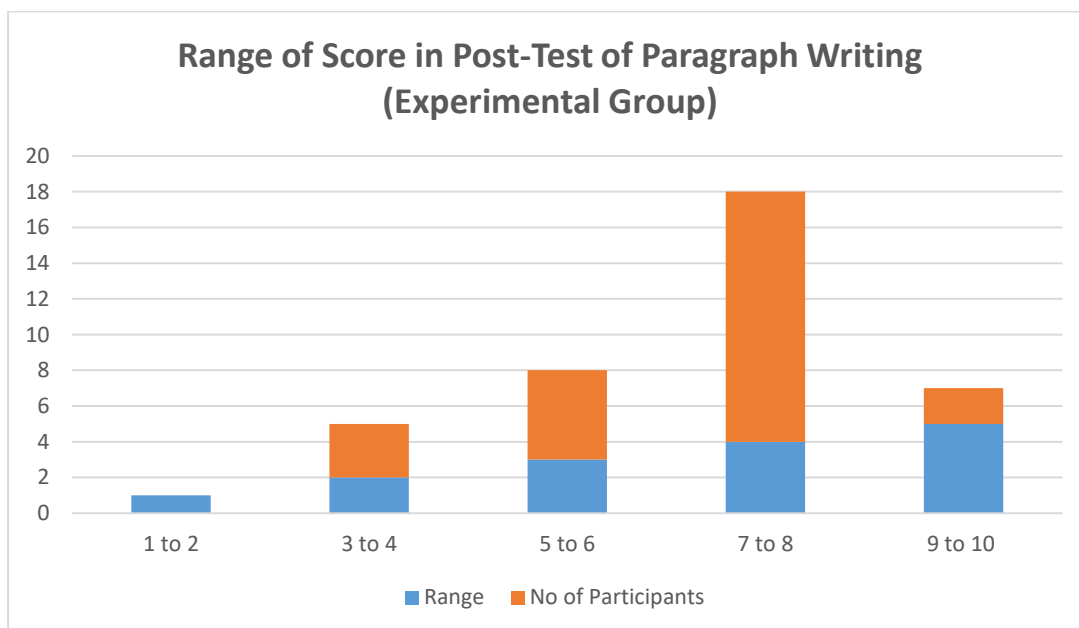


Figure 45 provides comprehensive detail about the marks of the participants from the experimental group in the post-test of paragraph writing. The data indicated that none of the participants scored within the lowest range of marks i.e. 1-2. Only 3 of the participants scored within the 2nd range of marks i.e. 3-4 whereas 5 of the participants could secure marks in the 3rd range scoring 5-6. Then, 14 of the participants scored within the range of 7-8 marks and 2 of the participants could reach the highest level of marks i.e. 9-10. Thus, the data indicated that most of the participants from the experimental group scored within the ranges of highest marks in the post-test of paragraph writing.

#### 4.9.3 Comparison of Paragraph Writing Pre and Post-Test (Exp. Group)

The comparison of Pre and post-tests of paragraph writing aims at having an idea of whether the research participants improved after the treatment or not. The next table compares participants' marks in both the tests and indicates the differences:

**Table: 56***Comparison of Paragraph Writing Pre and Post-Test (Exp. Group)*

Participants	Marks in PW	Marks in PW	Difference
	Pre-Test	Post-Test	
1	5	8	3
3	1	4	3
5	1	7	4
7	1	7	6
9	2	7	5
11	0	7	7
13	1	6	5
15	4	7	3
17	1	8	7
19	1	4	4
21	3	6	4
23	1	4	3
25	2	9	7
27	3	8	6
29	3	7	6
31	1	6	5
33	1	8	7
35	1	7	6
37	4	7	3
39	2	7	5
41	1	6	5
43	2	7	5
45	2	8	6
47	3	9	6
49	2	6	4

Table 56 shows the comparison of participants' scores in pre and post-tests of paragraph writing. The data indicated that all the participants from the experimental

group secured better scores in the post-test and improved by the margin of 3 to 7 marks in paragraph writing. Thus, it can be asserted that 100% of the participants from the experimental group improved their writing skills and showed improved results in the post-test of paragraph writing.

#### 4.9.4 Paragraph Writing Pre-Test (Control Group)

The participants from the control group also took pre and post-tests of paragraph writing. As far as their results in the pre-test of paragraph writing are concerned, they showed the following results.

**Table: 57**

*Paragraph Writing Pre-Test (Control Group)*

<b>Participants</b>	<b>Total Marks</b>	<b>Marks Obtained</b>
2	10	0
4	10	0
6	10	1
8	10	0
10	10	2
12	10	1
14	10	1
16	10	2
18	10	2
20	10	0
22	10	2
24	10	1
26	10	2
28	10	1
30	10	1
32	10	1
34	10	0
36	10	1
38	10	0

Participants	Total Marks	Marks Obtained
40	10	3
42	10	0
44	10	1
46	10	1
48	10	2
50	10	0

Table 57 indicates that the participants from the control group secured different marks in the pre-test of paragraph writing ranging from 0 to 3. Thus, the lowest score was counted to be 0 whereas the highest score was 3. The mean of participants' scores in this test was counted as 1.0 whereas the same was also calculated as 1.0. The ranges in which different participants scored are presented in the figure:

**Figure: 46**

*Participants' Range of Score in Pre-Test of PW (Cont. Group)*

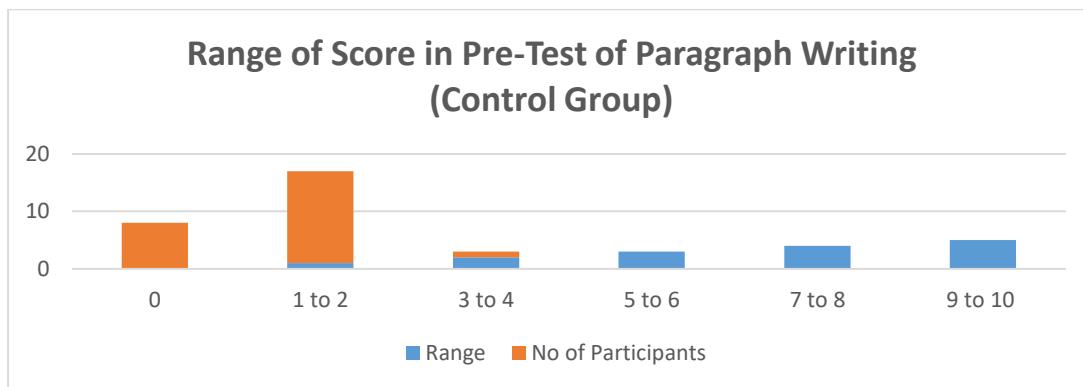


Figure 46 indicates that the participants from the control group could score within the lowest ranges of marks. Thus, 8 of the participants scored 0, 16 of the participants got marks within the range of 1-2 marks and only 1 participant could score within the range of 3-4 marks. None of the participants could score with the last three ranges of score i.e. 5-6, 7-8 and 9-10. Thus, it can be asserted that most of the participants from the control group scored within the lowest range of marks in the pre-test of paragraph writing.

#### 4.9.5 Paragraph Writing Post-Test (Control Group)

The participants from the control group also appeared in the post-test of paragraph writing in which they showed the following results:

**Table: 58**

*Paragraph Writing Post-Test (Control Group)*

Participants	Total Marks	Marks Obtained
2	10	1
4	10	1
6	10	2
8	10	1
10	10	4
12	10	0
14	10	1
16	10	2
18	10	1
20	10	1
22	10	1
24	10	1
26	10	1
28	10	2
30	10	1
32	10	0
34	10	1
36	10	1
38	10	1
40	10	2
42	10	0
44	10	1
46	10	3
48	10	1
50	10	1

Table 58 consists of the results of the paragraph writing post-test taken by the participants of the control group. The data indicated that the participants scored in the low ranges of marks in this test and could score from 0 to 4 out of 10 marks. The lowest score was counted as 0 whereas the highest was 4. The mean value of students' scores in this test was 1.24 whereas the median was 1.0. However, the ranges of marks in which different participants from the control group scored in the post-test of paragraph writing are explained through the following graph:

**Figure: 47**

*Participants' Range of Score in the Post-Test of Paragraph Writing  
(Control Group)*

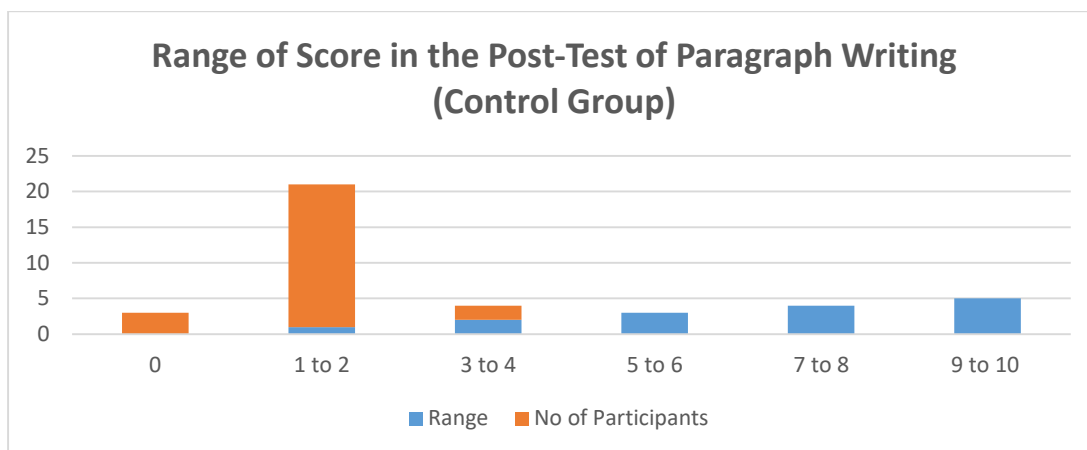


Figure 47 informs that the participants from the control group could not score beyond 4 in the post-test of paragraph writing. The data indicated that 3 of the participants got 0 and 20 of the participants from the control group got marks within the range of 1-2 marks whereas 2 of the participants scored within the range of 3-4 marks. Thus, it can be asserted that most of the participants from the control group scored within the lowest range of marks i.e. 1-2 marks.

#### 4.9.6 Comparison of Paragraph Writing Pre and Post-Test (Cont. Group)

After the detailed analysis of pre and post-tests of paragraph writing as taken by the control group, the next table compares the results of both tests to have an idea about participants' improvement in paragraph writing:

**Table: 59**

*Comparison of Paragraph Writing Pre and Post-Test (Control Group)*

Participants	Marks in PW	Marks in PW	Difference
	Pre-Test	Post-Test	
2	0	1	1
4	0	1	1
6	1	2	1
8	0	1	1
10	2	4	2
12	1	0	-1
14	1	1	0
16	2	2	0
18	2	1	-1
20	0	1	1
22	2	1	-1
24	1	1	0
26	2	1	-1
28	1	2	1
30	1	1	0
32	1	0	-1
34	0	1	1
36	1	1	0
38	0	1	1
40	3	2	-1
42	0	0	0
44	1	1	0
46	1	3	2
48	2	1	-1
50	0	1	1

Table 59 depicts that the participants from the control group could not improve significantly as 7 of the participants showed poorer performance in the post-test of paragraph writing, 7 of them got the same score in both pre and post-tests and showed 0% improvement whereas 44% of the participants showed improvement by the margin

of 1-2 marks which is not significant. Thus, it can be asserted that the participants from the control group could not improve in writing skills significantly.

#### 4.9.7 Comparison of Improvement in Paragraph Writing b/w both Groups

After analyzing the pre and post-test scores of both groups, the next table provides a comparison of improvement in paragraph writing b/w both the groups:

**Table: 60**

*Comparison of Improvement in Paragraph Writing b/w both Groups*

Observation	Experimental Group	Control Group	Group which Improved	Difference
Paragraph Writing	100% with 3-7 Marks	44% With 1-2 Marks	Experimental	66%

Table 60 indicates that 100% of the participants from the experimental group improved their writing skills with a margin of 3-7 marks whereas only 44% of the participants from the control group made slight progress in paragraph writing with a margin of 1-2 marks. Thus, it can be asserted that the participants from the experimental group were at an advantage because of learning English through the use of AI-powered Apps.

Thus, the data indicates that writing can also be improved through the use of AI-powered tools and Apps. Xia, Liu & Liu (2022) also found that AI supports writing improvement in English language learners. They experimented with using ‘Iwrite’ an AI-based program with happy results. They indicated that the program was useful for teaching writing, auto-grading, intelligent correction and so on. Thus, it can be asserted that not only the current study but other studies also recommend the use of AI-powered tools to teach English language skills.

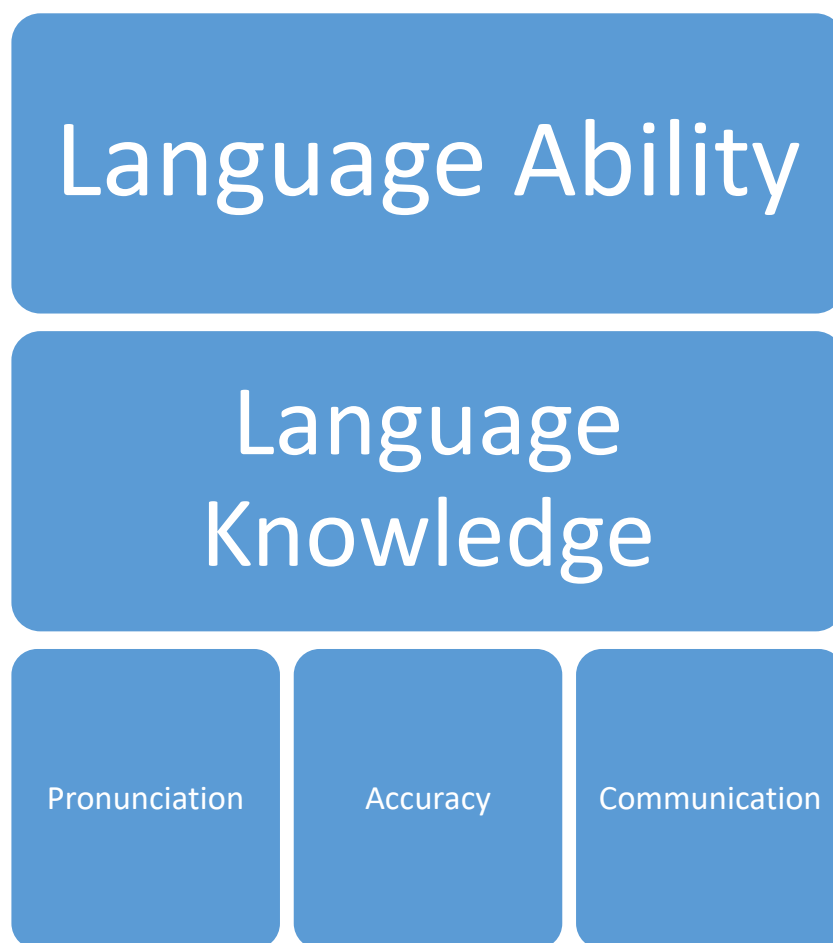
#### 4.10 Speaking Skills

In the current study, speaking tasks were also included in the pre and post-tests. To assess the speaking skills of the participants, short speeches and dialogues were included in the pre and post-tests. Speeches and dialogues were recorded through the mobile recorder for the sake of analysis later on. The data on speaking were

analysed under Bachman and Palmer's (2010) model of language ability. The key focus was on four important aspects of language ability which are presented in the following figure:

**Figure: 48**

*Model of Language Ability*



Bachman and Palmer (2010)

#### 4.10.1 Pre-test Short-Speeches (Experimental Group)

The performance of the participants from the experimental group in the pre-test of short speeches is presented in the following table:

#### 4.10.2 Pronunciation Pre-Test (Experimental Group)

Table 61 presents the results of pronunciation pre-test from the experimental group.

**Table: 61***Pronunciation Pre-Test (Experimental Group)*

<b>Participants</b>	<b>Pronunciation Pre-Test Assessment</b>	<b>Category</b>
1	2	Meets expectations low
3	3	Slightly under performed
5	4	Doesn't meet expectations
7	4	Doesn't meet expectations
9	3	Slightly under performed
11	3	Slightly under performed
13	3	Slightly under performed
15	2	Meets expectations low
17	3	Slightly under performed
19	3	Slightly under performed
21	3	Slightly under performed
23	4	Doesn't meet expectations
25	3	Slightly under performed
27	3	Slightly under performed
29	3	Slightly under performed
31	3	Slightly under performed
33	3	Slightly under performed
35	3	Slightly under performed
37	3	Slightly under performed
39	3	Slightly under performed
41	3	Slightly under performed
43	3	Slightly under performed
45	3	Slightly under performed
47	3	Slightly under performed
49	3	Slightly under performed

Table 61 consists of the results of the short speeches pre-test taken by the participants of the experimental group. The data indicated that the participants could not perform well and most of them underperformed in the test of pronunciation. The

scale through which the participants' speeches were assessed is presented through the following graph along with the frequencies in which different participants performed in different categories.

**Figure: 49**

*Participants' Performance in Pronunciation Pre-Test (Exp. Group)*

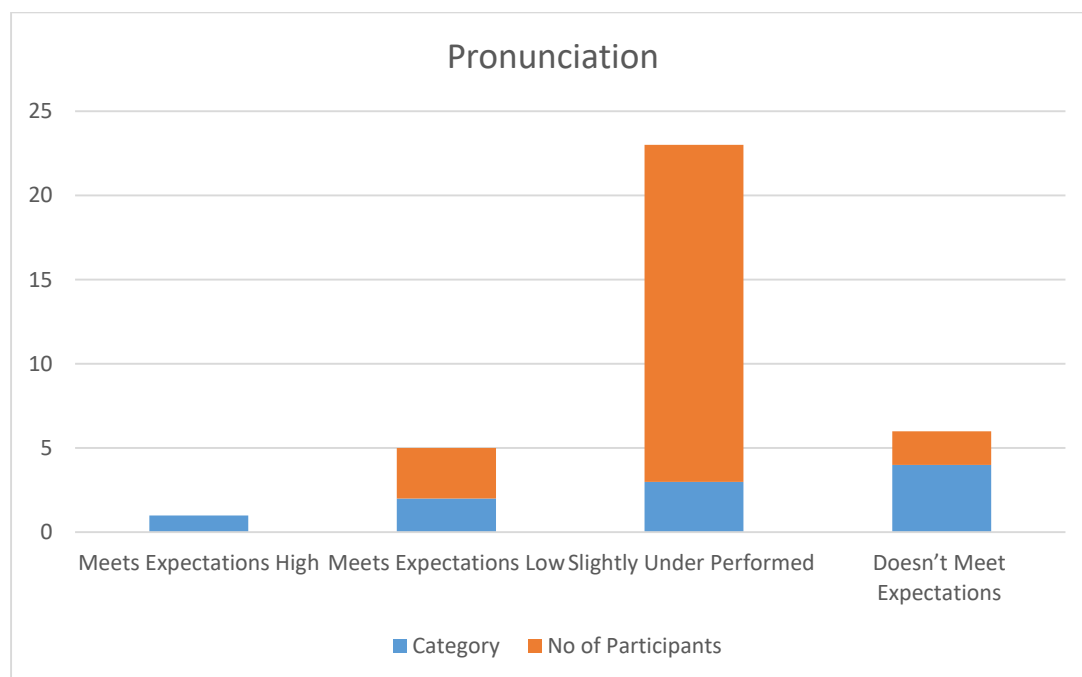


Figure 49 indicates that none of the participants could score in the first category in the pronunciation pre-test whereas 3 of the participants could score in the second category i.e. 'Meets expectations low'. 20 of the participants from the experimental group performed in the 3rd category i.e. 'Slightly underperformed' and 2 of the participants performed in the 4th category i.e. 'Does not meet expectations'. Thus, the data indicated that 12% of the participants performed in the 1st category, 80% of the participants performed in the 3rd category and only 8% of the participants performed in the 4th category. It can be asserted that most of the participants from the experimental group underperformed in the pre-test of pronunciation.

#### 4.10.3 Pronunciation Post-Test (Experimental Group)

After the treatment, the participants from both groups took the post-test of speaking. They were asked to deliver short speeches once again. The key focus was on pronunciation, vocabulary, accuracy and communication. The performance of the

participants from the experimental group in the post-test of pronunciation is presented in the following table:

**Table: 62**

*Pronunciation Post-Test (Experimental Group)*

<b>Participants</b>	<b>Pronunciation Post-Test Assessment</b>	<b>Category</b>
1	1	Meeting expectations high
3	2	Meeting expectations low
5	3	Slightly under performed
7	3	Slightly under performed
9	2	Meeting expectations low
11	2	Meeting expectations low
13	2	Meeting expectations low
15	1	Meeting expectations high
17	2	Meeting expectations low
19	2	Meeting expectations low
21	2	Meeting expectations low
23	3	Meeting expectations low
25	2	Meeting expectations low
27	2	Meeting expectations low
29	2	Meeting expectations low
31	2	Meeting expectations low
33	1	Meeting expectations high
35	2	Meeting expectations low
37	1	Meeting expectations high
39	2	Meeting expectations low
41	2	Meeting expectations low
43	2	Meeting expectations low
45	2	Meeting expectations low
47	2	Meeting expectations low
49	2	Meeting expectations low

Table 62 consists of the results produced by the participants of the experimental group in the post-test of pronunciation. The participants performed in different categories but most of them were found to perform in the 2nd category i.e. ‘meets expectations low’. However, the detail of frequencies in which different participants performed in various categories is presented through the following figure:

**Figure: 50**

*Participants’ Performance in Pronunciation Post-Test (Experimental Group)*

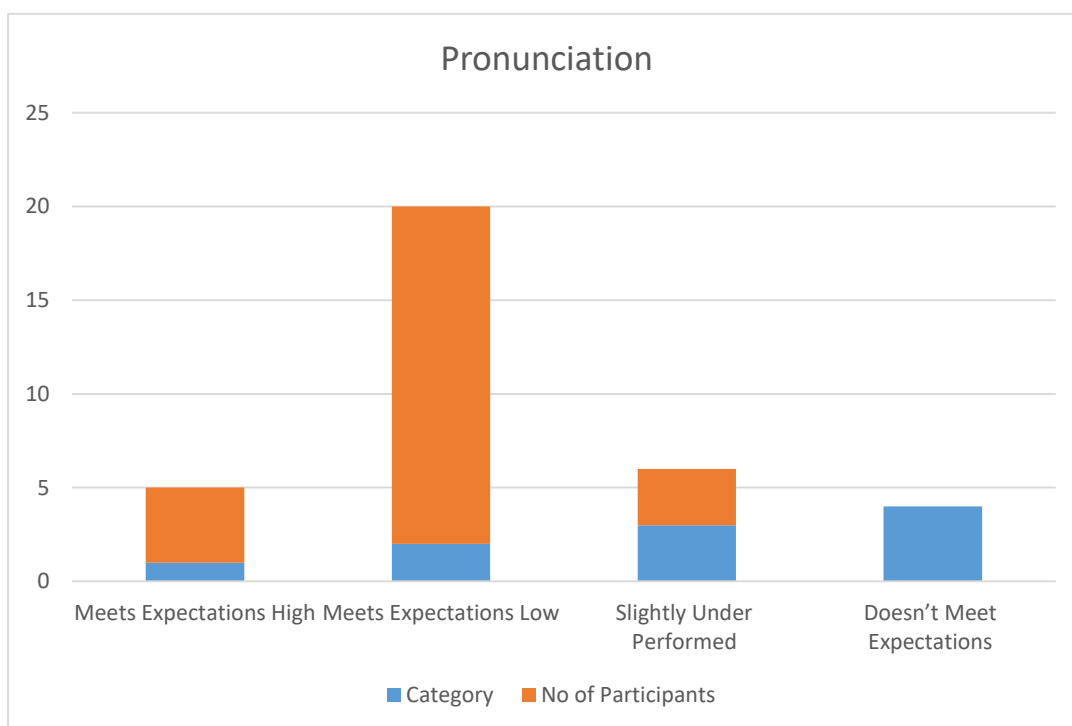


Figure 50 indicates that the participants from the experimental group performed within the first three categories in the post-test of pronunciation. 4 of the participants performed in the 1st category i.e. ‘meets expectations high’, 18 of the participants performed in category 2 i.e. meets expectations low and 3 of the participants performed in the 3rd category i.e. ‘slightly underperformed’. The situation indicated that 16% of the participants from this group performed in the 1st category, 72% of them performed in the 2nd category whereas 12% of them performed in the 3rd category. Thus, it can be asserted that most of the participants from the experimental group performed in the first 2 categories and their performance was satisfactory.

#### 4.10.4 Comparison of Pronunciation Pre and Post-Test (Exp. Group)

To compare the results of pronunciation pre and post-tests. The categories were converted into percentages of performance so that the difference in the results might be indicated. Thus, performance in Category 1 is replaced with 100%, performance in Category 2 is replaced with 75%, performance in Category 3 is replaced with 50% and performance in Category 4 is replaced with 25%. The next table compares the performance of the participants from the experimental group to indicate the difference in the results of pre and post-tests:

**Table: 63**

*Comparison of Pronunciation Pre and Post-Test (Experimental Group)*

Participants	Pronunciation	Pronunciation	% of Improvement
	Pre-Test	Post-Test	
1	75%	100%	25%
3	50%	75%	25%
5	25%	50%	25%
7	25%	50%	25%
9	50%	75%	25%
11	50%	75%	25%
13	50%	75%	25%
15	75%	100%	25%
17	50%	75%	25%
19	50%	75%	25%
21	50%	75%	25%
23	25%	50%	25%
25	50%	75%	25%
27	50%	75%	25%
29	50%	75%	25%
31	50%	75%	25%
33	50%	100%	50%
35	50%	75%	25%
37	50%	100%	50%

Participants	Pronunciation Pre-Test	Pronunciation Post-Test	% of Improvement
39	50%	75%	25%
41	50%	75%	25%
43	50%	75%	25%
45	50%	75%	25%
47	50%	75%	25%
49	50%	75%	25%

Table 63 presents the comparison of the performance of the participants from the experimental group in pre and post-tests of pronunciation. The data indicated that all of the participants from the experimental group improved their pronunciation after the treatment. However, 92% of the participants showed a 25% improvement in pronunciation whereas 8% of the participants showed a 50% improvement in pronunciation.

#### 4.10.5 Pronunciation Pre-Test (Control Group)

On the other hand, the participants from the control group also appeared in the pre and post-tests of short speeches through which their pronunciation was assessed. The next table presents the results of the participants from the control group in the pre-test of pronunciation:

**Table: 64**

*Pronunciation Pre-Test (Control Group)*

Participants	Assessment	Category
2	3	Slightly under performance
4	4	Doesn't meet expectations
6	4	Doesn't meet expectations
8	3	Slightly under performance
10	3	Slightly under performance

Participants	Assessment	Category
12	3	Slightly under performance
14	3	Slightly under performance
16	3	Slightly under performance
18	3	Slightly under performance
20	4	Doesn't meet expectations
22	3	Slightly under performance
24	3	Slightly under performance
26	3	Slightly under performance
28	3	Slightly under performance
30	3	Slightly under performance
32	3	Slightly under performance
34	3	Slightly under performance
36	3	Slightly under performance
38	3	Slightly under performance
40	3	Slightly under performance
42	4	Doesn't meet expectations
44	3	Slightly under performance
46	3	Slightly under performance
48	3	Slightly under performance
50	3	Slightly under performance

Table 64 shows the results of participants from the control group in the pre-test of pronunciation. The participants performed in different categories which are presented in the following figure:

**Figure: 51**

*Participants' Performance in Pronunciation Pre-Test (Control Group)*

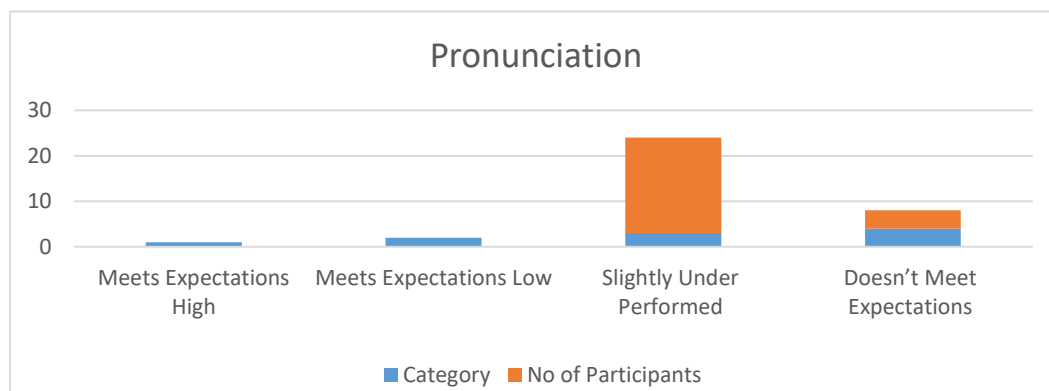


Figure 51 informs that none of the participants' performed in the first 2 categories i.e. 'meets expectations high' and 'meets expectations low'. 21 of the participants (84%) performed within the 3rd category i.e. 'slightly underperformed' whereas 4 (16%) of the participants performed within category 4 i.e. 'doesn't meet expectations'. Thus, it can be asserted that all the participants could not perform well and showed weak performance in pronunciation.

#### 4.10.6 Pronunciation Post-Test (Control Group)

The participants from the control group also took the post-test of pronunciation along with the participants of the experimental group. Their performance in the post-test of pronunciation is presented in the following table:

**Table: 65**

*Pronunciation Post-Test (Control Group)*

Participants	Scores	Category
2	3	Slightly under performance
4	2	Meets expectations low
6	2	Meets expectations low
8	3	Slightly under performance
10	2	Meets expectations low
12	3	Slightly under performance
14	3	Slightly under performance

Participants	Scores	Category
16	3	Slightly under performance
18	2	Meets expectations low
20	4	Doesn't meet expectations
22	3	Slightly under performance
24	3	Slightly under performance
26	3	Slightly under performance
28	3	Slightly under performance
30	3	Slightly under performance
32	3	Slightly under performance
34	3	Slightly under performance
36	2	Meets expectations low
38	3	Slightly under performance
40	3	Slightly under performance
42	3	Slightly under performance
44	3	Slightly under performance
46	2	Meets expectations low
48	3	Slightly under performance
50	2	Meets expectations low

Table 65 informs that the participants from the control group could perform in different categories. However, the frequencies in which different participants performed in various categories are presented in the following figure:

**Figure 52:**

*Participants' Performance in Pronunciation Post-Test (Cont. Group)*

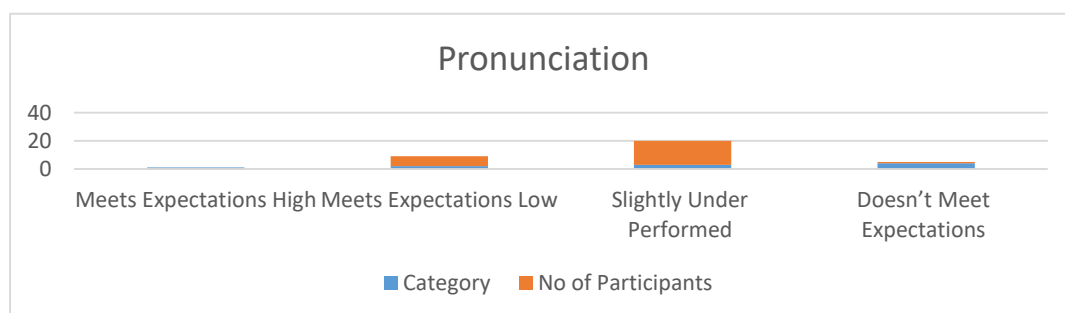


Figure 52 informs that none of the participants from the control group could perform category 1 i.e. ‘meets expectations high’. 7 (28%) of the participants performed in the 2nd category i.e. ‘meets expectations low’. 17 (68%) of the participants performed in category 3 i.e. ‘slightly underperformed’ and 1 of the participants from the control group performed in the 4th category i.e. ‘does not meet expectations’. Thus, it can be asserted that most of the participants from this group performed in the lowest categories.

#### 4.10.7 Comparison of Pronunciation Pre and Post-Test (Control Group)

After the detailed analysis of the results of pronunciation pre and post-tests taken by the participants from the control group, the next table compares the results of both tests to indicate differences.

**Table: 66**

*Comparison of Pronunciation Pre and Post-Test (Control Group)*

Participants	Pronunciation Pre-Test	Pronunciation Post-Test	Percentage of Improvement
2	50%	50%	0%
4	25%	25%	0%
6	25%	25%	0%
8	50%	50%	0%
10	50%	75%	0.25%
12	50%	50%	0%
14	50%	50%	0%
16	50%	50%	0%
18	50%	75%	0.25%
20	25%	25%	0%
22	50%	50%	0%
24	50%	50%	0%
26	50%	50%	0%
28	50%	50%	0%
30	50%	50%	0%
32	50%	50%	0%

<b>Participants</b>	<b>Pronunciation Pre-Test</b>	<b>Pronunciation Post-Test</b>	<b>Percentage of Improvement</b>
34	50%	50%	0%
36	50%	75%	0.25%
38	50%	50%	0%
40	50%	50%	0%
42	25%	50%	0.25%
44	50%	50%	0%
46	50%	75%	0.25%
48	50%	50%	0%
50	50%	75%	0.25%

Table 66 indicates that only 24% of the participants from the control group improved with a margin of 0.25% whereas 76% of the participants from the control group could not improve their pronunciation.

#### 4.10. 8 Comparison of Improvement in Pronunciation b/w both the Groups

The table below compares the level of improvement in speaking skills between both groups in pronunciation.

**Table: 67**

*Comparison of improvement in Pronunciation b/w both the Groups*

<b>Observation</b>	<b>Experimental Group</b>	<b>Control Group</b>	<b>Group which Improved</b>	<b>Difference</b>
Pronunciation	100%	24%	Experimental	76%

#### 4.10. 9 Speaking Accuracy Pre-Test (Experimental Group)

After pronunciation, overall speaking accuracy was also tested through pre and post-tests of short speeches in the current study. As far as accuracy is concerned,

the next table presents the results of the pre-test of accuracy in short speeches delivered by the participants of the experimental group:

**Table: 68**

*Speaking Accuracy in Short Speech Pre-Test (Experimental Group)*

Participants	Accuracy Assessment in Speech (Pre-Test)	Category
1	3	Slightly under performed
3	4	Doesn't meet expectations
5	4	Doesn't meet expectations
7	4	Doesn't meet expectations
9	4	Doesn't meet expectations
11	3	Slightly under performed
13	4	Doesn't meet expectations
15	3	Slightly under performed
17	4	Doesn't meet expectations
19	3	Slightly under performed
21	3	Slightly under performed
23	4	Doesn't meet expectations
25	3	Slightly under performed
27	4	Doesn't meet expectations
29	3	Slightly under performed
31	4	Doesn't meet expectations
33	3	Slightly under performed
35	4	Doesn't meet expectations
37	3	Slightly under performed
39	4	Doesn't meet expectations
41	4	Doesn't meet expectations
43	3	Slightly under performed
45	3	Slightly under performed
47	3	Slightly under performed
49	4	Doesn't meet expectations

Table 68 presents the results of speaking accuracy in a short speech pre-test taken by the participants of the experimental group. The participants performed in only two categories according to the scale applied for assessment. However, the detail about the frequencies in which the participant performed in different categories is presented through the following figure:

**Figure: 53**

*Participants' Performance in Speaking Accuracy Pre-Test (Exp. Group)*

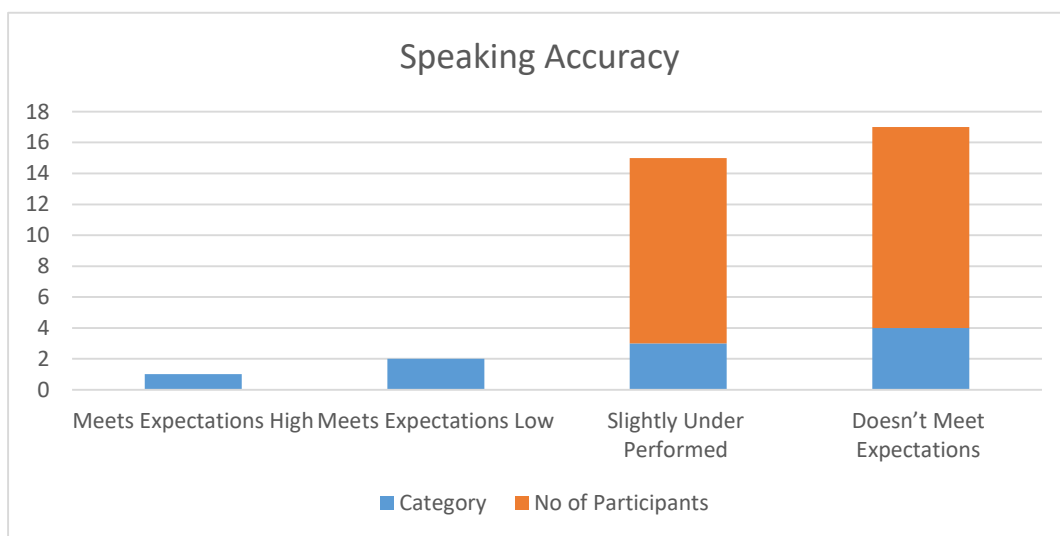


Figure 53 indicates that the participants from the experimental group could not perform within the first 2 categories i.e. 'meets expectations high' and 'meets expectations low'. All of the participants from this group performed in the last 2 categories i.e. 'slightly underperformed' and 'doesn't meet expectations'. Thus, the data indicated that 48% of the participants performed in the 3rd category and underperformed in the pre-test of speech accuracy whereas 52% of the participants performed in the 4th category and could not meet expectations at all.

#### 4.10.10 Speaking Accuracy Post-Test (Experimental Group)

A post-test of short speeches was conducted after the treatment period to have an idea about the improvement in speaking accuracy among the participants of both the groups. The participants from the experimental group demonstrated the following results:

**Table: 69***Speaking Accuracy in Short Speech Post-Test (Experimental Group)*

<b>Participants</b>	<b>Accuracy Assessment in Speech (Pre-Test)</b>	<b>Category</b>
1	1	Meeting expectations high
3	2	Meeting expectations low
5	2	Meeting expectations low
7	2	Meeting expectations low
9	2	Meeting expectations low
11	2	Meeting expectations low
13	2	Meeting expectations low
15	1	Meeting expectations high
17	2	Meeting expectations low
19	2	Meeting expectations low
21	2	Meeting expectations low
23	2	Meeting expectations low
25	1	Meeting expectations high
27	2	Meeting expectations low
29	2	Meeting expectations low
31	2	Meeting expectations low
33	1	Meeting expectations high
35	2	Meeting expectations low
37	1	Meeting expectations high
39	2	Meeting expectations low
41	2	Meeting expectations low
43	2	Meeting expectations low
45	2	Meeting expectations low
47	2	Meeting expectations low
49	2	Meeting expectations low

Table 69 indicates that the participant from the experimental group performed within the first 2 categories of the assessment scale in speaking accuracy post-test.

However, the following graph presents the details about the performance of the participants in speaking accuracy post-test:

**Figure: 54**

*Participants' Performance in Speaking Accuracy Post-Test (Exp. Group)*

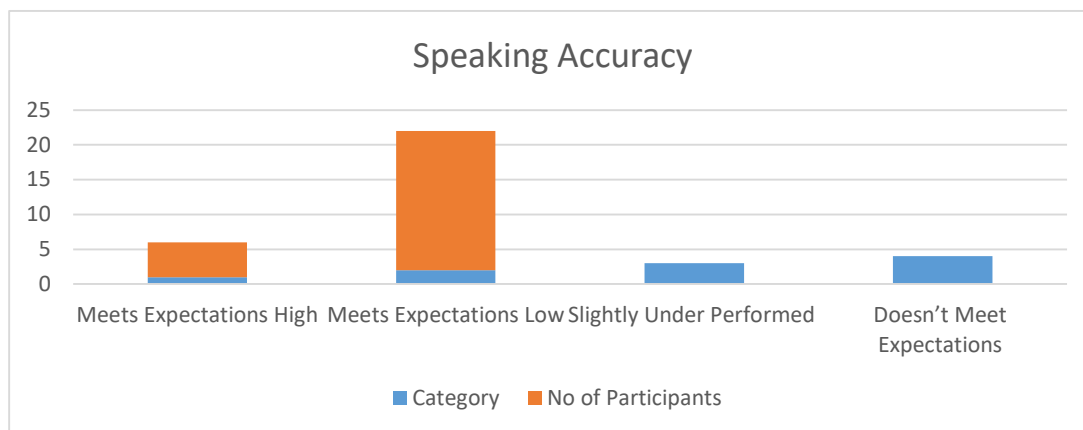


Figure 54 indicates that all the participants from the experimental group performed within the first 2 categories of the scale whereas none of them performed in category 3 and 4. Thus, it can be asserted that 20% of the participants showed a performance that met expectations high and 80% of them were in the 2nd category i.e. 'met expectations low' in the post-test of speaking accuracy.

#### 4.10.11 Comparison of Speaking Accuracy Pre and Post-Test (Experimental Group)

The next table presents a comparison between pre and post-tests of speaking accuracy of the participants from the experimental group.

**Table: 70**

*Comparison of Speaking Accuracy Pre and Post-Test (Experimental Group)*

Participants	Pre-Test	Post-Test	Percentage of Improvement
1	50%	100%	50%
3	25%	75%	50%
5	25%	75%	50%
7	25%	75%	50%
9	25%	75%	50%

Participants	Pre-Test	Post-Test	Percentage of Improvement
11	50%	75%	25%
13	25%	75%	50%
15	50%	100%	50%
17	25%	75%	50%
19	50%	75%	25%
21	50%	75%	25%
23	25%	75%	50%
25	50%	100%	50%
27	25%	75%	50%
29	50%	75%	25%
31	25%	75%	50%
33	50%	100%	50%
35	25%	75%	50%
37	50%	100%	50%
39	25%	75%	50%
41	25%	75%	50%
43	50%	75%	25%
45	50%	75%	25%
47	50%	75%	25%
49	25%	75%	50%

Table 70 compares participants' performance in the pre and post-tests of speaking accuracy. That data indicated that 7(28%) of the participants from the experimental group improved in speaking accuracy by 25% whereas 18(72%) of the participants improved by 50% in speaking accuracy. Thus, it can be asserted that all of the participants from the experimental group improved their speaking accuracy at varying levels.

#### 4.10.12 Speaking Accuracy Pre-Test (Control Group)

Like the participants of the experimental group, the participants from the control group also took pre and post-tests of short speeches so that their accuracy in

speaking could be assessed. The participants from the control group showed the following results in the pre-test of speaking accuracy:

**Table: 71**

*Speaking Accuracy Pre-Test (Control Group)*

Participants	Accuracy Assessment in Speech (Pre-Test)	Category
2	4	Is not meeting expectations
4	4	Is not meeting expectations
6	4	Is not meeting expectations
8	4	Is not meeting expectations
10	3	Slightly under performed
12	4	Is not meeting expectations
14	4	Is not meeting expectations
16	4	Is not meeting expectations
18	4	Is not meeting expectations
20	4	Is not meeting expectations
22	4	Is not meeting expectations
24	4	Is not meeting expectations
26	4	Is not meeting expectations
28	4	Is not meeting expectations
30	4	Is not meeting expectations
32	4	Is not meeting expectations
34	4	Is not meeting expectations
36	3	Slightly under performed
38	4	Is not meeting expectations
40	4	Is not meeting expectations
42	3	Slightly under performed
44	4	Is not meeting expectations
46	4	Is not meeting expectations
48	4	Is not meeting expectations
50	3	Slightly under performed

Table 71 consists of the results demonstrated by the participants of the control group in the pre-test of accuracy. The participants performed in different categories and the detail of frequencies is presented in the following graph:

**Figure: 55**

*Participants' Performance in Speaking Accuracy Pre-Test (Control Group)*

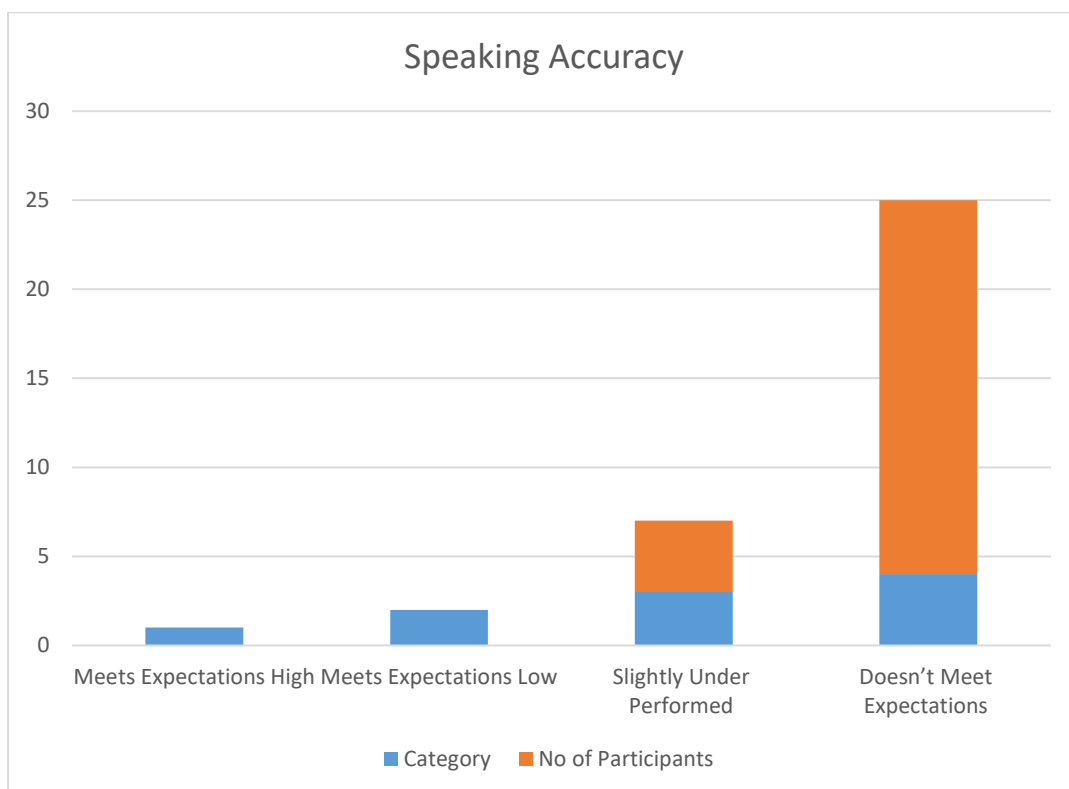


Figure 55 informs that the participants from the control group performed only in the last 2 categories in the pre-test of speaking accuracy and none of them performed in the first 2 categories i.e. 'meets expectations high' and 'meets expectations low'. The data indicated that 16% of the participants performed in category three because they slightly underperformed in the pre-test of speaking accuracy whereas 84% of the participants performed in category 4 and did not meet expectations.

#### 4.10.13 Speaking Accuracy Post-Test (Control Group)

The participants from the control group also took the post-test of speaking accuracy and they showed the following results:

**Table: 72***Speaking Accuracy Post-Test (Control Group)*

<b>Participants</b>	<b>Accuracy Assessment in Speech (Post-Test)</b>	<b>Category</b>
2	4	Is not meeting expectations
4	4	Is not meeting expectations
6	4	Is not meeting expectations
8	4	Is not meeting expectations
10	3	Slightly under performed
12	4	Is not meeting expectations
14	4	Is not meeting expectations
16	4	Is not meeting expectations
18	4	Is not meeting expectations
20	4	Is not meeting expectations
22	4	Is not meeting expectations
24	4	Is not meeting expectations
26	4	Is not meeting expectations
28	4	Is not meeting expectations
30	4	Is not meeting expectations
32	4	Is not meeting expectations
34	4	Is not meeting expectations
36	3	Slightly under performed
38	4	Is not meeting expectations
40	4	Is not meeting expectations
42	4	Is not meeting expectations
44	4	Is not meeting expectations
46	3	Slightly under performed
48	4	Is not meeting expectations
50	3	Slightly under performed

Table 72 presents the results of the participants from the control group in the post-test of speaking accuracy. The data indicated that the participants from the

control group could perform in different categories. The details about their performance in this test can be understood through the following figure:

**Figure: 56**

*Participants' Performance in Speaking Accuracy Post-Test (Control Group)*

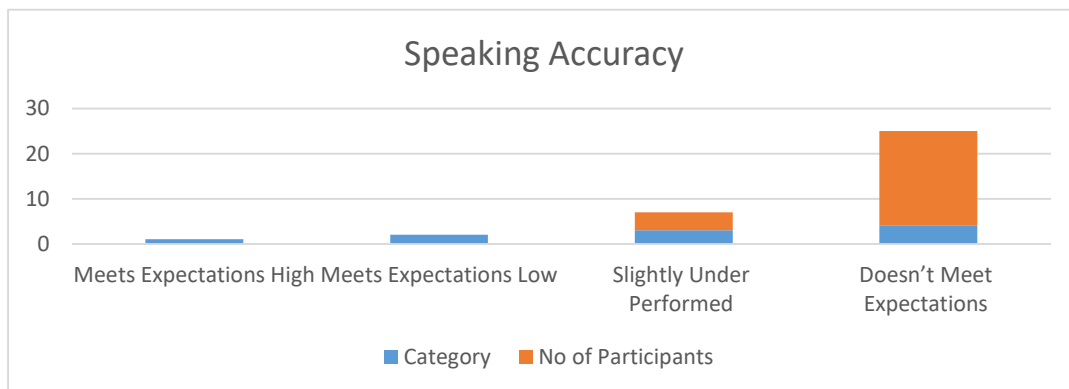


Figure 56 informs that none of the participants from the control group performed within the first 2 categories. The data indicated that 16% of the participants performed in the category 3 i.e. 'slightly underperformed' and 84% of the participants performed in the 4th category i.e. 'doesn't meet expectations'.

#### 4.10.14 Comparison of Accuracy Pre and Post-Test (Control Group)

After the detailed analysis of participants' performance in the pre and post-tests of speaking accuracy, the next table compares the results of the pre and post-tests to indicate differences and improvement:

**Table: 73**

*Comparison of Pronunciation Pre and Post-Test (Control Group)*

Participants	Pre-Test	Post-Test	Percentage of Improvement
2	25%	25%	0
4	25%	25%	0
6	25%	25%	0
8	25%	25%	0
10	50%	50%	0.25

Participants	Pre-Test	Post-Test	Percentage of Improvement
12	25%	25%	0
14	25%	25%	0
16	25%	25%	0
18	25%	25%	0
20	25%	25%	0
22	25%	25%	0
24	25%	25%	0
26	25%	25%	0
28	25%	25%	0
30	25%	25%	0
32	25%	25%	0
34	25%	25%	0
36	50%	75%	0.25
38	25%	25%	0
40	25%	25%	0
42	50%	25%	-0.25
44	25%	25%	0
46	25%	50%	0.25
48	25%	25%	0
50	50%	75%	0.25

Table 73 compares participants' results of pre and post-tests of speaking accuracy. The data indicated that 16% of the participants improved their speaking accuracy by a 0.25% margin whereas 84% of the participants from the control group could not improve their speaking accuracy.

#### 4.10.15 Improvement in Speaking Accuracy b/w both the Groups

After the detailed analysis of participants' performance in the pre and post-tests of speaking accuracy, the next table compares the level of improvement b/w both the groups in speaking accuracy:

**Table: 74**

*Comparison of improvement in Accuracy b/w both the Groups*

Observation	Experimental Group	Control Group	Group which Improved	Difference
Accuracy	100%	16%	Experimental	84%

Table 74 informs that 100% of the participants from the experimental group improved their speaking accuracy as all of them showed better results in the post-test of speaking accuracy whereas only 16% of the participants from the control group could slightly improve in speaking accuracy. Thus, the data indicated that the participants who were taught through AI-harnessed Apps improved by a margin of 84% in comparison with the participants of the control group.

### 4.11 Dialogue

#### 4.11.1 Dialogue Pre-Test (Experimental group)

The dialogue was used as another tool to assess participants' speaking skills but unlike the short speeches, the dialogues were conducted to assess the overall speaking and communication skills of the participants through the same scale as was used to assess the speeches. So, pre and post-tests of dialogues were conducted for the participants of both groups. The participants were assigned different topics and pairs were formed for dialogues. The results of the participants from the experimental group in the pre-test of dialogue are presented in the following table:

**Table: 75**

*Dialogue Pre-Test (Experimental group)*

Participants	Performance Assessment	Category
1	3	Slightly under performed
3	4	Is not meeting expectations
5	4	Is not meeting expectations
7	4	Is not meeting expectations
9	4	Is not meeting expectations
11	4	Is not meeting expectations
13	3	Slightly under performed
15	3	Slightly under performed
17	4	Is not meeting expectations
19	4	Is not meeting expectations
21	4	Is not meeting expectations
23	4	Is not meeting expectations
25	3	Slightly under performed
27	4	Is not meeting expectations
29	4	Is not meeting expectations
31	4	Is not meeting expectations
33	3	Slightly under performed
35	4	Is not meeting expectations
37	3	Slightly under performed
39	4	Is not meeting expectations
41	4	Is not meeting expectations
43	4	Is not meeting expectations
45	4	Is not meeting expectations
47	4	Is not meeting expectations
49	4	Is not meeting expectations

Table 75 consists of the participants' results of the Dialogue pre-test. The participants from the experimental group performed at different levels in the pre-test of dialogue though most of them could not meet expectations according to the assessment scale. However, the following figure presents the details of participants' performance in the pre-test of dialogue.

**Figure: 57**

*Participants' Performance in Dialogue Pre-Test (Experimental Group)*

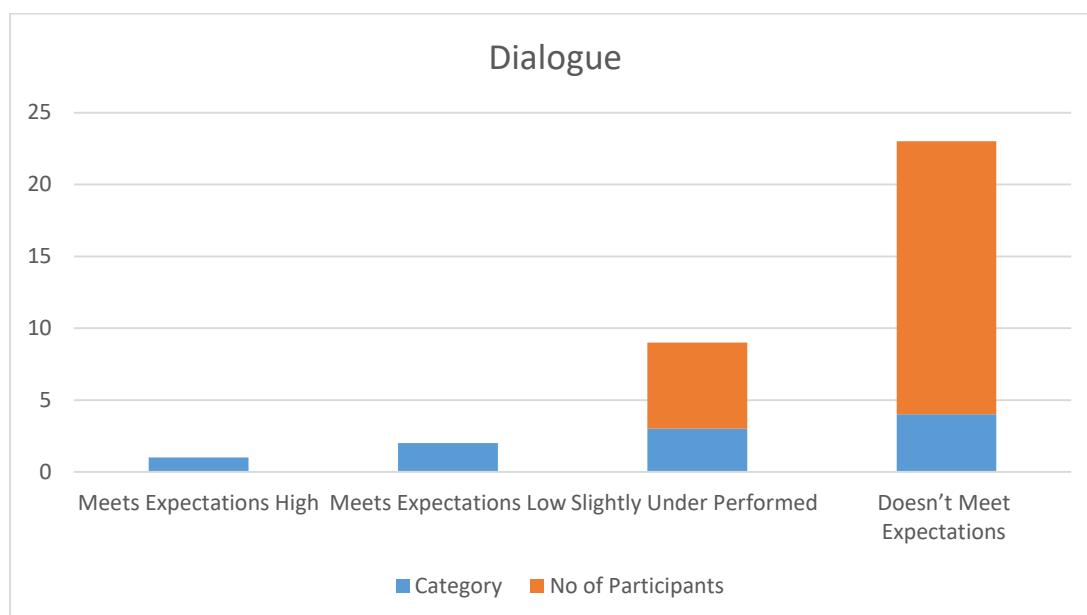


Figure 57 indicates that the participants from the experimental group could not show good performance in the pre-test of dialogue. The data indicated that none of the participants could perform in the first 2 categories i.e. 'meets expectations high' and 'meets expectations low'. 24% of the participants performed in the 3rd category i.e. 'slightly underperformed' and 76% of the participants performed in category 4 i.e. 'doesn't meet expectations'. Thus, it can be asserted that all of the participants from the experimental group showed poor performance in the pre-test of dialogue.

#### 4. 11.2 Dialogue Post-Test (Experimental Group)

After the treatment, the participants from the experimental group also took the post-test of dialogue. The participants were found to perform at different levels in the post-test of dialogue. Their performance in the post-test of dialogue is presented through the following table:

**Table: 76**

*Dialogue Post-Test (Experimental Group)*

Participants	Performance Assessment	Category
1	1	Meeting expectations high
3	2	Meeting expectations low
5	3	Slightly under performed
7	3	Slightly under performed
9	2	Meeting expectations low
11	2	Meeting expectations low
13	2	Meeting expectations low
15	1	Meeting expectations high
17	2	Meeting expectations low
19	2	Meeting expectations low
21	2	Meeting expectations low
23	3	Slightly under performed
25	1	Meeting expectations high
27	2	Meeting expectations low
29	2	Meeting expectations low
31	2	Meeting expectations low
33	1	Meeting expectations high
35	2	Meeting expectations low
37	1	Meeting expectations high
39	2	Meeting expectations low
41	2	Meeting expectations low
43	2	Meeting expectations low
45	2	Meeting expectations low
47	2	Meeting expectations low
49	2	Meeting expectations low

According to the data presented in Table 76, it can be asserted that the participants from the control group performed in the first 2 categories of performance. However, the details of the performance can be understood through the following figure:

**Figure: 58**

*Participants' Performance in Dialogue Post-Test (Experimental Group)*

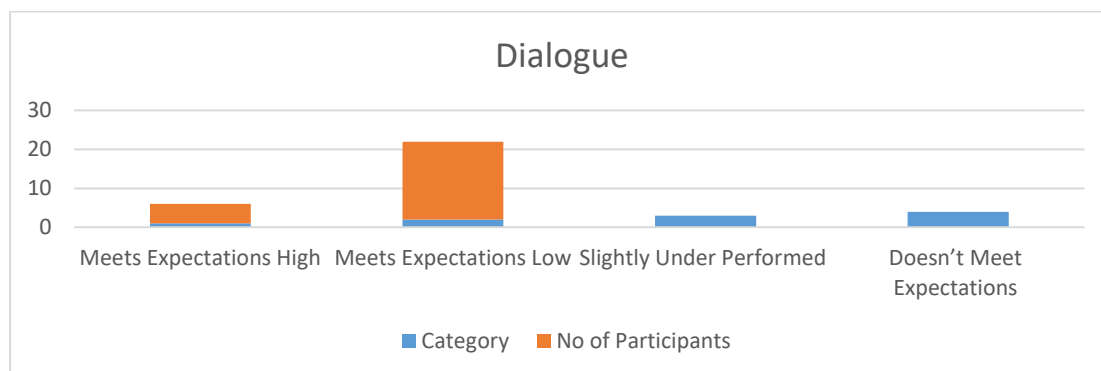


Figure 58 informs that the participants from the experimental group performed with the first 2 categories of the assessment scale. 20% of the participants from the experimental group performed in category 1 i.e. 'meets expectations high' whereas 80% of them performed in category 2 i.e. 'meets expectations low'. The data indicated that none of the participants performed in the last 2 categories that showed the poorest performance. Thus, it can be asserted that all the participants from the experimental group showed better performance in the post-test of dialogue.

#### 4.11.3 Comparison of Participants' Performance in Dialogue Pre and Post-Test (Experimental Group)

After the detailed analysis of pre and post-test results as shown by the participants from the experimental group, the next table compares the results of the participants in both the tests to indicate differences and improvement in communication skills:

**Table: 77**

*Comparison of Pre and Post-Test Results Dialogue (Experimental Group)*

Participants	Pre-Test	Post-Test	Difference
1	50%	100%	50%
3	25%	75%	50%
5	25%	50%	25%
7	25%	50%	25%
9	25%	75%	50%

Participants	Pre-Test	Post-Test	Difference
11	25%	75%	50%
13	50%	75%	25%
15	50%	100%	50%
17	25%	75%	50%
19	25%	75%	50%
21	25%	75%	50%
23	25%	50%	25%
25	50%	100%	50%
27	25%	75%	50%
29	25%	75%	50%
31	25%	75%	50%
33	50%	100%	50%
35	25%	75%	50%
37	50%	100%	50%
39	25%	75%	50%
41	25%	75%	50%
43	25%	75%	50%
45	25%	75%	50%
47	25%	75%	50%
49	25%	75%	50%

Table 77 compares the results of the participants from the experimental group in both pre and post-tests of dialogue. The data indicated that all the participants from the experimental group improved their communication skills and showed better results in the post-test of dialogue. 16% of the participants improved by a margin of 25% whereas 84% of them improved by a margin of 50%. Thus, it can be asserted that all of the participants from the experimental group improved their communication skills.

#### 4.11.4 Dialogue Pre-Test (Control group)

The participants from the control group also participated in the pre and post-tests of dialogues. Their performance in the pre-test of dialogue is presented in the following table:

**Table: 78**

*Dialogue Pre-Test (Control group)*

Participants	Performance Assessment	Category
2	4	Is not meeting expectations
4	4	Is not meeting expectations
6	4	Is not meeting expectations
8	4	Is not meeting expectations
10	4	Is not meeting expectations
12	4	Is not meeting expectations
14	4	Is not meeting expectations
16	4	Is not meeting expectations
18	4	Is not meeting expectations
20	4	Is not meeting expectations
22	4	Is not meeting expectations
24	4	Is not meeting expectations
26	4	Is not meeting expectations
28	4	Is not meeting expectations
30	4	Is not meeting expectations
32	4	Is not meeting expectations
34	4	Is not meeting expectations
36	3	Slightly under performed
38	4	Is not meeting expectations
40	4	Is not meeting expectations
42	4	Is not meeting expectations
44	4	Is not meeting expectations
46	4	Is not meeting expectations

Participants	Performance Assessment	Category
48	4	Is not meeting expectations
50	3	Slightly under performed

Table 78 consists of the details about participants' performance in the pre-test of dialogue. The participants from the control group performed within the last 2 categories according to the assessment scale. The details about the performance of the participants from the control group in the pre-test of dialogue can be understood through the following graph:

**Figure: 59**

*Participants' Performance in Dialogue Pre-Test (Control Group)*

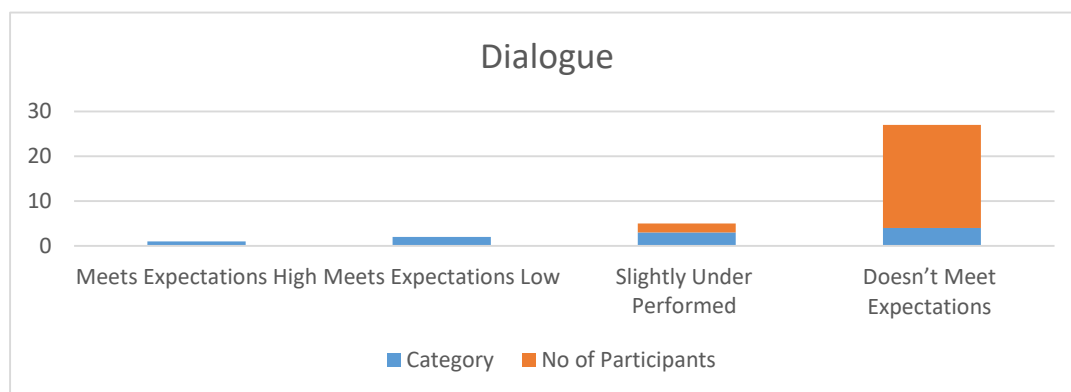


Figure 59 indicates that the participants from the control group could not perform within the first 2 categories i.e. 'meets expectations high' and 'meets expectations low'. The data indicated that 8% of the participants performed in category 3 i.e. 'slightly underperformed' and 92% of the participants from this group performed in category 4 i.e. 'does not meet expectations'. Thus, it can be asserted that all of the participants from this group showed poor performance in the pre-test of dialogue.

#### 4.11.5 Dialogue Post-Test (Control Group)

The participants from the control group also took the post-test of dialogue. Their performance in this test is presented in the next table:

**Table: 79***Dialogue Post-Test (Control Group)*

<b>Participants</b>	<b>Performance Assessment</b>	<b>Category</b>
2	4	Is not meeting expectations
4	4	Is not meeting expectations
6	4	Is not meeting expectations
8	4	Is not meeting expectations
10	4	Is not meeting expectations
12	4	Is not meeting expectations
14	4	Is not meeting expectations
16	4	Is not meeting expectations
18	4	Is not meeting expectations
20	4	Is not meeting expectations
22	4	Is not meeting expectations
24	4	Is not meeting expectations
26	4	Is not meeting expectations
28	4	Is not meeting expectations
30	4	Is not meeting expectations
32	4	Is not meeting expectations
34	4	Is not meeting expectations
36	3	Slightly under performed
38	4	Is not meeting expectations
40	4	Is not meeting expectations
42	4	Is not meeting expectations
44	4	Is not meeting expectations
46	4	Is not meeting expectations
48	4	Is not meeting expectations
50	3	Slightly under performed

Table 79 provides us with details about the performance of the participants from the control group in the post-test of dialogue. The participants were found to perform in the last 2 categories that showed poor results. However, the details about

the participants' performance in the pre-test of dialogue can be understood through the following figure:

**Figure: 60**

*Participants' Performance in Dialogue Post-Test (Control Group)*

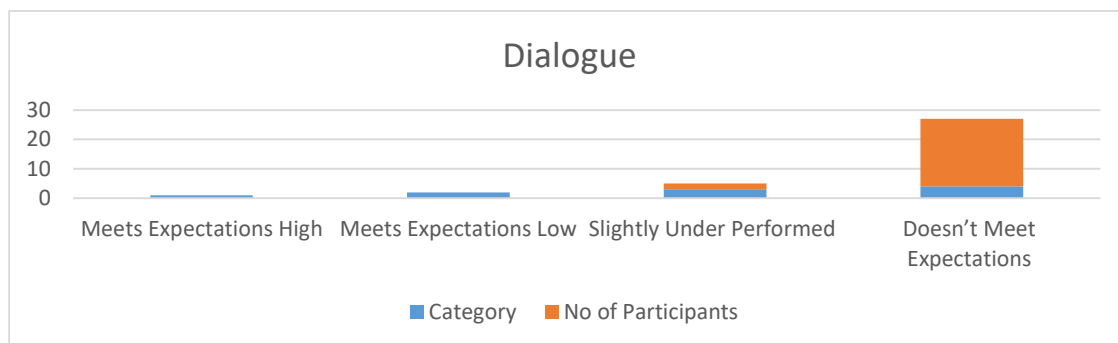


Figure 60 indicates that the participants from the control group could not meet expectations high or low rather they performed in the last 2 categories that show the poorest results. The data indicated that 8% of the participants slightly underperformed whereas 92% of the participants did not meet the expectations at all. Thus, it can be asserted that the participants from the control group showed poor performance in the post-test of dialogue.

#### 4.11.6 Comparison of Dialogue Pre and Post-Test Results (Cont. Group)

After the detailed analysis of participants' performance in the post-test of dialogue, the next table presents the comparison of participants' performance in the pre and post-tests of dialogue:

**Table: 80**

*Comparison of Pre and Post-Test Results Dialogue (Control Group)*

Participants	Performance in Dialogue Pre-Test	Performance in Dialogue Post-Test	Difference
2	25%	25%	0
4	25%	25%	0
6	25%	25%	0
8	25%	25%	0
10	25%	25%	0

<b>Participants</b>	<b>Performance in Dialogue Pre-Test</b>	<b>Performance in Dialogue Post-Test</b>	<b>Difference</b>
12	25%	25%	0
14	25%	25%	0
16	25%	25%	0
18	25%	25%	0
20	25%	25%	0
22	25%	25%	0
24	25%	25%	0
26	25%	25%	0
28	25%	25%	0
30	25%	25%	0
32	25%	25%	0
34	25%	25%	0
36	25%	50%	0.25
38	25%	25%	0
40	25%	25%	0
42	25%	25%	0
44	25%	25%	0
46	25%	50%	0.25
48	25%	25%	0
50	50%	75%	0.25

Table 80 indicates that only 12% of the participants from the control group improved with a margin of 0.25% whereas 88% of the participants from the control group could not improve their communication skills.

#### 4.11.7 Comparison of Improvement in Dialogue b/w both the Groups

After the detailed analysis of the performance of participants from both the groups in pre and post-tests of dialogues, the next table presents the comparison of improvement between both the groups in dialogue and overall communication skills:

**Table: 81***Comparison of improvement in Dialogue b/w both the Groups*

<b>Observation</b>	<b>Experimental Group</b>	<b>Control Group</b>	<b>Group which Improved</b>	<b>Difference</b>
Communicative Ability	100%	12%	Experimental	88%

Table 81 indicates that all the participants from the experimental group improved in dialogue and communication skills after the treatment whereas only 12% of the participants from the control group improved in this particular area. Thus, it can be asserted that the participants who were taught the English language through the use of AI-powered Apps improved their communication by a margin of 88% in comparison with the participants from the control group. Thus, it can be asserted that the participants from the experimental group were at an advantage.

Thus, the results indicate that English language learning through AI-powered tools to teach English at the college level is effective and the use of AI-powered Apps can be retained to improve students' communication skills in English. Rusmiyanto & et al. (2023) also second the idea of using AI-powered tools to develop English language skills because they found the use of AI effective in improving students' communication skills.

#### **4.12 t-Tests Analysis for the Pre and Post-Tests**

The t-tests were applied to the results sought through pre and post-tests to have an idea whether the difference between the both was significant or not. A paired sample t-test was applied in this analysis because we had to analyse the difference between two variables of the same sample. Pre and post-tests were conducted in this experimental research whereas Reading, Writing and Speaking skills were the key observations tested through the pre and post-tests. In reading, a t-test was applied to the pre and post-tests of inference, comprehension and reading pace whereas the results of pre and post-tests of grammar knowledge and paragraph writing were analysed through the t-test in

the domain of writing. Then, participants' mean scores in overall communication skills were also compared to have an idea about the difference between before and after performance.

According to Ross & Willson (2017), the key observations in a paired sample t-test are:

- Mean Difference: Mean difference may be positive or negative
- Standard Deviation: It analyses the level of variability between two variables.
- Standard Error Mean: It indicates the standard deviation of the mean difference of a sample. It helps to calculate the confidence interval.
- Confidence Interval: It ensures and confirms the mean difference up to 95%.
- Degree of Freedom: This refers to the number of pairs minus one ( $n - 1$ ).  $N$  is the number of pairs.
- Significance (2-tailed): It refers to the p-value indicating that if the difference is  $<$  (less than) alphanumeric (0.05) the difference is significant and it rejects the Null Hypothesis ( $H_0$ ). If the p-value is  $>$  (greater than) 0.05 it accepts the Null hypothesis.

Thus, pre and post-test data are analysed using paired sample t-tests in the current research to have an idea about participants' improvement in English language skills.

#### 4.12.1 t-Test Analysis of Comprehension Improvement (Exp. Group)

The following table interprets the t-test results applied to pre and post-tests of comprehension.

**Table: 82**

*Paired Sample Test for Comprehension (Experimental Group)*

	Paired Differences				t	Df	Sig. (2-tailed)
	Mean	Std. Dev.	Std. Error Mean	95% Confidence Interval of the Difference			
Comprehension							

				Lower	Upper			
Pre – post-test	-2.04000	.63333	.12667	-2.30143	-1.77857	-16.105	24	.000

Table 82 shows that the mean difference is -2.04000 between the pre and post-comprehension tests in the experimental group. This indicates that the pre-test mean is 2.040 units lower than the post-test mean. Then, the post-test results deviate from the pre-test results by .63333 which is also positive. Moreover, the table shows that the standard error mean indicates that the post-test mean deviates by .12667. The confidence interval indicates that the true mean difference can be counted between -2.30143 and -1.77857. The t values -16.105 shows that the mean of the post-test is significant enough to reject H<sub>0</sub>. Then, the p-value being too low (.000) also strongly rejects the null hypothesis. Thus, it can be concluded that the difference between pre and post-tests of comprehension is significant and it can be asserted that the participants from the experimental group improved their comprehension skills up to a significant level.

#### 4.12.2 t-Test Analysis of Comprehension Improvement (Control Group)

The table below presents the t-test analysis of the pre and post-tests of comprehension taken by the participants from the control group.

**Table: 83**

*Paired Samples Test for Comprehension (Control Group)*

Comprehension	Paired Differences					t	Df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 Pre-post-tests	-.05333	.59845	.11969	-.30036	.19370	-.446	24	.660

Table 83 shows that the mean difference between pre and post-comprehension tests taken by the participants from the control group is -0.05333 which is not statistically significant. The confidence interval for the difference being -.30036 lower and .19370 upper is also not significant because it includes 0. The p-value on the other hand indicates that the difference might occur because of random variation in the factors and this difference might not be true. Thus, it can be concluded that there is no significant difference between the pre and post-tests of comprehension as taken by the participants from the control group.

The t-test results inform that the participants from the experimental group were at the advantage after using AI-based Apps to learn English and they improved their reading comprehension skills significantly whereas the participants from the control group could not make any significant progress in comprehension skills because they did not use any AI-based Apps to learn English.

#### 4.12.3 t-Test Analysis of inference Improvement (Experimental Group)

The table below presents the details of the paired sample t-test applied to the pre and post-test results of inference produced by the participants from the exp. group.

**Table: 84**

*Paired Samples Test for Inference (Experimental Group)*

Inference	Paired Differences					T	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pre-post-tests	-1.79200	.37184	.07437	-1.94549	-1.63851	-24.096	24	.000

The t-test results show that there is a significant difference between pre and post-test results because the mean of inference post-test taken by the participants from the experimental group deviates by .37184 from the pre-test mean. Moreover, the confidence interval which includes 0 also strengthens the fact that the mean difference

is statistically significant. As far as the t-value -24.096 and p-value .000 are concerned, they indicate that the difference of mean between the pre and post-tests of inference is justified, positive and significant. Thus, it can be asserted that the participants from the experimental group improved their inference skills significantly.

#### 4.12.4 t-Test Analysis of Inference Improvement (Control group)

The next table compares the means of inference pre and post-test scores produced by the participants from the control group.

**Table: 85**

*Paired Samples Test for Inference (Control Group)*

Inference	Paired Differences					T	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pre-Post-test	-.03200	0.42301	.08460	-.20661	.14261	-.378	24	.709

The t-test data sought from pre and post-tests of inference taken by the participants from the control group indicates that the mean of paired difference is -.03200 indicating that the difference between both variables is slight. As far as the standard deviation is concerned, it is also not much significant as the post-test mean deviates by only 0.42301 from the pre-test mean. Moreover, the values in the standard error of the mean and confidence interval also indicate that the difference is insignificant. Then the t-value being very high and the p-value being very low also reinforce the findings that there is no significant difference between the means of inference pre and post-tests taken by the participant from the control group.

Thus, it can be asserted that the mean of the inference post-tests from the experimental group is significantly different from the mean of the inference pretest whereas the mean of the inference post-test from the control group is not significantly different from the inference pre-test. The situation indicates that the participants from the experimental group were at an advantage after learning English with AI-based Apps during the current research.

#### 4.12.5 t-Test Analysis of Improvement in Reading Pace (Exp. Group)

The following table presents the results of the t-test analysis applied to the pre and post-test scores of the participants from the experimental group in reading pace.

**Table: 86**

*Paired Samples Test for Reading Pace (Experimental Group)*

Reading Pace	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pre-Post-test	-34.88000	27.83780	5.56756	-46.37088	-23.38912	6.265	24	.000

Paired sample test of reading pace pre-post-test means indicate that the mean difference is 1.16000 and the mean of the pre-test is higher than the mean of the post-test. The standard deviation of the mean difference is 13.83739, standard error of the mean difference is 2.76748 which is negative. The value of 95% confidence interval is - 4.55179 to 6.87179 and includes 0 indicating that no significant difference can be traced in the mean of pre and post-tests. Then, the t-value is 0.419 which is relatively low and the p-value is 0.679 indicating that the difference in the mean of pre and post-tests of reading pace from the control group is not significant because the p-value is > than alphanumeric (0.05). Thus, it can be concluded that the participants from the control group could not improve their reading pace throughout the experiment phase.

Thus, it can be postulated that the participants from the experimental group improved their reading pace significantly, which is encouraging and strengthens the idea of using AI-harnessed Apps for teaching English but the participants from the control group could not improve their reading pace because they did not use any AI-based Apps/tools to learn English.

#### 4.12.6 t-Test Analysis of Improvement in Reading Pace (Control Group)

Paired sample t-test was also applied to the pre and post-tests of writing for both experimental and control groups. The table below presents the results of the test for writing pre and post-tests from the experimental group.

**Table: 87**

*Paired Samples Test for Reading Pace (Control Group)*

Reading Pace	Paired Differences					T	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pre & Post-Test	1.16000	13.83739	2.76748	-4.55179	6.87179	.419	24	.679

Paired sample test of reading pace pre-post-test means indicate that the mean difference is 1.16000 and the mean of the pre-test is higher than the mean of the post-test. The standard deviation of the mean difference is 13.83739, standard error of the mean difference is 2.76748 which is negative. The value of the 95% confidence interval is - 4.55179 to 6.87179 and includes 0 indicating that no significant difference can be traced in the mean of pre and post-tests. Then, the t-value is 0.419 which is relatively low and the p-value is 0.679 indicating that the difference in the mean of pre and post-tests of reading pace from the control group is not significant because the p-value is > than alphanumeric (0.05). Thu, it can be concluded that the participants from the control group could not improve their reading pace throughout the experiment phase.

Thus, it can be postulated that the participants from the experimental group improved their reading pace significantly, which is encouraging and strengthens the idea of using AI-harnessed Apps for teaching English but the participants from the control group could not improve their reading pace because they did not use any AI-based Apps/tools to learn English.

#### 4.12.7 t-Test Analysis of Improvement in Paragraph Writing (Exp. Group)

Paired sample t-test was also applied to the pre and post-tests of writing for both experimental and control groups. The table below presents the results of the test for writing pre and post-tests from the experimental group.

**Table: 88**

*Paired Samples Test for Paragraph Writing (Experimental Group)*

Paragraph Writing	Paired Differences							Sig. (2-tailed)
	Mean	Std. Dev	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pre-Post-test	-4.88000	1.45258	.29052	-5.47960	-4.28040	-16.798	24	.000

The data presented in the table shows that the mean difference between the writing pre and post-test from the experimental group is -4.88000 and the mean of the post-test deviates from the pre-test by 1.45258 indicating that the difference is considerably positive. Then, the values of the standard error mean and 95% confidence interval also show an inclination toward the significant difference between the pre and post-test means. Moreover, the t-value -16.798 refers to the higher range of difference and the p-value .000 being < the common alpha level of 0.05 encourages us to reject the null hypothesis. Thus, it can be concluded that the mean difference between the pre and post-tests of writing from the experimental group is significant.

#### 4.12.8 t-Test Analysis of Paragraph Writing (Control Group)

The next table presents the t-test analysis of writing pre and post-tests from the control group to indicate whether the participants improved their writing or not.

**Table: 89**

*Paired Samples Test for Paragraph Writing (Control Group)*

Paragraph Writing	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pre-Post-test	-.24000	.96954	.19391	-.64020	.16020	-1.238	24	.228

The output data presented in the table suggests that the difference between pre and post-test writing mean is -.24000 which shows a slight difference which is negative. Then, the mean of the post-test deviates by .96954 indicating that there is a spread in differences. The values in the standard error mean and 95% confidence interval suggest that there is an insignificant difference between the variables. As far as the t and p-values are concerned, the t-value indicates that the mean difference is 1.2238 units below 0 and the p-value .228 is > than the common alpha level 0.05 indicating that the difference is not statistically significant. So, it can be concluded that there is no significant difference in the control group students' scores which they got in pre and post-writing tests.

Thus, it can be asserted that the t-test analysis indicates that the participants from the experimental group improved their writing skills as a significant difference was found in their pre and post-test results whereas the participants from the control group could not make any considerable improvement in their writing skills. The results show that the experimental group got the advantage of using AI-based Apps to learn English over the control group.

#### 4.12.9 t-Test Analysis of Grammar Knowledge (Exp. Group)

The next table presents the output of t-test analysis applied to the experimental group pre and post-tests of sentence correction to observe improvement in the grammar knowledge.

**Table: 90**

*Paired Samples Test for Sentence Correction (Experimental Group)*

Sentence Correction/Grammar Knowledge	Paired Differences					T	Df	Sig. (2- tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pre-Post-test	- 3.00000	1.52753	.30551	-3.63053	-2.36947	- 9.820	24	.000

The output data indicate that the average difference between the pre and post-tests of sentence correction from the experimental group is -3.00000 which is significant. The spread of differences around the mean is presented by the value 1.52753 which is also significant. The values in standard error mean and 95% confidence interval are also favourable to claim that the difference of mean is significant. Then the t-value -9.820 being greater and the p-values .000 being lower also inform that the difference of mean in pre and post-tests of sentence correction is significant and encouraging.

#### 4.12.10 t-Test Analysis of Grammar Knowledge (Control Group)

The next table presents a t-test analysis of control group students' scores in pre and post-tests of grammar knowledge.

**Table: 91**

*Paired Samples Test for Sentence Correction (Control Group)*

Sentence Correction/Grammar Knowledge	Paired Differences					t	D f	Sig. (2- tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pre  Post-Test	-.36000	1.18603	.23721	-.84957	.12957	-1.518	24	.142

The paired sample t-test of pre and post-test of grammar knowledge from the participants of the control group indicates that the mean difference between the pre and post-tests is -.36000 and its 0.36 units lower than the post-test mean indicating that the difference is not significant. Moreover, the standard deviation also informs that the difference is insignificant because the post-test deviates by 1.18603 from the mean of the pre-test. Other observations like standard error mean and 95% confidence interval also suggest that the difference is not significant. As far as the t and p-values are concerned, the t-value indicates that the mean difference is -1.518 standard errors away from 0 and is not significant and the p-value .142 is also  $>$  than the common alpha level i.e. 0.05 indicating that the difference in mean is not significant. Thus, the situation indicates that there is no significant difference between students' score in the pre and post-tests of grammar knowledge.

#### 4.12.11 t-Test Analysis of Speaking Improvement (Experimental Group)

The table below interprets the output of the paired sample t-test for the pre and post-test results as produced by the participants from the experimental group.

**Table: 92**

*Paired Samples Test for Overall Communication (Experimental Group)*

Overall Communication	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pre-Post-Test	-2.08760	.39493	.07899	-2.25062	-1.92458	-26.430	24	.000

The statistical paired sample t-test compares the means of pre and post-speaking tests from the experimental group indicating that the mean difference between the both is -2.08760 and the post-test mean is 2.08760 units higher than the pre-test mean which is sufficient to be declared as significant. Then, the standard deviation is also significant because it deviates from the mean by .39493. The observations like standard error mean and confidence interval also come up with the positive output tending towards the significance of the difference between both variables. Then, the t-value with -26.430 and p-value with .000 also inform that the difference of mean is significant because the t-value is much higher and the p-value is much lower than the standard values. Overall impression of the analysis refers to the rejection of the null hypothesis that the difference between the pre and post-test performances is 0. Conclusively, it can be asserted that the participants from the experimental group improved their speaking skills significantly.

#### 4.12.12 t-Test Analysis of Speaking Improvement (Control Group)

The next table presents the t-test analysis of the pre and post-tests of the participants in speaking proficiency.

**Table: 93**

*Paired Samples Test for Overall Communication (Control Group)*

Overall Communication	Paired Differences					T	df	Sig. (2- tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pre-Post-Test	-.06000	.14930	.02986	-.12163	.00163	-2.009	24	.056

The t-test analysis of the mean of pre and post-tests taken by the students from the control group informs that the difference of mean in the pre and post-test is -.06000, the standard deviation is .14930 whereas the standard error mean is .02986 which makes the confidence interval include 0 leaving the difference insignificant. Further

process in the paired sample t-test informs that the t-value being -2.009 is lower than the set standard and p-value .056 greater than the common alpha level 0.05 which rejects the null hypothesis indicating the difference between the pre and post-test means is not significant. Thus, the results show that the participants from the control group did not make any significant improvement in their speaking skills during the experimental and treatment phase.

### **4.13 Observation**

Observation was also used as a tool to collect research data. Thus, the researcher kept on taking field notes throughout the treatment period to record insightful information during the whole research process. The data collected through observation is presented in terms of themes related to learners' behaviours, difficulties, problem-solving, motivation, acceptance and improvement. Moreover, assignments submitted through Readlee by the participants were also a constant source of information about the participants' learning behaviour. The following key themes were found to be important for the study:

#### **4.13.1 Participants' Behaviours towards Learning**

The academic session was started on August 20, 2022, for the intermediate students at the research site. The participants were informed about the type of research that was being conducted at the start of their class. When they were asked to give their consent to participate in the current research, they happily agreed to be a part of this research. The participants were found to be enthusiastic about knowing that they were going to have a new English language learning experience. Before initiating the current research, a short workshop was conducted in which the participants were informed about AI-based Apps that were to be used for English language learning during the session. The participants were asked to bring their mobile phones to college and they were asked to make their accounts to use the main App named 'Readlee' through which they had to submit their assignments according to the set schedule. The participants were found excited to learn about the Apps they had to use during the research.

#### 4.13.2 Difficulties Faced by the Participants

At the start of the current study, the participants were not well familiar with the apps so they had to face different difficulties. Participant number 7 informed that he was unable to join the class though he had made an account to use the 'Readlee App'. Thus, he was told he needed to join the Readlee class through the class code. Then, Participant Number 5 had an issue with viewing the task on his phone and he was asked to rotate his phone and view the task with landscape mobile orientation. Some of the participants had issues with text size and they were unable to read a complete line because it was not completely visible. Thus, the participants were asked to reset the size of text on their phone and the problem was resolved. Then, some of the participants had issues with recording their voices while reading the assigned text through the 'Readlee App'. They were advised to permit microphone from the settings of their mobile phones for the App they were using and the problem was resolved. Participant number 13 and 23 informed that sometimes they had poor internet service at home. So, they were permitted to use the college computer lab if they could not submit their assignments at home.

All the problems and difficulties mentioned above were related to technological areas and they were resolved as soon as they were communicated by the participants.

#### 4.13.3 Problem-Solving

Though at the start, some of the participants faced certain issues and problems in learning the English language through AI-based Apps, soon they were found to be efficient enough to deal with every problem themselves. After the submission of a few early assignments, the participants felt at ease and the number of complaints was soon decreased. If ever some participant came up with some issue, the other participants assisted him and helped him in resolving the problem.

#### 4.13.4 Motivation

The more the participants learned using the Apps for English language learning, the more motivated they were. At the start, a few participants shirked work and gave lame excuses when they did not submit their assignments timely. But, with time, their interest in learning enhanced and they started working properly. However, most of the participants were always eager to work and submit their tasks well on time. If the new task was not assigned for some reason or some scheduled break, they would ask why

the new task was not uploaded for them on the Readlee dashboard. So, it was observed that the participants were always energetic and enthusiastic in learning English through AI-based Apps.

#### 4.13.5 Level of Acceptance of Task

It was observed that the participants were ready to accept any task assigned through AI-based Apps. Earlier the participants were not always ready to accept tasks but when they were introduced to AI-based Apps and they were assigned the tasks, they were found ready to accept and complete them happily. So, it was observed that the participants' level of acceptance of the task improved which directly influenced their learning pace and level of improvement.

#### 4.13.6 Training for Future Studies

The most important thing that was observed during the current research work was that most of the participants were trying hard to learn the use of AI-based applications for learning English because they most often discussed that the same Apps would be helpful for them for their future studies. They exclaimed that in their higher studies, they would keep using the same Apps for new subjects. Once, while talking about the benefits of these Apps, Participant Number 15 indicated that he would keep looking for more Apps for learning other subjects in the future. He also informed me that he was enjoying learning English with AI-based Apps. So, he thought that the students should use more Apps for learning other subjects because it's an interesting way to learn new things.

#### 4.13.7 Improvement

Many studies indicate that English language teaching cuts a sorry figure in the Pakistani educational context (Kiran, 2010). The students lack creativity and improvement though they pass their exams with good grades. The basic aim of teaching the English language at every level is to equip the learners with language skills that enable them to use the English language in practical life but unfortunately, the learning outcomes are not satisfactory. Thus, the current study was conducted to come up with a way of teaching while focusing on the most required phenomenon in language teaching i.e. learning, improvement and development of English language

skills in students in a real sense. So, right after the treatment started, it was observed that the participants were going on the right track and improving their English language skills with time. Finally, the current ‘Experimental Research’ proved to be a success as the post-test results of the participants from the experimental group were exceptionally good. The following table presents a detailed comparison of the improvement between the experimental and control groups to indicate improvement in learning.

**Table: 94**

*Improvement in English Language Skills*

Areas of Improvement	Percentage of Improvement	Remarks
Reading Skills		
1. Reading Pace	76%	Encouraging
2. Reading Accuracy	64%	
3. Inference	100%	
4. Comprehension	100%	
5. Word Recognition	96%	
6. Vocabulary	100%	
Writing Skills		
Areas of Improvement	Percentage of Improvement	Remarks
1. Sentence Correction	96%	Encouraging
2. DCTs	96%	
3. Paragraph Writing	100%	
Speaking Skills		
Areas of Improvement	Percentage of Improvement	Remarks
1. Pronunciation	100%	Encouraging
2. Vocabulary	100%	

3. Accuracy	100%
4. Overall Communication	100%

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Table 94 provides a comprehensive detail of participants' improvement in English language skills i.e. 'reading, writing and speaking skills'. The data indicates that the use of AI-based Apps for English language teaching at the college level proved very successful and it produced encouraging results.

## CHAPTER 5

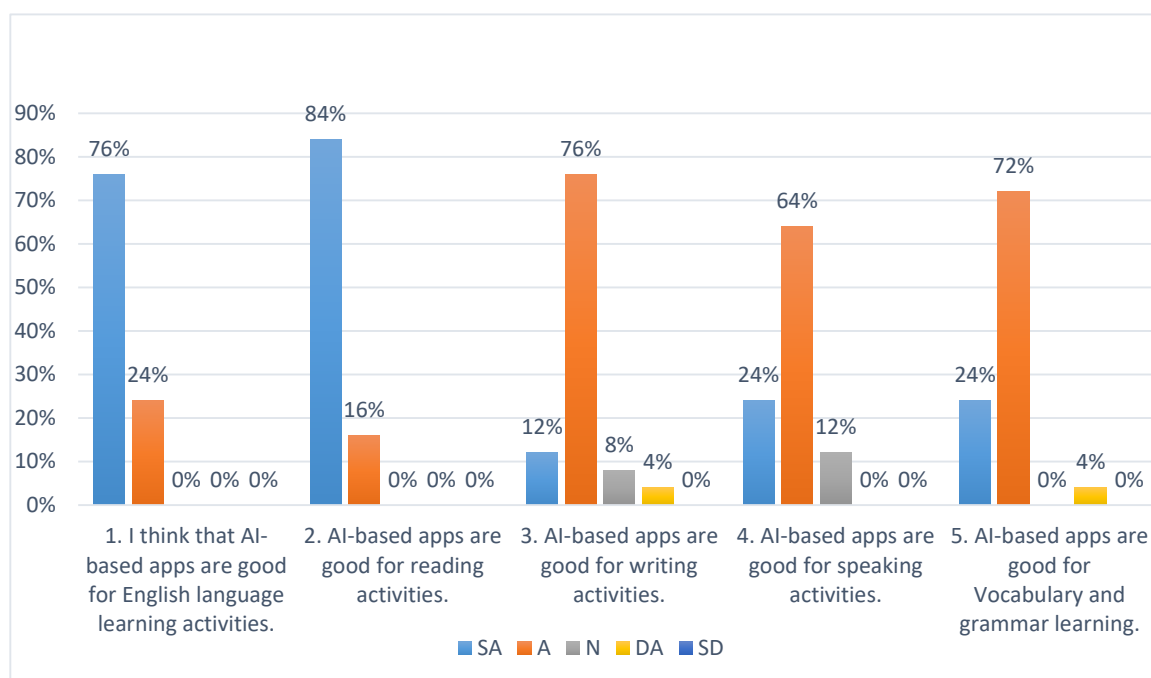
### LEARNERS' VIEWS ON AI IN ELT

#### 5.1 Students' Perception Regarding the Use of AI-Based Apps to Improve English Language Skills

Since the real stakeholders in the whole English Language Teaching and learning activity are the students, it was considered important to have their opinions and beliefs about the use of AI-based apps in English language teaching and learning. To collect the data on students' perceptions regarding the use of AI-based apps in English language teaching and learning, a questionnaire based on the Likert Scale was applied whereas interviews were also conducted to have participants' views on learning English through the use of AI-based apps. Thus, the data sought through the questionnaire provided us with the following insights:

**Figure: 61**

Students' Perception Regarding the Use of AI-Based Apps to Improve English Language Skills



Note: SA=Strongly Agree, A=Agree, N= Neutral, D= Disagree, SD= Strongly Disagree

Statement 1: I think that AI-based apps are good for English language learning activities

Statement 2: AI-based apps are good for reading activities.

Statement 3: AI-based apps are good for writing activities.

Statement 4: AI-based apps are good for speaking activities.

Statement 5: AI-based apps are good for vocabulary and grammar learning.

The figure indicates that while responding to statement No. 1 i.e. “I think that AI-based apps are good for English language learning activities.” 76% of the participants strongly agreed and 24% agreed with the statement. Thus, the situation indicates that all of the participants were found to be in favour of the use of AI-Based Apps for English language learning. Then, while responding to Statement No. 2 i.e. “AI-based apps are good for reading activities,” 84% of the participants strongly agreed and 16% of the participants agreed with the statement. Hence, the data indicated that all participants thought that AI-based apps are useful for reading activities which indicates that the participants were satisfied with performing reading activities during the treatment period.

When asked about the effectiveness and suitability of AI-Based Apps for writing activities, 12% of the participants strongly agreed that AI-Based Apps are good for improving writing skills, 76% of the participants agreed to the statement, 8% of them were neutral and 4% of the participants disagreed that AI-Based Apps are helpful and effective for practicing writing skills. The situation indicated that most of the participants believed that writing activities could also be practiced through AI-based apps.

While giving their opinions about the usefulness of AI-based Apps for speaking activities, 24% of the participants strongly agreed with the statement that AI-based apps are good for speaking activities. 64% of the participants agreed that AI-based apps are good for speaking activities whereas 12% of the participants were found to be neutral in their opinion on this statement. Thus, the data indicated that most of the participants were in favour of the idea that AI-based apps are good for speaking activities.

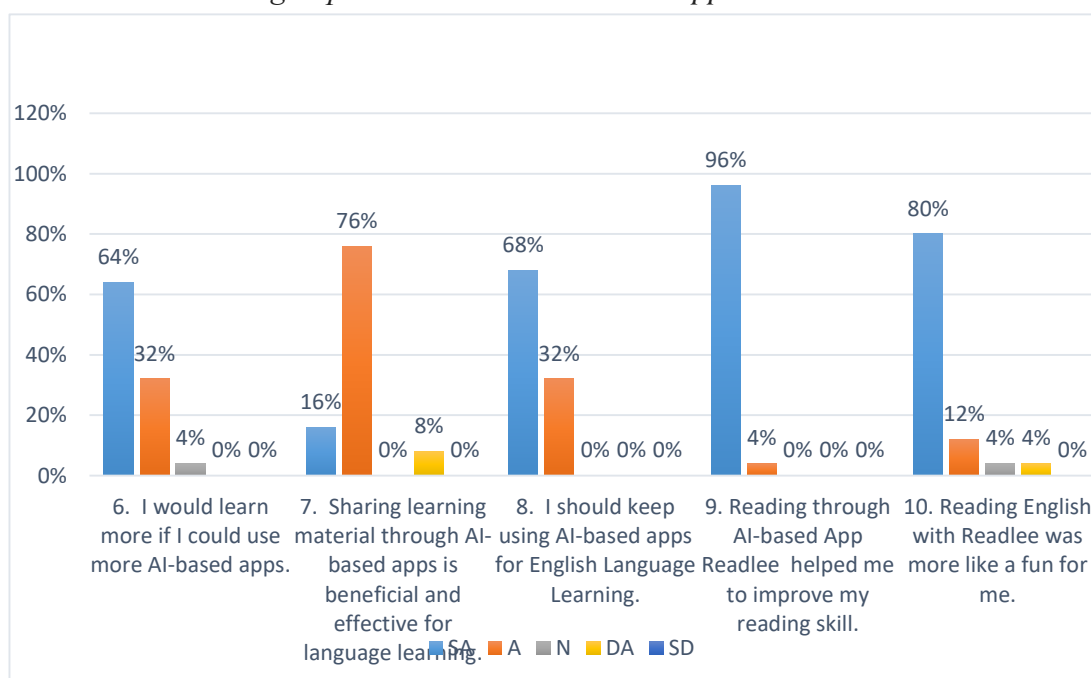
While responding to statement No. 5 i.e. “AI-based apps are good for vocabulary and grammar learning,” 24% of the participants strongly agreed with the idea, 72% of them agreed with the opinion and 4% of them disagreed with the idea that AI-based apps are good for vocabulary and grammar learning. Thus, it can be asserted that most of the participants believed that vocabulary and grammar could be improved through the use of AI-powered Apps.

#### Students’ Learning Experience with AI-Powered Apps

When the participants were asked to share the learning experience through AI-based Apps, they shared the following experiences:

**Figure: 62**

#### *Students’ Learning Experience with AI-Powered Apps*



Note: SA=Strongly Agree, A=Agree, N= Neutral, D= Disagree, SD= Strongly Disagree

Statement 6: I would learn more if I could use AI-based apps.

Statement 7: Sharing learning material through AI-based apps is beneficial and effective for language learning.

Statement 8: I should keep using AI-based apps for English Language Learning.

Statement 9: Reading through AI-based App Readlee helped me to improve my reading skill.

Statement 10: Reading English with Readlee was more like a fun for me.

While responding to statement No. 6 i.e. “I would learn more if I could use more AI-based apps,” 64% of the participants strongly agreed whereas 32% agreed to the statement and only 4% of them remained neutral in giving their opinion. Thus, it can be asserted that most of the participants believed that they could learn more if they used more Apps powered by AI. So, the data indicates that most of the participants had a good impression of using AI-powered Apps in English language learning.

While giving their opinions about the sharing of learning material, 16% of the participants strongly agreed to the idea that sharing learning material through AI-based Apps is effective whereas 76% of the participants agreed to the idea and 8% of them did not agree to the idea that sharing learning material through AI-based Apps is effective and beneficial. Statement No. 8 is concerned with the participants’ level of satisfaction after using AI-based Apps so 68% of the participants strongly agreed that they would sustain the use of AI-based Apps for learning English whereas 32% of them agreed to the idea. Thus, the data indicated that all participants were willing to keep using AI-based Apps for learning English in the future.

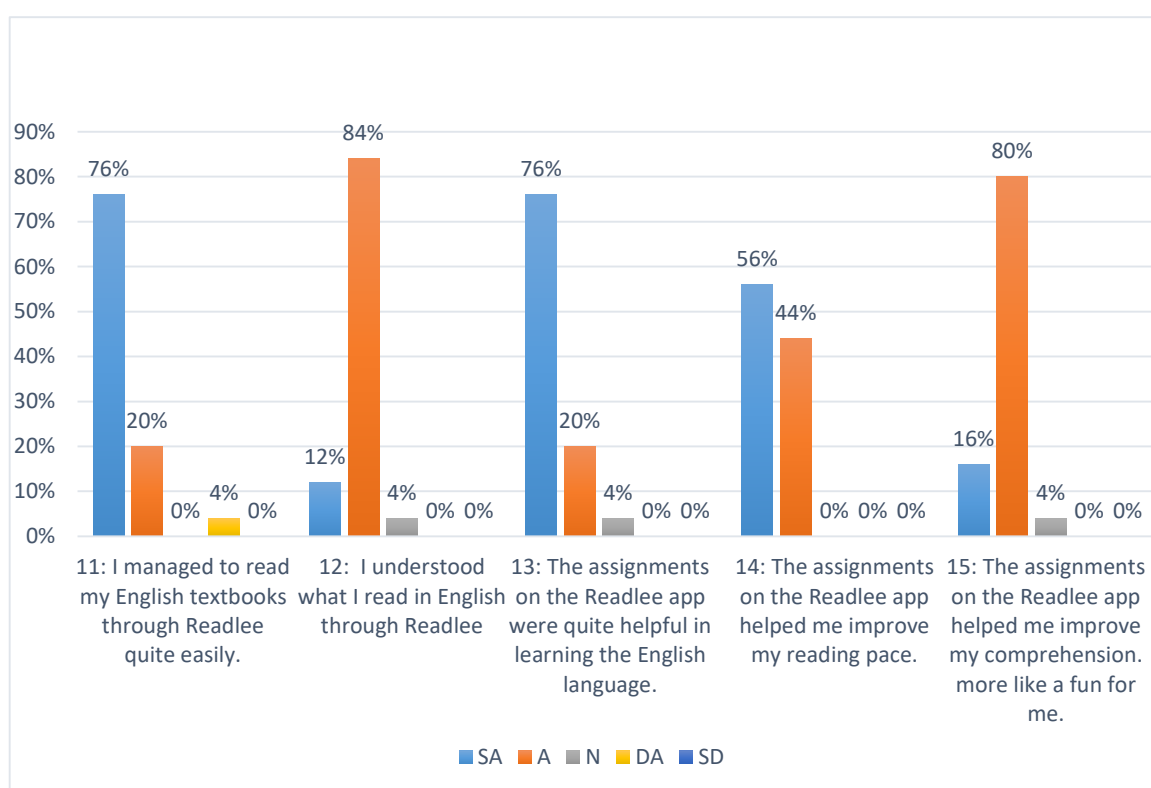
Statements No., 9 and 10 pertain to learners’ reading experience with the ‘Readlee’ App. while giving their opinions about the effectiveness of the ‘Readlee’ App, 96% of the participants strongly agreed that the ‘Readlee’ App was quite helpful in improving their reading skills whereas 4% of the participants agreed with the statement. Thus, it can be asserted that all participants were satisfied with their reading improvement through the use of the AI-based App ‘Readlee’. Moreover, while giving their response to statement No. 10, 80% of the participants strongly agreed to the idea that reading through ‘The Readlee App was more fun for them whereas 12% of the participants agreed to this notion. 4% of the participants were found to be neutral and 4% of them disagreed with the idea that reading through the Readlee App was more fun for them. Thus, it can be asserted that most of the participants were happy while reading the assigned text through ‘Readlee’ because they enjoyed their readings.

### 5.1.1 Students' Learning Experience with 'Readlee' App

AI-based App Readlee was incorporated to improve the linguistic input for the learners, and they had to read their English Textbook through the App for the whole treatment period. So, the students were required to share their learning experience with this App through the questionnaire. Thus, the next figure provides the details about students' learning experience with the Readlee app:

**Figure: 63**

*Students' Learning Experience with 'Readlee' App*



Note: SA=Strongly Agree, A=Agree, N= Neutral, D= Disagree, SD= Strongly Disagree

Statement 11: I managed to read my English textbooks through Readlee quite easily.

Statement 12: I understood what I read in English through Readlee.

Statement 13: The assignments on the Readlee app were quite helpful in learning the English language.

Statement 14: The assignments on the Readlee app helped me improve my reading pace.

Statement 15: The assignments on the Readlee app helped me improve my comprehension.

While responding to Statement No. 11 of the questionnaire 76% of the participants strongly agreed to the idea that they could easily manage to read their textbooks through 'Readlee' App. 20% of the participants agreed with the same statement whereas only 4% of the participants did not agree with the statement. Thus, the data indicated that more than 90% of the participants had no issues while using the 'Readlee' App.

Then, 12% of the participants strongly agreed with statement 12 indicating that they could easily understand what they read through the 'Readlee' App whereas 84% of the participants agreed that they also understood whatever they were assigned to read through 'Readlee'. 4% of the participants remained neutral in their opinion about the statement. The situation indicates that 96% of the participants were able to read and understand English text through the 'Readlee' App.

While expressing their views regarding their improvement in English language skills, 76% of the participants strongly agreed to the statement claiming that the reading assignments on the 'Readlee' App helped improve their English language skills whereas 20% of the participants agreed to the same statement. Only 4% of the participants were neutral and did not agree or disagree with the statement. Thus, the data indicated that 96% of the participants thought that the reading assignment on the 'Readlee' portal helped them improve their English language skills.

Moreover, while indicating the improvement in reading pace, 56% of the participants strongly agreed and 44% of the participants agreed with the statement that the 'Readlee' App helped them improve their reading pace. Thus, it can be asserted that all participants were in favour of the statement that their reading pace improved because of using this App.

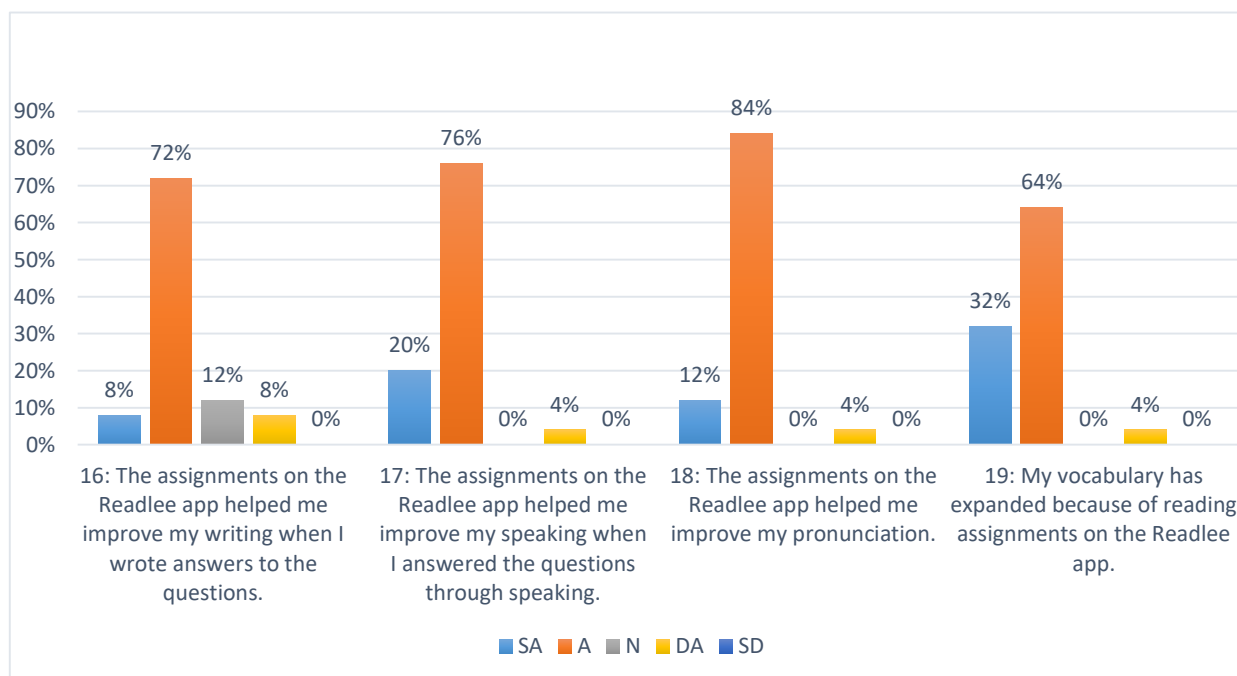
In response to statement No. 15, 16% of the participants strongly agreed to the idea that the comprehension skills of the participants were improved through the use of the 'Readlee' App and it was also fun for the students to improve comprehension through this App. 80% of the participants agreed to the same idea whereas only 4% of participants were found to be neutral against the idea that their reading comprehension improved through the Readlee app. However, most of the participants supported the idea that the assignments on the Readlee app helped them improve their comprehension skills.

### 5.1.2 Students' Perceptions of the Impact of Readlee App on Writing and Speaking Skills

The participants shared their opinions about the impact of 'The Readlee App' on skills other than reading. Participants' ideas about the impact of this App on writing and speaking skills are presented in the following figure:

**Figure: 64**

*Impact of 'Readlee' on Writing and Speaking Skills*



Note: SA=Strongly Agree, A=Agree, N= Neutral, D= Disagree, SD= Strongly Disagree

Statement 16: The assignments on the Readlee app helped me improve my writing when I wrote answers to the questions.

Statement 17: The assignments on the Readlee app helped me improve my speaking when I answered the questions through speaking.

Statement 18: The assignments on the Readlee app helped me improve my pronunciation.

Statement 19: My vocabulary has expanded because of reading assignments on the Readlee app.

While responding to statement No. 16, 8% of the participants strongly agreed, 72% of the participants agreed, 12% of the participants remained neutral and 8% of the participants did not agree with the idea that the writing tasks on the Readlee App helped them improve their writing skills. Hence, it can be asserted that most of the participants were satisfied with their improvement in writing skills after submitting the assignment through the 'Readlee' App.

Then, 20% of the participants strongly agreed with the idea that their speaking skills were improved by solving the tasks through the 'Readlee' App. 76% of the participants agreed with the same idea whereas only 4% of the participants disagreed with the idea. Thus, the situation indicated that most of the participants claimed that like writing skills, their speaking skills also had a positive impact of the 'Readlee' App.

While responding to statement No. 18, 12% of the participants strongly agreed to the idea that their pronunciation improved because of the assignments on the 'Readlee Portal'. 84% of the participants agreed to the same idea whereas only 4% of the participants did not agree to the idea that their pronunciation improved because of the tasks on the 'Readlee Portal'. Thus, the situation indicates that most of the participants claimed that they improved their pronunciation through the use of the 'Readlee' App.

While giving their opinion about the vocabulary improvement, 32% of the participants strongly agreed to the idea that participants' vocabulary improved because of the 'Readlee Assignment'. 64% of the participants also agreed to the same idea whereas only 4% of the participants were not in favour of the idea that their

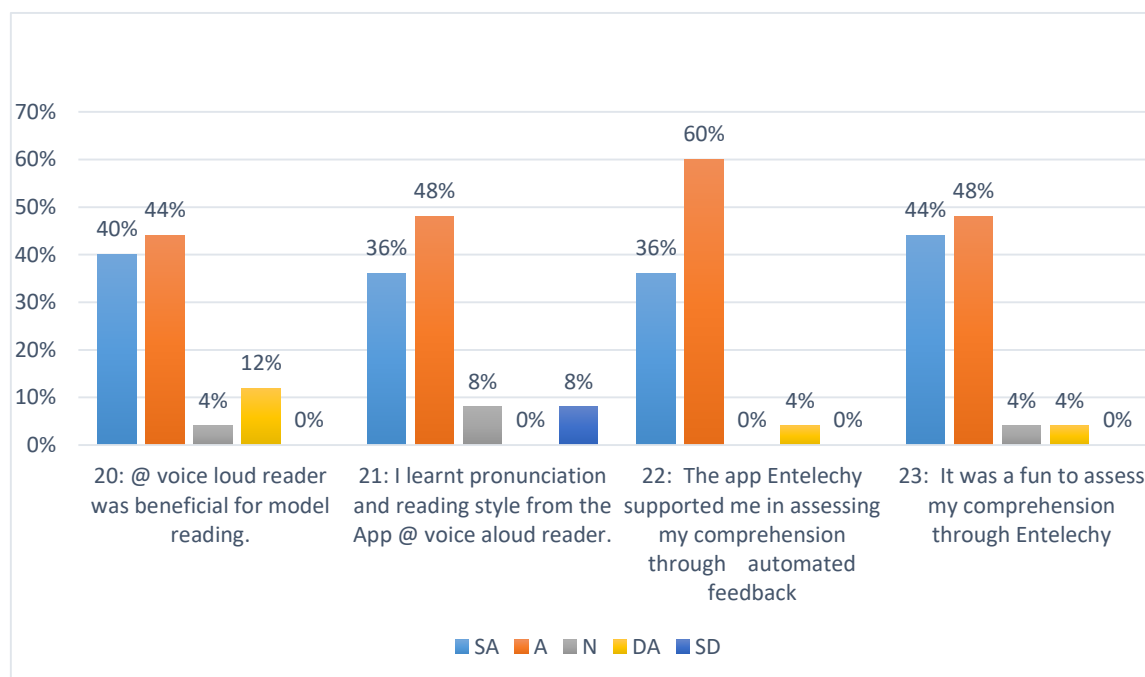
vocabulary improved because of the 'Readlee Assignments'. Thus, the situation indicates that most of the participants claimed that they improved their vocabulary repertoire because of 'Readlee Assignments'.

### 5.1.3 Students' Perceptions Regarding the Use of '@ Voice Aloud Reader' and 'Entelechy'

The participants expressed their ideas on the use of two other AI-based Apps that were incorporated into English language teaching at the college level. The ideas and opinions of the participants about these Apps are presented in the next figure:

**Figure: 65**

*Students' Learning Experience with '@ Voice Aloud Reader' and 'Entelechy'*



Note: SA=Strongly Agree, A=Agree, N= Neutral, D= Disagree, SD= Strongly Disagree

Statement 20: @ Voice aloud reader was beneficial for model reading.

Statement 21: I learnt pronunciation and reading style from the App @ voice aloud reader.

Statement 22: The app Entelechy supported me in assessing my comprehension through automated feedback.

Statement 23: It was fun to assess my comprehension through Entelechy.

While counting the benefits of ‘the @Voice Aloud Reader App, 40% of the participants strongly agreed to the idea that the App ‘@ Voice Aloud Reader’ was helpful for model reading whenever they student used it to have an idea about reading style and pronunciation of new difficult words. 44% of the participants agreed with this idea, 4% of the participants remained neutral whereas 12% of the participants did not agree with the idea that this App was beneficial for model reading. Thus, the data indicated that most of the participants thought that the App ‘@Voice Aloud Reader’ was useful for model reading.

Then 36% of the participants strongly agreed that they improved their reading style and pronunciation through the use of the App ‘@Voice Aloud Reader’. 48% of the participants agreed with the statement, 8% of the participants remained neutral whereas 8% strongly disagreed with the idea that this App was useful for improving the reading style and pronunciation of the participants. Thus, the situation indicated that most of the participants were convinced that their reading style and pronunciation improved because of the App ‘@Voice Aloud Reader’.

While responding to statement No. 36% of the participants strongly agreed that the app ‘Entelechy’ supported them in assessing their comprehension through automated feedback. 60% of the participants agreed with this statement whereas 4% of the participants did not agree with the idea that the App supported them in assessing their comprehension. The data indicated that most of the participants claimed that ‘Entelechy’ was useful in assessing their comprehension.

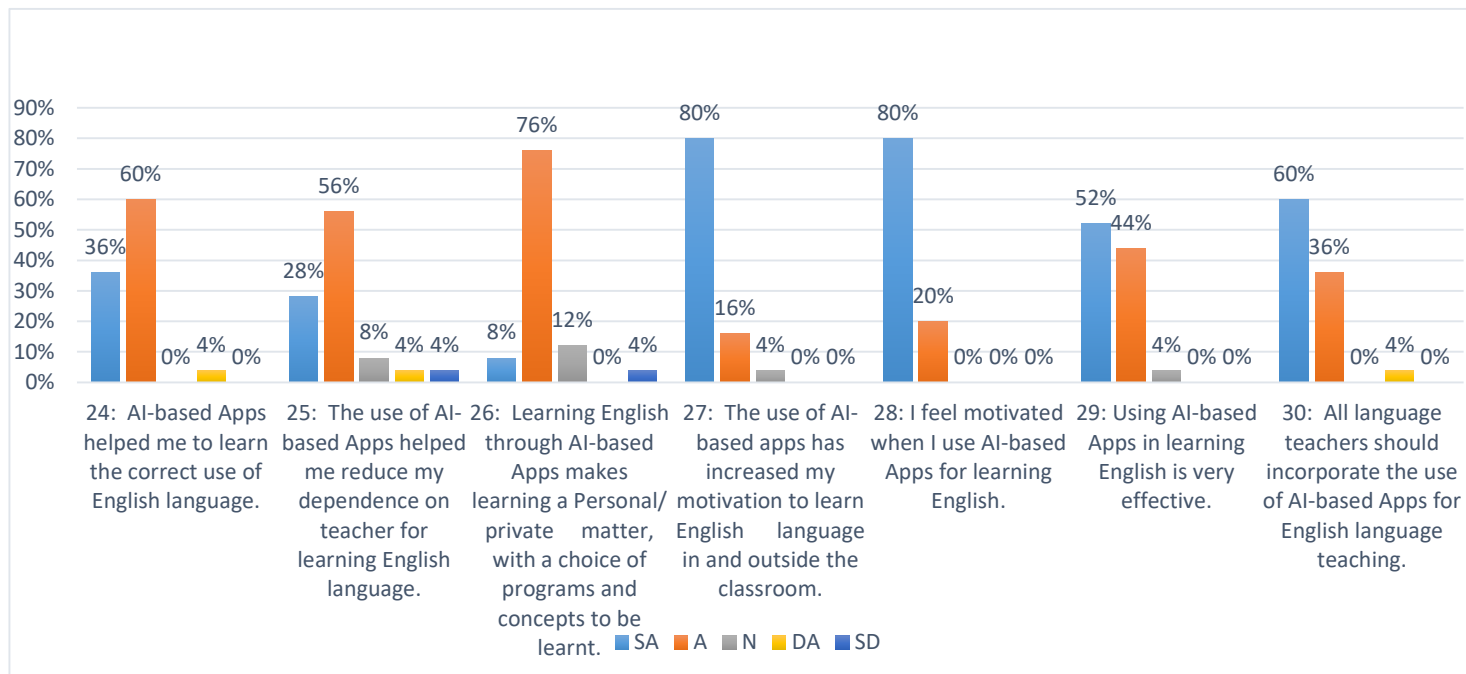
Then 44% of the participants strongly agreed that it was fun for them to assess their comprehension through ‘Entelechy’, 48% of them agreed to the idea whereas 4% of them remained neutral and 4% did not agree with the statement. Thus, it can be asserted that most of the participants thought that they had fun while assessing their comprehension through ‘Entelechy’.

#### 5.1.4 Overall Impact of AI-Based Apps on English Language Learning

The participants shared their views about the overall impact of AI-based Apps on English language learning with the following frequencies of opinion

**Figure: 66**

*Students' Opinions on the Overall Impact of AI-Based Apps on English Language Learning*



Note: SA=Strongly Agree, A=Agree, N= Neutral, D= Disagree, SD= Strongly Disagree

Statement 24: AI-based Apps helped me to learn the correct use of the English language.

Statement 25: The use of AI-based Apps helped me reduce my dependence on teacher for learning English language.

Statement 26: Learning English through AI-based Apps makes learning a Personal/private matter, with a choice of programs and concepts to be learnt.

Statement 27: The use of AI-based apps has increased my motivation to learn the English language in and outside the classroom.

Statement 28: I feel motivated when I use AI-based Apps for learning English.

Statement 29: Using AI-based Apps in learning English is very effective.

Statement 30: All language teachers should incorporate the use of AI-based Apps for English language teaching.

Statements 24 to 30 pertain to students' opinions about the overall impact of AI-powered Apps on English language learning. So, while responding to Statement

No. 24, 36% of the participants strongly agreed to the idea that AI-based Apps helped the students learn correct use of English. 60% of the participants agreed with this idea whereas only 4% of the participants disagreed with it. The situation indicates that 96% of the participants favored the idea that they learned the correct use of the English language through AI-powered Apps during the current study.

28% of the participants strongly agreed with statement No. 25 indicating that AI-based Apps reduced their dependence on teachers in English language learning whereas 56% of the participants agreed with this idea. Some 8% of them remained neutral and 4% disagreed whereas 4% of the participants strongly disagreed. Thus, the data indicated that most of the participants believed that their dependence on teachers in English language learning was reduced because of AI-based Apps.

While responding to statement No. 26 i.e. “Learning English through AI-based Apps makes learning a Personal/ private matter, with a choice of programs and concepts to be learnt”, 8% of the participants strongly agreed to the statement whereas 76% of them agreed to it. 12% of the participants remained neutral and only 4% of the participants strongly disagreed with the idea. Thus, the data indicated that 84% of the participants agree that learning English through AI-based Apps makes learning a Personal/ private matter for them and they have a choice of programs and concepts to be learned.

80% of the participants strongly agreed with statement No., 27 indicating that their motivation level was increased during the current research whereas 16% of them agreed to the statement and some 4% remained neutral. Thus, it can be asserted that 96% of the participants indicated that their motivation level to learn English improved during the current research because of AI-based Apps and they are now motivated to learn English in and outside the classroom.

While comparing English language learning with AI-based Apps to English language learning without the AI-based Apps, 80% of the participants strongly agreed to the idea that they feel more motivated when they learn English through AI-based Apps whereas 20% of the participants agreed to this statement which indicates that all

of the participants thought that they feel more motivated to learn English when they learn English through AI-based Apps.

52% of the participants strongly agreed to the idea that the use of AI-based Apps for learning English is very effective whereas 44% of the participants agreed to this idea. Conversely, only 4% of the participants remained neutral on this point. Thus, the data indicated that 96% of the participants thought that the use of AI-based Apps is very effective for learning the English language.

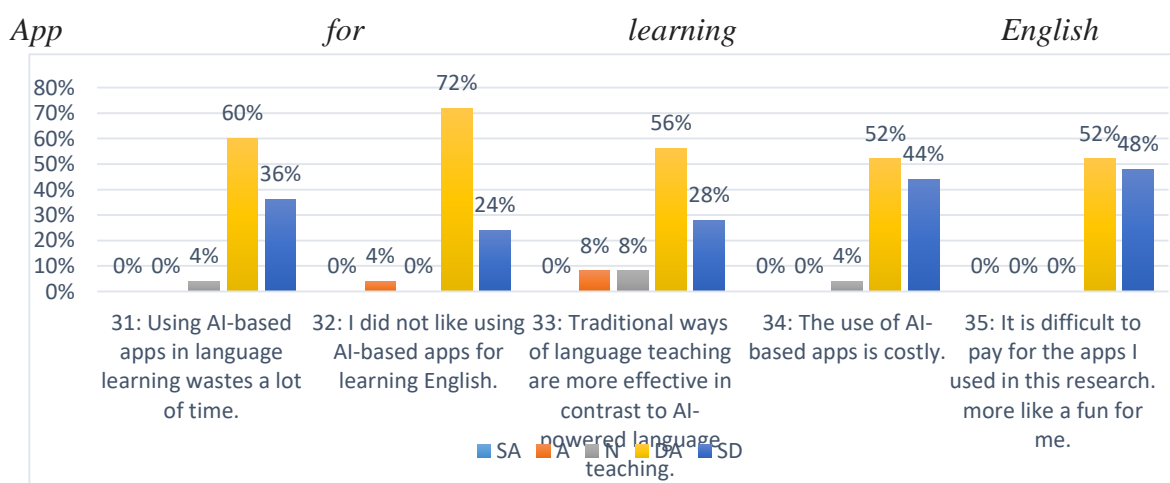
While responding to statement 30, 60% of the participants strongly agreed to the idea that all language teachers should incorporate the use of AI-based Apps for language teaching whereas 36% of the participants agreed to this idea. Only 4% of the participants disagreed with the idea that all language teachers should use AI-based Apps to teach the English language. Thus, the data indicated that 96% of the participants favoured the idea that all English language teachers should use AI-powered Apps to teach the English language.

### 5.1.5 Limitations on Incorporating AI-based Apps in English Language Learning

The participants expressed their views on limitations and issues they had to face while using AI-based Apps for learning English. The following figure explains the details.

**Figure: 67**

*Students' Perceptions Regarding the Limitations on Using AI-Based*



Note: SA=Strongly Agree, A=Agree, N= Neutral, D= Disagree, SD= Strongly Disagree

Statement 31: Using AI-based apps in language learning wastes a lot of time.

Statement 32: I did not like using AI-based apps for learning English.

Statement 33: Traditional ways of language teaching are more effective in contrast to AI-powered language teaching.

Statement 34: The use of AI-based apps is costly.

Statement 35: It is difficult to pay for the apps I used in this research.

While responding to statement No. 31, 60% of the participants disagreed with the idea that using AI-based Apps for learning English is a waste of time whereas 36% of the participants strongly disagreed with this idea. Some 4% of the participants remained neutral on this point. The data indicated that 96% of the participants did not consider it a waste of time to incorporate AI-based Apps to learn English.

Only 4% of the participants agreed with statement No. 32 indicating that they didn't like using AI-based Apps for learning English whereas 72% of the participants disagreed with this idea and 24% of the participants strongly disagreed with this notion. The situation indicates that 96% of the participants did not agree with the idea that they didn't like the use of AI-based Apps for learning English.

8% of the participants agreed with the statement that the traditional ways of language teaching are more effective in contrast to AI-powered language teaching. Whereas 8% of them remained neutral on this. 56% of the participants disagreed with the statement and 28% of them strongly disagreed. The data indicated that 84% of the participants favoured AI-powered English language teaching.

Statement 35 pertains to the cost of using AI-based Apps for language teaching and learning. While giving their opinions on this statement, 52% of the participants disagreed with the idea that they had to spend a lot of money to use AI-based Apps for learning English whereas 48% of them strongly disagreed with this notion. Thus, the data indicated that all participants indicated that using AI-based Apps for learning English is not expensive.

## 5.2 Interviews

To have students' perceptions regarding the use of AI-based Apps in English language learning, 7 participants were selected from the experimental group through a systematic sampling technique. The participants answered 10 questions that were based on the following themes:

- Participants' experience with AI-powered Apps
- Contributed of AI-based Apps to participants' English language learning
- Participants' future plans about using AI-based Apps
- Most striking features of Ai-based Apps
- Challenges the participants met while using AI-based Apps
- Participants preferences for traditional or AI-assisted English language learning
- Whether the teacher should retain teaching through AI-based Apps or not
- Impact of AI-based Apps on participants' level of motivation
- Whether or not the students would recommend other students to learn through AI-based Apps
- The most effective App

The interviews were recorded through the mobile phone recorder and then transcribed for the sake of analysis. The qualitative data sought through interviews were analysed through thematic analysis with the following findings:  
Students' Learning Experience with AI-Based Apps.

While responding to Question No. 1, most of the participants indicated that their English language learning experience with AI-based Apps was amazing. Almost all participants thought that they had a very different learning experience and they learnt the target language in a new and interesting way. The participants indicated that they found AI-based Apps quite beneficial for English language learning. The participants also indicated that they improved their language skills to a great extent because of AI-based Apps.

### 5.2.1 Students' Satisfaction Level

As far as students' level of satisfaction is concerned, all participants indicated that they are very much satisfied after learning the English language through AI-powered Apps. The participants acknowledged that they felt great improvement in their English language skills. They also indicated that AI-powered Apps are interactive and provide personalized learning with real-time feedback. Some of the participants informed that they found a new and innovative way of learning English to which they were not familiar before the current research. So, the data indicated that all participants were found very satisfied with learning through AI-based Apps.

### 5.2.2 Students' Intentions to Use AI-based Apps in Future

When the participants were asked whether or not they would keep using AI-based Apps for learning English in future, all participants expounded that they would retain the use of AI-based Apps for their future English language learning. The participants indicated that they would keep using these Apps in future because they learnt a new and effective method to improve their English language skills. Moreover, they found it to be a practical and innovative way of learning English. Some of the participants indicated that they found it very interesting to learn the English language through AI-powered Apps. One of the participants indicated that he would keep using AI-harnessed Apps because he found them easy to use from anywhere and the students can learn the English language according to their schedule. So, it can be asserted that the interviewees agreed to keep using AI-based Apps in future because they found these Apps effective for English language learning.

### 5.2.3 The Most Striking Feature in AI-Based Apps

When the participants were asked to give opinions about the most striking feature of AI-based Apps, they indicated that they found all features to be amazing but commonly counted features of AI-based Apps were:

- Voice recording and quick feedback
- Personalized learning experience
- Interesting and amusing activities
- Word count per minute and highlighting pronunciation mistakes
- Interactive and innovative learning

## · Ubiquitous learning

The data indicated that the participants found different striking features of the Apps they used during the current research. Thus, it can be asserted that the students learnt new techniques to improve their English. They also got familiarized with different useful features of different Apps. These apps would help them in their future studies as well.

### 5.2.4 Challenges the Participants Faced

When the students were asked what kind of challenges and difficulties they met while using AI-based Apps for learning English, most of the participants said that there were no challenges but some of the participants indicated that they rarely had poor internet connection. One of the participants indicated that he faced difficulty in using AI-based Apps at the start because he lacked training. Another participant informed me that sometimes he was disturbed by his family while submitting his reading assignments through the 'Readlee' App. So, the data indicated that the students did not face any severe issues while using AI-based Apps during the current research.

### 5.2.5 Students' Preference for the Teaching Method

Since the participants learnt English through AI-powered Apps for about 8 months during the current research, they had exposure to new ways of English language learning. After the exposure to new techniques, when the participants were asked to share their preferences, most of the participants indicated that they found the AI-powered English language teaching method more effective and beneficial for them. They informed me that AI-assisted language teaching is more practical. They found it unique and innovative. Some of the students indicated that their motivation level was enhanced through the use of AI-based Apps so they prefer AI-assisted language teaching to traditional language teaching methods. Just a few students thought that both, the AI-assisted language teaching method and traditional language teaching have their advantages so both should be incorporated into teaching English. Thus, it can be asserted that most of the participants favoured the use of AI-powered English language teaching at the college level.

### 5.2.6 Students Views about the Retention of the Use of AI-Powered App

When the participants were asked whether the teacher should retain the use of AI-based Apps to teach English at the college level, all participants suggested that the teacher should keep using AI-based Apps to teach English at the college level. The participants argued that these Apps are quite effective, innovative and beneficial. The students liked English language learning through this medium of instruction. Moreover, the participants indicated that these Apps provide advanced learning options while providing vocabulary, pronunciation and grammar rules which are the key components of English language learning. Thus, it can be asserted that all participants emphasized the use of AI-powered Apps for English language teaching at the college level.

### 5.2.7 Students' Opinions about the Increase in their Interest Level

During the interview, the participants were asked about their level of interest during and after the use of AI-based Apps for English language learning. Almost all the participants informed that their level of interest in learning English increased because of the use of AI-based Apps during the current research. The participants indicated that their past experiences of learning English were not good because English language learning was a boring activity for them. But, this time they had a good learning experience because they enjoyed learning through new technology. The participants informed that learning English through AI-based Apps was fun for them and they had a pleasant learning experience this time.

### 5.2.8 Recommending the Use of AI-Based Apps to other Teachers

When the participants were asked whether the other language teachers should also use AI-based Apps for English language teaching or not all participants suggested that other language teachers should also use this platform for English language teaching because they found it quite effective and beneficial for English language learners. While counting the reasons why other teachers should also use AI-based Apps, the participants approved that the Apps they used were quite effective, useful, interesting and innovative. Moreover, the participants indicated that they found these Apps practical because they engage students in learning properly, give quick and personalized feedback and make language learning more interactive and lively.

### 5.2.9 The Most Effective App Indicated by the Participants

Three AI-based Apps were incorporated into the current research for different purposes and the participants were required to use all of them to learn the English language. So, they were asked to share their opinions about the most effective App. The participants informed that they like all Apps but ‘Readlee’ served their purpose well. While counting the features of this App, the participants indicated that they found it most effective because it records the voice of readers which they can listen to after submitting their reading assignment. Moreover, they found the App effective because it provided them with quick and personalized feedback and they could know about their mistakes. Thus, most of the participants indicated that the Readlee App has amazing features. Some of the participants indicated the App ‘@voice aloud reader’ was also very effective because it helped them improve their listening skills and pronunciation.

The data obtained through the interviews indicated that the participants were satisfied after learning English through AI-based Apps. The detailed analysis of the interview questions indicates that the participants gave positive reviews about the use of AI-based Apps for teaching/learning English language skills at the college level. The data indicated that students’ past English language learning experience was not as good as the current one. The participants admitted that they had a very pleasant English language learning experience this time. They informed me that they not only enjoyed learning English but they also learned new ways to improve English language skills through personalized learning patterns. Thus, it can be asserted that all the interviewees gave positive remarks in favour of AI-powered English language teaching and approved the implementation of these Apps in the area of English language teaching at the college level.

## CHAPTER 6

### DISCUSSION

This chapter discusses the major the data in light of its objectives, research questions, and previous literature. The research data inform that the use of AI-based apps to improve college ESL students' English language skills proved effective. The study came up with the findings that the integration of AI technology in English language teaching is really worthwhile. The traditional English language teaching, which is exam-oriented and based on rote learning, has been replaced with a newer methodology that integrates AI-powered tools in English language teaching. It is doubtless that researchers, linguists and language teachers have been coming up with new techniques and methodologies which recommended the use of electronic devices, computers and mobiles, and they have been proved to be effective in one way or another. However, all these platforms could not achieve the same level of effectiveness as that achieved through the use of AI technology.

For instance, CALL and MALL, in the recent past, revolutionised English language teaching at their levels, and both techniques were warmly welcomed by students and teachers around the globe for their usefulness (Kafryawan, 2023). But AI technology left everything behind due to its multidirectional and multifunctional aspects.

The findings of the current study thus indicate that the use of AI-based apps for English language teaching is many times more effective than traditional language teaching practices and methods, both within and outside the classroom. The key difference in usefulness between the traditional English language teaching methods and AI-enhanced English language teaching can be understood through the following comparison.

#### Traditional vs AI-Powered English Language Teaching

Traditional Language Teaching	AI-Powered English Language Teaching
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Based on rote learning and Exam oriented aspects of English language teaching.	Focuses on engaging learners in learning activities.
Learning based on classroom activities only.	24/7 learning as per the choice of learners.
Reliance on teacher/ Teacher centered approaches	self-learning/ Student centered
Time constraints	Time management as per students' choice
Limited resources to learn (specific books & syllabus)	Unlimited resources and multiple options to learn along with the prescribed textbooks.
Slow, steady and cumbersome processes	Quick, robust and timely response
Teacher's dependency for feedback	Quick, and personalized feedback
Boring & passive learning	Interesting & active learning

The study further highlights the key differences b/w CALL/MALL vs AI-Powered English Language Teaching indicating the advantages of AI-powered language teaching.

### **CALL/MALL vs AI-Powered English Language Teaching**

<b>CALL/MALL</b>	<b>AI-Powered English Language Teaching</b>
CALL/MALL lack immediate and personalized feedback.	AI-powered language teaching provides quick and personalized feedback.
CALL/MALL requires resources and appliances that involve cost and budget.	AI-based Apps are budget friendly and affordable they require either no cost or low cost.
<b>CALL/MALL</b>	<b>AI-Powered English Language Teaching</b>

CALL/MALL engage the teacher who designs and plans every activity.	AI-powered apps have built-in language learning systems.
CALL/MALL are designed to subject and topic specific activities.	AI-based language teaching/learning provides ample and systematic language learning opportunities with multiple resources.
CALL/MALL lack progress monitoring systems	AI-based tools provide an automated analysis of students' engagement in learning activities providing time-to-time monitoring details.
CALL/MALL have limited interactive systems.	AI-harnessed apps are interactive and responsive.

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As far as the reading skills of the students are concerned, marked improvement in participants' reading skills was noticed, which aligns with Grabe's (2009) theoretical model of reading. The significant contribution of the study is reflected in the fact that reading skills of college-level learners are usually overlooked due to time constraints and large-sized classes. Both lower- and higher-level reading skills require continuous practice, which cannot be ensured without daily reading engagement. Thus, the study indicated that daily reading tasks, supported by three different AI-based apps, improved learners' lower-level reading skills—such as word recognition, syntactic parsing, grammar knowledge, and basic decoding abilities—on one hand, and comprehension skills on the other. Learners improved their reading fluency and speed through the AI-based apps, which were enriched with text-to-speech tools, vocabulary enhancement platforms, and interactive reading modules. Hence, increased automaticity in lower-level skills was one of the key findings of the study.

Conversely, higher-level skills such as inference and comprehension also improved remarkably due to the regular use of AI-based apps, which were specifically designed for inference and comprehension practice. In this regard, significant improvement was noted among the learners, as the AI-powered apps engaged them with adaptive questioning and comprehension exercises after each reading task. This

practice enabled students to interact with texts more critically, make inferences, summarise, and synthesise texts more systematically.

Thus, the study highlights that reading skills of college-level ESL learners can be effectively improved with the help of AI-based apps. However, language teachers need to reconsider traditional methods for improving students' reading skills. The findings of the current study further indicate that long-standing issues, such as time constraints and large-sized classes, can be successfully addressed if teachers implement AI-powered language teaching both during and beyond the syllabus-specific English language classes at the college level.

The integration of AI tools into English language teaching—specifically in reading instruction—has proved to be effective and successful, as also supported by studies conducted by Fitria (2021), Srinivasan and Murthy (2021), Hidayat (2024), Chavez and Palaoag (2024), Jose (2025), and Elmaadaway, El-Naggar, and Abouhashesh (2025), all of whom favour the application of AI-based platforms for improving ESL students' reading skills. However, the side effects and potential drawbacks of using such platforms must also be carefully considered, as AI technology does have limitations that might impact creativity and critical thinking in learners (Watkins, 2024). Although the use of AI tools in language teaching is gaining popularity, it must not be overlooked that learners might suffer from reduced development of essential native capabilities that require regular practice and engagement for personal growth. Chea and Xiao (2024), for instance, highlight the damages AI tools may cause to learners' reading abilities, suggesting that reliance on such tools could negatively affect reading pace and comprehension. For example, if a learner depends on an app to read aloud and merely listens without reading actively, it can lead to a habit of passive learning.

To address this concern, the participants in this study were instructed first to listen to the text via the @Voice Aloud Reader and then to read it aloud themselves using the 'Readlee' app to complete their reading tasks.

The findings of the study further indicated that improvements in reading skills had a positive impact on both writing and speaking abilities. This dual-level improvement in reading, writing, and speaking was the result of AI-enhanced reading instruction, which addressed the lack of adequate linguistic input at the college level. The findings revealed that systematic implementation of AI-powered English language instruction led to significant gains in speaking and writing. Notably, there was a considerable difference in pre- and post-test results, attributed to improvements in vocabulary, grammar, pronunciation, and fluency. Previously, when reading practice and linguistic input were insufficient, learners struggled to construct grammatically correct sentences in writing. They lacked vocabulary, grammatical accuracy, coherence, and organisation. However, the robustness of AI-powered tools enabled learners to perform significantly better in the writing post-test, which involved sentence completion and paragraph writing tasks.

Regarding speaking skills, the participants were found to be more accurate, confident, and expressive after using AI-based apps such as Readlee and @Voice Aloud Reader. The post-test results demonstrated that learners improved their pronunciation and exhibited better fluency and spontaneity. Listening to texts through @Voice Aloud Reader helped improve pronunciation and expression through auditory input, while Readlee's transcription of loud reading identified pronunciation errors and provided immediate feedback. Furthermore, daily reading aloud to the app enhanced learners' fluency and confidence.

A major aspect of the current study was exploring learners' views on the integration of AI tools for English language learning. Perceptions and beliefs shape individuals' actions and intentions (Chee, 2002); therefore, it was essential to investigate learners' perceptions regarding the use of AI-based apps to improve reading, writing, and speaking at the college level. Responses to the questionnaire and interviews were largely positive. Participants found AI-powered apps effective, easy to use, engaging, and beneficial for English language learning. Most appreciated the real-time and personalised feedback systems, which were distinctive features of the AI-

based apps used in this study. Most notably, participants reported increased interest and motivation in their learning.

It can thus be concluded that traditional English language teaching now has a valuable supplement in the form of AI-based apps, which offer practical and individualised learning, quick and automated feedback, and empower learners to self-monitor their progress and focus on weak areas independently. This indicates that positive learner perceptions of AI tools reinforce the value of AI-powered apps in making ELT more scalable and learner-centred. The findings also suggested that ESL learners at the college level are open and welcoming towards AI-powered English learning, encouraging teachers, curriculum designers, and policymakers to consider integrating AI tools into English language instruction, particularly at the college level.

Last but not least, the fundamental objective of the current study was to improve college ESL learners' English language skills using AI-based apps. The findings confirmed that the predefined objectives were successfully achieved by the end of the intervention. Not only did the learners' language skills improve, but they also experienced a new and motivating paradigm of English language learning supported by improved classroom dynamics. The flexible nature of AI-powered instruction enabled students to learn at their own pace, according to their diverse needs. Throughout the experimental phase, improved student participation, timely task submission, and enhanced overall outcomes were observed, which further supported the effectiveness of integrating AI-powered tools into English language teaching.

Thus, the evidence suggests that the current experimental methodology proved highly effective for improving the English language skills of college ESL learners. The study makes a positive contribution to the growing body of research supporting the integration of AI technology in the Pakistani college-level ELT context.

## CHAPTER 7

### FINDINGS & CONCLUSION

The current study was conducted within the field of English Language Teaching (ELT) and it endeavoured to improve college students' English language skills using AI-based applications. The key focus of the study was to enhance students' linguistic input in the form of *reading*, which is often neglected—not only by many teachers, but also by students, who are frequently reluctant to complete reading tasks assigned as homework. Reading plays a vital role in language learning. In the Pakistani context, reading is commonly taught using traditional methods, and there is typically no feedback system in place to inform teachers about whether students have completed their reading tasks. Moreover, time constraints and large-sized classes further hinder teachers from evaluating students' reading and providing timely feedback.

Consequently, the lack of regular reading practice on the part of students, coupled with the teacher's inability to offer feedback, significantly impedes the development of reading skills. As a result, the writing and speaking skills of ESL learners are also negatively affected, as linguistic input through effective reading is compromised. To address this issue, the current study incorporated three AI-based applications—*Readlee*, *@Voice Aloud Reader*, and *Entelechy*—to support Pakistani college students in improving their reading skills. Simultaneously, the study explored the extent to which writing and speaking skills are influenced when reading is regularly practised using AI-based applications.

In line with the stated problem, research questions, and objectives, the present experimental study was grounded in Grabe's (2009) theory of reading. Additionally, Srisang and Everatt's (2021) analytical model was employed to enhance students' reading skills, while Bachman and Palmer's (2010) model of *Language Ability* was applied to improve the writing and speaking skills of the research participants. The study yielded the following findings:

## 7.1 Improvement in English Language Skills

### 7.1.1 Improvement in Reading Skills

Grabe's (2009) theory of reading consists of two key elements that an ESL reader needs to focus on. It includes:

- a) Lower Level Reading Skills
- b) Higher Level Reading Skills

The lower-level skills addressed in the study include reading pace and accuracy, word processing and recognition, vocabulary, grammar knowledge, and inference. All these components were targeted throughout the treatment period, and the following results were ultimately observed.

The results indicated that only 20% of the participants from the control group showed slight improvement in reading pace when finally assessed using the AI-based app *Readlee*. In contrast, participants from the experimental group demonstrated significant improvement in reading pace after practicing through *Readlee*. These findings indicate that students who were taught using AI-based apps had a clear advantage.

Furthermore, the results demonstrated that 40% of the participants from the control group improved their reading accuracy, while 64% of the participants from the experimental group improved their accuracy through regular reading practice using *Readlee*. The improvement is attributed to consistent engagement in reading tasks, facilitated by both the teacher and the students during the intervention. Thus, it can be asserted that the *Readlee* app proved effective in enhancing college students' reading pace and accuracy.

When analysing students' improvement in word processing and recognition, it was found that 64% of the control group improved, compared to 96% of the experimental group. This 32% difference in improvement highlights the advantage gained by using the AI-based app *Readlee*. Similar findings are reported in other

studies. For instance, Al-Far and Shahin (2019) also found AI technology effective for teaching and learning. Al-Omari (2019) emphasised the need for training in AI app usage due to their cognitive benefits. Al-Yajizi (2019) similarly recommended opportunities for university teachers to be trained in AI-based tools, given their effectiveness. Both Al-Farrani and Al-Hejaili (2020) also advocated the integration of AI-based applications in teaching and learning.

Regarding vocabulary acquisition, data analysis revealed that 56% of the control group improved their vocabulary through traditional instruction. In contrast, all participants from the experimental group demonstrated vocabulary improvement after practising with AI-based apps. These results support the view that incorporating AI-powered apps into reading instruction is both practical and effective. Zucchet (2023) also argues that learners benefit from immediate feedback on vocabulary, pronunciation, and grammar through AI-powered language learning, which significantly impacts their overall progress.

Grammar knowledge also plays a crucial role in language learning (Rustembaevna, 2020). Grabe's (2009) reading theory includes grammar knowledge as a fundamental element nurtured through regular reading practice. Accordingly, the current study aimed to enhance grammar knowledge among college students using reading tasks from the prescribed textbook delivered through AI-based platforms. The results showed that all participants from the experimental group made significant improvement in grammar knowledge, whereas only 44% of the control group did so. These findings further support the efficacy of AI-based apps in promoting grammar development through reading.

Inferential skills, another key component of lower-level reading skills, were also examined. Marzo (2010) describes inference as a "foundational skill" and a prerequisite for struggling readers. In the current study, inference skills were explicitly practised through AI-powered language instruction, and the results were highly encouraging: 100% of participants from the experimental group improved their

inference skills, while only 36% of the control group showed any improvement. The control group, having not used AI-based apps, did not benefit similarly. These findings confirm that AI-powered apps are effective tools for enhancing inference skills. A similar conclusion was reached by Madhugiri (2023), who found that AI can perform tasks with high accuracy, reducing errors and improving overall precision.

Higher-level reading skills, as outlined by Grabe (2009), include reading comprehension—considered the ultimate goal of a proficient reader. Comprehension, therefore, is the hallmark of reading proficiency. The current study paid special attention to comprehension skills to develop more effective readers. After the eight-month intervention, results showed that the experimental group achieved 100% improvement in comprehension, while the control group improved by only 28%. This clearly demonstrates the advantage gained by the experimental group through regular use of AI-based apps.

Overall, the findings indicate that the use of AI-based apps is beneficial for improving students' comprehensive reading skills, encompassing both lower- and higher-level sub-skills. A total of seven reading sub-skills, as proposed by Grabe (2009), were addressed in the study. To assess these skills, Srisang and Everatt's (2021) model was applied. During the eight-month experimental period, students in the experimental group were assigned a series of reading tasks using the *Readlee* app. The final results confirmed that *Readlee* significantly contributed to the development of all seven reading sub-skills among college-level ESL learners.

### 7.1.2 Improvement in Writing and Speaking Skills

The second research question pertains to the improvement of linguistic output in the form of writing and speaking. For second language learning, linguistic input is indispensable; without it, linguistic output cannot be ensured (Begum, Hossain & Rahman, 2018). Therefore, the current study aimed to enhance students' linguistic input so that their output, particularly in writing and speaking, could also be improved. The results indicated that the participants from the experimental group enhanced their

reading skills with the help of the AI-based applications, and these apps proved effective in improving college-level English language learners' reading proficiency.

Furthermore, the findings revealed that the writing and speaking skills of the participants in the experimental group also improved to a significant extent. The students' writing and speaking competencies were assessed and analysed using Bachman and Palmer's (2010) model of *Language Ability*, with a primary focus on structural and grammatical knowledge. The following findings further illustrate the extent to which the participants enhanced their writing and speaking performance:

With regard to writing skills, the participants were assessed using two tools: *Discourse Completion Tasks* (DCTs) and *Paragraph Writing*. After comparing the pre-test and post-test results, it was observed that 96% of the participants from the experimental group showed improvement in discourse completion tasks, whereas only 56% of the participants from the control group demonstrated improvement in the same tasks. Additionally, all participants from the experimental group exhibited progress in paragraph writing, whereas only 44% of the control group participants showed improvement in this area. These results indicate that the majority of the participants from the experimental group, having improved their reading skills, were subsequently able to enhance their writing and speaking abilities. On the contrary, the participants from the control group did not demonstrate any significant improvement in reading, which negatively impacted their linguistic output. Consequently, they were unable to make meaningful progress in their writing and speaking skills.

Similarly, the participants from the experimental group showed considerable improvement in their speaking abilities. As far as speaking is concerned, the participants were evaluated according to Bachman and Palmer's (2010) model of *Language Ability*. They were assessed through short speeches and dialogues, with a focus on pronunciation, grammatical accuracy, and overall communicative competence. The results demonstrated that all participants from the experimental group improved their pronunciation, whereas only 24% of the control group participants

achieved any improvement in this area. Regarding speaking accuracy, again, all participants from the experimental group showed measurable improvement, while only 16% of the control group participants improved in this aspect. Thus, the findings indicated that the speaking skills of the experimental group participants developed significantly, whereas the control group participants failed to make substantial progress. It can therefore be asserted that once the participants improved their linguistic input through the use of AI-powered tools, their linguistic output—specifically writing and speaking—also advanced considerably.

In addition, the experimental group participants continued practising both writing and speaking through the *Readlee* app by consistently responding to specific questions after reading assigned texts on the *Readlee* portal. Each participant was required to answer two questions in written form and two in spoken form. In contrast, the control group participants did not have access to this feature, nor were they provided with any AI-based platform to practise writing and speaking. Hence, the difference in the mode of learning contributed greatly to the improved performance of the experimental group, particularly in terms of writing skill development.

To assess the participants' overall communicative ability in speaking, dialogue-based assessments were conducted. The findings revealed that all participants from the experimental group made remarkable progress in their communicative competence, whereas only 12% of the control group participants demonstrated any improvement in this area. This clearly indicates that those students who were taught English through AI-based applications—including *Readlee*, *Entelechy*, and *@Voice Aloud Reader*—achieved notable progress in their speaking abilities.

### 7.1.3 Students' Perceptions about the Use of AI-Based Apps for Improving Reading Skills

The participants from the experimental group were asked to provide their opinions regarding the use of AI-based applications for improving reading skills. To gather these insights, a questionnaire was administered via Google Forms based on a

Likert scale, and interviews were also conducted to obtain qualitative data. Hence, the third research question—“*What are the perceptions of students regarding the use of artificial intelligence in teaching reading?*”—was addressed through both quantitative and qualitative methods.

The results revealed that the participants from the experimental group expressed a high level of satisfaction after using AI-based apps to learn English language skills, particularly reading. The questionnaire comprised 35 items concerning students’ perceptions of the role of AI-based applications in English Language Teaching (ELT), while a subset of the participants responded to 10 interview questions. The key findings derived from the questionnaire and interview data are summarised below:

- Students generally believed that AI-based applications were effective tools for English language learning activities, particularly for improving vocabulary and grammar.
- Participants expressed satisfaction after using AI-based apps and conveyed their willingness to continue using them for future learning.
- They agreed that sharing learning materials via AI-based apps is both beneficial and efficient for language acquisition.
- Many students acknowledged that the *Readlee* app was instrumental in improving their reading skills, noting that reading English through *Readlee* was more enjoyable and engaging.
- Participants reported being able to read their English textbooks more effectively using *Readlee* and demonstrated greater comprehension of the content.
- Assignments on the *Readlee* app helped enhance their reading pace, accuracy, and comprehension, thus supporting overall reading development.
- Students indicated that the writing and speaking tasks embedded in the *Readlee* app also contributed positively to their productive language skills.
- Participants were satisfied with the use of the *@Voice Aloud Reader* app, citing its usefulness in providing model reading experiences.
- The *Entelechy* app was appreciated for its automated feedback system, which assisted students in assessing their comprehension. Moreover, it proved beneficial for teachers by simplifying the quiz-creation process.

- Participants stated that using AI-based applications reduced their reliance on teachers. This finding aligns with Dickson's (2017) assertion that AI technologies significantly reshape the roles of teachers and learners, transforming the traditional learning environment. In this context, the teacher acts as a facilitator who designs and supports learning activities, while the student assumes a more central and active role.
- Students also reported that English language learning through AI-based apps felt more personal and private. This supports the *personalisation principle*, which allows learners to progress according to their own schedule and learning pace. This finding is supported by Mayer et al. (2004) and Dunsworth (2004), who found that personalisation enhances learning outcomes.
- As highlighted by Zucchet (2023), AI and machine learning are transforming language education through personalised content delivery, real-time feedback, and adaptive learning. These features were evident in students' feedback during the current study.
- Most importantly, students' motivation to learn English increased significantly after using AI-based applications.
- Participants suggested that English language teachers should incorporate AI-based applications into their teaching practices.
- Students found the learning experience enjoyable and effective. They appreciated the efficiency and affordability of AI-based apps, noting that these tools saved considerable time otherwise spent on traditional assessment and feedback methods. The real-time feedback provided by these apps was especially valued.
- Since most participants accessed these applications via mobile phones, their experience reflects the principles of Mobile-Assisted Language Learning (MALL). Previous studies by Kukulska-Hulme (2005), Kukulska-Hulme & Pettit (2009), Kukulska-Hulme & Shield (2008), Naismith et al. (2004), Pachler (2009), and Sharples (2009) also highlighted the usefulness of MALL, citing benefits such as flexibility, portability, access to learning resources, and convenience. Although MALL specifically refers to mobile technology use in language education, the context of the present study shows a strong overlap, as the participants primarily used mobile phones to engage with the AI-based applications.

These findings underscore the transformative potential of AI-based applications in enhancing English language proficiency among Pakistani college students. The students' positive perceptions and learning experiences reflect a paradigm shift in language education—from traditional teacher-centred instruction to interactive, student-driven learning environments supported by AI technologies.

The *Readlee* app emerged as a particularly effective tool, significantly enhancing reading fluency, comprehension, and learner engagement. Additionally, the integration of writing and speaking tasks into the app fostered improvements in productive language skills, demonstrating that AI-powered tools can facilitate comprehensive language development. Participants also commended *@Voice Aloud Reader* for providing effective model reading, and *Entelechy* for delivering instant feedback and easing teachers' workload in areas such as assessment.

Notably, the students reported increased independence and confidence, suggesting that AI-based applications foster learner autonomy and redefine the teacher's role as that of a guide or facilitator. The emphasis on personalised learning resonated strongly with educational psychology principles, as students valued being able to study at their own pace and convenience, which in turn enhanced their motivation and commitment.

Overall, the study's findings suggest that incorporating AI-based applications into English language instruction can substantially improve learner outcomes, foster learner autonomy, and modernize teaching practices in the context of Pakistani college education.

#### 7.1.4 Participants' Views about the Use of AI-Based Apps to improve Overall English Language Skills

The participants from the experimental group were interviewed to gather their views on the use of AI-based apps for improving English language skills among college students. The following findings were derived from the interview data:

- The results showed that the participants' English language learning experience was highly positive, and they expressed satisfaction with the teaching methodology employed. They noted that AI-powered English language instruction made a substantial contribution to their learning process. Based on their pleasant experience, the participants indicated that they would continue to use AI-based applications in their future studies. This outcome implies that other students are also likely to adopt AI-based apps willingly for learning English in Pakistani colleges.
- Students expressed deep appreciation for the advanced features of AI-based apps, particularly the quick feedback mechanism and personalized learning opportunities. These features were seen as highly engaging and motivating for learners. In similar studies, Ota and DuPaul (2002), as well as Acevedo-Polakovich, Lorch, and Milich (2007), found that the automatic feedback functionality played a central role in participants' enjoyment and enriched learning experiences. Moreover, Deci and Ryan (1985) and Lepper (1981) also emphasized that immediate feedback positively affects learners' intrinsic motivation, a finding that aligns with the current study.
- The participants did not report encountering any major difficulties while using the AI-based applications. This observation underscores the user-friendly nature of these apps, as participants were able to use them effectively and with positive results throughout the research period. The ease of use further supports their suitability for widespread implementation in college-level English language instruction.
- The participants strongly endorsed AI-powered English language instruction, advocating for the use of such applications by all English language teachers at the college level. They believed that the integration of AI-based apps could substantially improve teaching and learning outcomes, which are often unsatisfactory in the traditional educational context.
- The findings suggest that the use of AI-enhanced tools not only elevated learners' motivation but also increased teachers' enthusiasm for employing innovative teaching methodologies. This dual enhancement of motivation—both for teachers and students—has the potential to significantly elevate the quality of English language education. As motivation is considered a cornerstone of effective learning, improvements in motivational levels directly contribute to better learning outcomes.

- The study utilized three AI-based apps—‘Readlee’, ‘@Voice Aloud Reader’, and ‘Entelechy’. While each application had distinct functions and advantages, the ‘Readlee’ app emerged as the most effective due to its diverse functionalities. Participants particularly praised the app for its ability to support reading, writing, and speaking through interactive tasks and real-time feedback, making it their preferred choice among the three.

In conclusion, the results of the interview strongly support the notion that AI-based applications are highly beneficial for English language learning. Kamel, Al-Jazzar, and Mahmoud (2010, p. 220) also emphasized that AI-powered apps create an engaging and supportive learning environment characterized by various advanced features. Similarly, studies by Calp (2019) and Barnes (2016, p. 6) highlight that AI transforms traditional education into a modern, mechanized system where smart, interactive tools use natural language processing to develop learners’ language skills through structured drills, exercises, and guided feedback.

The interview findings complement and reinforce the data obtained through the questionnaire, thereby strengthening the reliability and validity of the study’s conclusions. Participants consistently reported high levels of satisfaction, motivation, and involvement, emphasizing the benefits of real-time feedback, individualized learning experiences, and overall ease of use. The convergence of evidence from both data sources confirms the significant potential of AI-based applications in revolutionizing English language education at the college level in Pakistan.

## **7.2 Achievement of Teaching Targets**

The results indicate that the use of AI-based apps in English language teaching at the college level is highly approved by the students. Therefore, all English language teachers can use these apps at the college level confidently. The current study has successfully incorporated the use of AI-based apps in English language teaching with happy results. It was for the first time in the researcher’s 19-year teaching career that he can claim to have been successful in making the students read their textbooks completely. In traditional teaching, it is not possible to monitor students after the

classroom, but AI-based apps like *Readlee* have made it possible for the teacher to monitor students' reading practice through a system that records voice and gives automated feedback to the teacher as well as to the students. Borge (2016, pp. 10–11) also expounded on his satisfaction with the use of AI-based apps, indicating that AI applications are very helpful in analysing students' performance, which is difficult otherwise.

Moreover, this study also served in the skill development of the students because they had to use different apps for different purposes during the study. Sudhaus (2013) also informs that mobile technology handlers pursue improvement in their skills more because they use mobile technology for their education. Since most of the participants used their mobile phones during the current research, it can be asserted that they developed further skills in this regard.

To conclude the current chapter, it can be asserted that the use of AI-powered apps for teaching the English language at the college level proved to be favourable and encouraging, as the basic purpose of teaching English textbooks at this level was achieved with positive results. Therefore, the current study recommends the use of the same apps as were used during the current study to improve college students' English language skills, and at the same time, it encourages the use of other AI-based apps for teaching English.

### **7.3 Conclusion**

The current study was conducted in the ELT arena, aiming at experimenting with AI-harnessed tools and apps to improve college students' English language skills. The study drew on the notion that weak or low linguistic input results in limited or low linguistic output. Reading, being one of the sources of linguistic input, plays a vital role in the entire language teaching and learning scenario, and it is through reading that linguistic output in the form of writing or speaking can be ensured (Zhang, 2009). Since English is taught through the prescribed textbooks in the Pakistani educational set-up, it is essential to make students read these textbooks within the prescribed time frame.

As far as ELT at the college level is concerned, language teachers are found struggling with issues like time constraints and large-sized classes. Thus, it hampers them from making students read during the class, and they just assign reading tasks to learners as home assignments which they cannot assess, nor do they have any authentic source through which they can ensure that every student has read the assigned text at home. It can be asserted that suitable teaching techniques are required to teach reading in large-sized classes, as traditional methods have several pitfalls (Istiqomah, Indah & Al Aziz, 2023). Thus, the current study experimented with using AI-powered apps at college-level English language teaching, while focusing on maximum reading practice through three different AI-based apps, i.e. *Readlee*, *@Voice Aloud Reader*, and *Entelechy*. All three applications were used to analyse how far English language skills of Pakistani college students can be improved using AI-based applications.

Moreover, the study also tried to investigate the perceptions of the students regarding the use of artificial intelligence in teaching reading, because it was the first time they experienced reading practice through AI-powered apps.

This action research lasted for 8 months, and the experiment phase was from September 2022 to April 2023. The participants were divided into control and experimental groups. Each group consisted of 25 college-level English language learners. The control group was taught the textbooks through the traditional lecture method, where the teacher did model reading and the students were assigned the reading tasks that they were required to complete using their textbooks at home after the class. Conversely, the participants from the experimental group were also taught through the traditional way during the class, but they were required to complete the reading assignments through the prescribed AI-powered apps. The participants were made to have linguistic input in the form of reading through the prescribed English textbooks for about 8 months, according to the lesson plans scheduled for the session 2022–2023. Each assignment was uploaded on the dashboard of *Readlee* and the students were required to read the assigned text aloud. The app recorded the voices of the students and gave them feedback on reading pace based on word count per minute, pronunciation mistakes, and reading time. The participants were then required to

answer the short questions given at the end of each assignment, and some of the questions had to be answered through spoken responses, whereas others had to be answered through written responses. Thus, speaking and writing skills were also focused on throughout the experiment phase.

The data were collected through pre- and post-tests, observation, and a Likert-scale questionnaire. The results of the pre- and post-tests were compared and quantitatively analysed through descriptive statistics using SPSS. Qualitative data sought through observation and interviews were analysed under thematic analysis. The findings indicated that the use of AI-powered apps for teaching the English language at the college level proved beneficial, and the following observations came to light:

- The students from the experimental group were found to be at an advantage after using AI-harnessed apps for learning English, whereas the participants from the control group made no significant progress in learning English.
- The participants from the experimental group improved lower- and higher-level reading skills, including reading pace, pronunciation, inference, and comprehension, whereas the participants from the control group could not make any significant progress in all these areas.
- As far as vocabulary and grammar improvement is concerned, the participants from the experimental group showed improvement, but the participants from the control group could not improve to a reasonable extent.
- Since the participants from the experimental group showed improvement in reading skills and had maximum linguistic input throughout the experiment phase, their writing and speaking skills were also nourished at the end. However, the students from the control group showed less improvement in writing and speaking tasks because their linguistic input in the form of reading was compromised.
- The students from the experimental group were found to be satisfied with their learning experience, and it was found that their English language learning experience was amazing.
- The experimental group participants said they would keep using AI-based apps for their future studies because they found AI-powered apps effective and interesting.

- The participants expounded that features of AI-powered apps like the quick feedback system and personalised learning are amazing.
- The motivation level of the participants was also found to have increased during the current research.
- The students did not face any serious challenges while using these AI-based apps for learning English.
- AI-powered English language teaching was approved by the participants, and they indicated that all language teachers should use AI-based apps for teaching English at the college level.
- The teacher's motivation level also increased by using AI apps because the teaching and learning outcomes were found to be favourable. Moreover, the teaching and learning objectives were successfully achieved, and not only were the prescribed textbooks read by each participant from the experimental group, but their English language skills also improved to a significant level.
- During the current research, the participants had to use different AI-based apps, for which they kept on delving into different technological tools that trained them in the field of IT.
- Overall, the results of the study were found to be encouraging and convincing, based on the fact that the use of AI-powered tools for English language teaching proved beneficial. Significantly, improvement in reading skills resulted in improved linguistic output, indicating that reading should be a key focus for teachers and students alike; otherwise, linguistic output in the form of speaking and writing cannot be ensured.

## **7.4 Recommendations**

Since the current research was experimental, it provided us with the opportunity to seek many insights. The findings of the study indicate that new technology in the form of AI-based apps should be incorporated in ELT at the college level in Pakistani educational settings to resolve long-standing issues. There is a need to revisit teaching methods and come up with effective teaching techniques. Based on the results and findings of this experimental research, the following recommendations are suggested to upgrade ELT teaching techniques at the college level:

- English language teachers and students at the college level should incorporate the use of AI-based Apps like ‘Readlee’ ‘@voice loud reader’ and ‘Entelechy’.
- English language teachers and students at the college level should try other AI-based Apps to come up with more options that might prove more effective in ELT at the college level.
- English language teachers at the college level should be given training at the departmental level and they should be enabled to use AI-powered teaching techniques and tools in their classrooms.
- Digital resources should be enhanced at the college level for English language teaching and learning.
- More AI-based Apps should be locally developed for English language teaching in Pakistan so that they are cheaper in cost and easy to access locally. This can be made possible with the help of Computer/IT experts and software engineers.
- AI-based Apps should be incorporated at every level of English language teaching so that the learners may experience the use of technology in English language learning. This will enhance their skills on the one hand and they will learn the English language more practically on the other hand.
- Textbooks of English should be replaced with etext-books so that they are easily accessible, and omnipresent in mobile phones, tablets, laptops and computers.
- An all-in-one AI-App for English language learning should be developed with the help of AI experts so that all language skills may be focused and equal development of all four language skills and sub-skills may be covered for better and required results.

Thus, it can be asserted that an entirely new English language teaching set-up should be introduced in which AI-based Apps should be used to improve students’ linguistic input in the form of ‘Reading’. Good readers can prove to be good speakers and writers at the end which is the ultimate target of English language teaching at every level of education in Pakistan. Many other scholars have also recommended the use of AI tools for English language teaching. For instance, as cited in Wei’s (2023)

study Carpio Cañada et al., 2015; Ebadi and Amini, 2022; Hsu et al., 2023 also recommend the use of AI tools for English language teaching because they are believed to be very effective in English language learning and teaching. For instance, Duolingo, Google Translate and Grammarly can help English language learners in developing language skills effectively (Saifulloh 2020, Yunanto and et al 2020; Prastiwi and Pujiawati 2019). According to Li, Ning and Fang 2021, the quality of language translation can be improved by developing AI-based apps. These scholars also approve of the use of AI in the area of English language learning. AI-based applications like Netflix and Joox Music can improve students' listening language skills more effectively (Suryana, Asrianto & Murwantono, 2020). AI in the form of a Chabot improves students' communication skills and writing skills. Moreover, they help in lowering the level of anxiety, especially in speaking. So, AI catboats improve the confidence level of English language learners because they are effective in language learning. (Suryana, Asrianto & Murwantono 2020, Abilowo, Santoni, & Muliawati 2020; Su, Miao & Man 2019). Noviyanti et al 2020 also postulate that the use of AI in the form of a spell checker application is effective in improving the pronunciation and speaking skills of English language learners. According to Sun, Yunanto, Prayogi, Akbar, Herumurti; Rochimah 2021, AI powered language teaching has numerous advantages and it can has potential to transform language teaching from passive to active learning while engaging and involving the learners in a 24/7 learning environment. AI powered language learning offers diverse, personlised, transparent, flexible and effective language learning to all learners. Vocabulary, listening, interpretation and speech of English language learners can be improved through the use of AI-based technology (Divekar, Drozdal, Chabot, Zhou, Su, Chen & Braasch 2022). Thus, it can be asserted that AI changes the whole teaching and learning environment by providing learners with ample learning opportunities and frequent feedback systems which positively impact motivation level and interest in learners. (Sun, 2021, Divekar, Drozdal, Chabot, Zhou, Su, Chen & Braasch 2022; Arti 2020)

## **7.5 Implications**

The current study was a journey from a manual to a digital landscape of English language teaching at the college level. The researcher has been teaching the English language since 2005 in a public sector college in Pakistan but throughout this

long journey, it was never possible for him to make students read the prescribed English text-books because of the following reasons:

- There were time constraints and large-sized classes due to which students could not read the text from the textbook in the class because it was always impossible to make fifty to 100 students read the assigned text in a 40-minute class.
- The students were always assigned the text for reading at home and the next day if the teacher asked whether they read the text at home or not, they would answer ‘no’ and those who would claim that they read the text at home could not be verified because there was no way to verify whether they read the text at home or not.
- Taking feedback from the students in the form of quizzes or short questions through oral tests was a way to know whether the students read the assigned text at home or not but the next day was scheduled for the next chapter that the teacher had to teach to complete the syllabus well in time. Thus, it was never possible for the teacher to conduct quizzes daily.
- If the students would read the text at home without the tutor, there was no one to indicate their mistakes.
- Earlier there were no effective digital resources in the form of mobile apps, software and AI technology available to teachers and students which could help them in English language teaching and learning according to their choice.

Thus, the teachers in the recent past lacked many digital facilities due to which they could not ensure reading practice at the student level and it was only the teacher who would read the text, translate it into Urdu language and prepare the students for the examination while merely focusing on the writing skills of the students. Firstly, reading and secondly speaking were ignored because writing was the only focus of the students and the teachers alike for which the students were left with the only option to cram the material to pass the exam. In this pathetic situation, the current study came up with an idea to revolutionize the whole English language teaching and learning scenario at the college level. For this, three different AI-based Apps namely ‘Readlee’, ‘@Voice Aloud reader’ and ‘Entelechy’ were used for a whole academic

session commencing from September 2022 and ending in April 2023. The study contributed to the body of knowledge in multiple ways which are the following:

- It was for the first time that the college students read the prescribed textbooks word by word and they had the maximum of linguistic input which was quite hard earlier.
- Reading assessment was revisited through this study for the first time in the Pakistani ELT context at the college level and it was for the first time in a teacher's 19 years of teaching career that he could make his students read each word of their English text-book whereas every student got immediate feedback and assessment on his reading task right after the submission of the reading task.
- The current study is not merely a thesis itself, but it is a complete manual and guide for all the ELT teachers working in various colleges of the Punjab province in specific and Pakistan in general.
- The current research provides a series of lesson plans that all the other English language teachers teaching at the college level can directly adopt or adapt to use for their students to have encouraging results in English language teaching at the college level.
- Though the key focus of the study was 'reading', writing and speaking skills were also focused and the students were given the chance to write and speak daily through the 'Readlee App'. Thus, the writing and speaking skills of the students also improved to a significant extent.
- Reading, writing and speaking skills were focused through the 'Readlee App' whereas the students were asked to listen to the model reading through the app '@Voice Aloud Reader'. The app 'Entelechy' was used by the teacher to generate quizzes automatically but the students were also asked to assess their comprehension through this app. Thus, the study kept students engaged in language learning through these three Apps which provided the students with an entirely different learning experience and environment that won their interest, enhanced their level of motivation and finally, they made significant improvements in English language learning.
- Improvement of English language skills in students is not the only contribution this study made, it also trained English language learners to use AI technology

for learning the English language. After the completion of this research, almost all the participants indicated that they have learned to use AI tools for language learning and they expressed their willingness to keep using these apps for their future studies. So, the participants were exposed to new English language learning techniques to which they were not familiar so far.

Thus, it can be asserted that the current study proved very significant because it proposed a solution to a common problem of giving the maximum linguistic input in the form of reading to English language learners. Without linguistic input, it was almost impossible to ensure linguistic output in the form of writing and speaking. Moreover, the study came up with an option to replace the traditional English language teaching methods with AI-powered language teaching because the former traditional methods are no longer effective and compatible with students' current and future needs.

### 7.5.1 Pedagogical, Methodological and Theoretical Implications

The current experimental study provides significant pedagogical, methodological and theoretical insights into the integration of AI-based applications in English language teaching at the college level in Pakistan.

Methodologically, the research proved to be effective in measuring the perceptible impact of AI tools on language skill development. The use of three distinct applications—Readlee for reading fluency and comprehension, @Voice Aloud Reader for auditory input and pronunciation practice, and Entelechy for personalized learning and feedback offered a multimodal intervention. This methodological triangulation enriched the reliability of results and it can further support as a replicable model for future experimental researches in ELT.

As far as the theoretical implication of the present study are concerned, the findings are aligned with Constructivist Learning Theory (Bruner, 1966), advocating for a learner-centered approach in ELT. Moreover, the findings also support Krashen's Input Hypothesis (Krashen, 1992), signifying that linguistic input through AI-powered modes significantly supports language learning especially in a setup like

Pakistan. Furthermore, the findings align with Vygotsky's Zone of Proximal Development (Vygotsky, 1978), which advocates the implementation of AI-scaffolding for better language learning outcomes as compare to traditional language learning environment.

Conclusively, this study not only authenticates the efficacy of AI tools in boosting language learning but also adds to the growing body of knowledge advocating AI-powered pedagogy. It further encourages educators and policymakers to integrate AI strategically to bridge gaps in traditional language teaching.

## **7.6 Limitations**

As with the majority of studies, the design of the current study is also subject to some limitations though not very serious. Since, it was an experimental study in Pakistani English language teaching context at the college level, 50 English language learners participated in it. The first limitation was to collect research data through pre and post-tests. The participants were the students of intermediate/Higher Secondary level and they had to attend 6 classes of 6 different subjects in a day including English whereas each class had 40 minutes duration. So, the first limitation was the time constraint to conduct the pre-test and post-tests to collect the research data. The pre and post-test consisted of multiple questions about reading, writing and speaking skills and it was not possible to conduct a test in just 40 minutes. Since pre and post-tests were the most important sources to collect the data, they had a significant role in the current study. Moreover, it was an utmost need of the time to collect data through the pre-test before starting the experiment. Though it was quite challenging to conduct the pre-test in one go, it was conducted in three different phases. In the first phase, a pre-test of reading was conducted to record participants' performance in reading pace and accuracy. In the second phase, the questionnaire consisting of questions on word processing, vocabulary, sentence correction, inference, comprehension, discourse completion tasks and paragraph writing was floated among the participants and they were asked to attempt this test after the closing hours of college so that the time for other classes is not consumed in this activity. In the third phase, the participants were asked to deliver short speeches and dialogues which were recorded through the mobile recorder. This activity was also much time consuming and for this,

the other teachers were requested to sacrifice their classes for a day. Thus, the pretest data were collected in three days and each test category was covered on a separate day. The same strategy was repeated at the time of the post-test to collect the data which was to be compared with the data sought through the pre-test.

The second limitation was participants' inability to use the AI-based apps prescribed for the current research. At the start, the participants were not trained and they had certain issues while using the applications they were prescribed. Since the plan of the study was to teach the English language and improve college students' English language skills through AI-based Apps, students' training/skill to use the apps was a pre-requisite. Students' inability to use the prescribed applications might lead to the failure of the current project. Thus, to resolve the issue the participants were first given training for a few days. They were asked to bring their mobile phones to class and play with the apps for some time to become familiar with the functions and features of the apps. Some mock activities were also performed to have a better understanding of the apps.

Thus, both of the limitations were tactfully addressed so that the results of the study might not be impacted negatively. While conducting any research in this area in the future, we may also need to pay special attention to such limitations as are indicated in the current study. So, the researchers may conduct their pre and post-tests with a preplanned schedule to deal with the issue of time constraints whereas the participants may also need to be trained to use any new and unfamiliar AI-based Apps before starting the research.

## **7.7 Future Research**

With the advent of AI technology new research avenues have been opened not only for IT/Computer/Software engineering and AI but also for other fields like business, medical and education. English language teaching has witnessed many epochs of innovations since its early times and with the swirl of the pendulum, newer things have been tried to make English language teaching more effective and practical. However, the recent developments in the field of AI invite English language teachers

and scholars to experiment with different AI-based tools that can prove ideal and practical for language teaching.

The current study has experimented with three AI-based Apps to improve college students' English language skills at the college level and recommended the use of these three Apps specifically and the use of other Apps available in the market for ELT in general. A successful experiment during the current study indicates that English language teachers and language scholars should keep on experimenting with AI tools in English language teaching. However, based on the encouraging findings of this study, future research may explore the integration of AI-based applications with adaptive learning systems tailored to individual learner profiles in Pakistani college settings. Longitudinal studies could investigate the sustained impact of such tools on learners' language proficiency over extended periods. Moreover, comparative research examining the effectiveness of different categories of AI applications like speech recognition, grammar correction, and interactive storytelling can provide deeper insights into their specific contributions to ELT. Future studies might also focus on training teachers to integrate AI tools into their teaching and measure how such training impacts teaching/learning outcomes. Additionally, expanding the research to include rustic or under-resourced institutions can help determine the scalability and accessibility of these technologies in various educational contexts in Pakistan.

Moreover the following areas in English language teaching can be further explored and researched:

- The use of AI tools for English language teaching at various levels of education i.e. preschool, primary, elementary, secondary and higher level.
- Different AI-based Apps can be tried for developing reading, writing, listening and speaking skills in English language learners.
- Sub-skills of the English language can also be covered by the use of AI technology through some experimental studies.
- Beliefs and perceptions of English language learners and teachers about the use of AI-based Apps and tools in ELT can also be explored to have an idea

about trends and temperaments of the stakeholders regarding this phenomenon.

- New apps and tools can be developed and tested through experimental research for English language teaching at various levels of learning in collaboration with English language experts and IT/Computer/AI experts.

Thus, it can be asserted that AI in English language teaching is an inviting field for research and scholars should explore this field for improving the results in the field of English language teaching in Pakistani educational context.

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## APPENDICES

### Appendix A: Demographic Details

**1. How old are you?**

- a. 16              b. 17              c. 18              d. 19              e. 20 and above

**2. Your gender?**

- a. Male                      b. Female

**3. What is your native language?**

- a. Punjabi/Potohari              b. Sindhi              c. Balochi              d. Pashto              e. any other

**4. How long have you been learning English?**

- a. 10-11 Years              b. 12-13 Years              c. 14-15 Years              d. More than 15 Years

**5. Are you satisfied with your English language proficiency?**

- a. Yes                      b. No                      c. To some extent                      d. No Idea

**6. Have you ever used AI-based Apps to learn English?**

- a. Yes                      b. No

**7. Do you have an excess to technology like mobile phone, computer, laptop, tablet and internet.**

- a. Yes                      b. No

**8. Would you like to learn English with AI-based Apps?**

- a. Yes                      b. No                      c. May be                      d. Can't Decide

**9. Where do you live? (Mention rural or urban/city area)**

- a. Urban/City                      b. Rural/Village

**10. What is your father's estimated monthly income in Pakistani Rupees?**

- a. 30-40                      b. 40-50                      c. 50-60                      d. 60 Above

## Appendix B: Pre & Post-Tests

### Pre-Test

Name \_\_\_\_\_

Roll No. \_\_\_\_\_

### Pre-test Reading

Reading fluency and accuracy

Instructions: Read the text through Readlee App

English Book II Chapter 3 Why Boys Fail in College

Word processing/recognition

Instructions: There are different words in each line. You are required to separate them with a slash.

Greenishfantasticuniquepure

Sweetmankindnoise fusion

Quiteflameobscuremute

Earningsoftpleasurecrime

Courageousknightbattlesword

Curioussubmissivebrave loyal

Milkywayvastimmensefrightening

Modestseashoruniversehumble

Abnormalfeasiblecrownhousewife

Buckettrackmeaslesremarkable

### Vocabulary (Synonyms)

Choose the correct synonym for the underlined bold word.

i. Each star makes a **voyage** in complete loneliness.

a. Journey                      b. Plan                      c. Programme                      d. Schedule

ii. It is always to the **detriment** of their health.

Benefit                      b. Gain                      c. Protection                      d. Damage

iii. Sometimes there were unexpected **respites**.

Crisis                      b. Frost                      c. Holidays                      d. Match

iv. I continued in this **unpretentious** situation.

a. Humble                      b. Difficult                      c. Arrogant                      d. Confused

v. We were considered such **dunces**.

a. Intelligent                      b. Stupids                      c. Wise                      d. Witty

vi. I got an **immense** advantage over the cleverer boys.

Slight                      b. Cold                      c. Great                      d. Unpopulated

vii. Merivale called on Chips every **fortnight** or so.

One week                      b. Two weeks                      c. Three weeks                      d. Four weeks

viii. **Rarely** did he read more than a page.

a. Smooth                      b. Seldom                      c. Difficult                      d. Miserable

ix. Wetherby himself was a fatherly and **courteous**.

a. Hard                      b. Smooth                      c. Civilized                      d. Slow

x. His dream had been to get a headship **eventually**.

a. Politically                      b. Luckily                      c. Scholarly                      d. Finally

### Grammar knowledge (correction of errors)

#### Choose the correct option.

1. I gave him many advices.

a) I gave him many advises.

b) I gave him many advice.

c) I gave him many pieces of advice.

d) I gave him many number of advices.

2. He recites Holy Quran daily.

a) He recites a Holy Quran daily.

b) He recites an Holy Quran daily.

c) He recites the Holy Quran daily.

d) He recites Holy Quran daily.

3. He absented from the college.

a) He absented me from the college.

b) He absented himself from the college.

c) He absented them from the college.

d) He absented himself from the college.

4. The Gold is costly these days.

a) The Golds is costly these days.

b) Gold is costly these days.

c) An Golds will be costly these days.

d) A Gold were costly these days.

5. I distributed the sweet among two boys.

a) I distributed the sweet in two boys.

6. Slow and steady win the race.

a) Slow and steady winning the race.

- |  |  |
|--|--|
| b) I distributed the sweet for two boys.     | b) Slow and steady won the race.       |
| c) I distributed the sweet from two boys.    | c) Slow and steady wins the race.      |
| d) I distributed the sweet between two boys. | d) Slow and steady won the race.       |
| 7. It has been raining for the morning.      | 8. He did not succeeded in exam.       |
| a) It has been raining since the morning.    | a) He do not succeeded in exam.        |
| b) It is raining since the morning.          | b) He does not succeeded in exam.      |
| c) It was raining since the morning.         | c) He have not succeeded in exam.      |
| d) It have been raining since the morning.   | d) He did not succeed in exam.         |
| 9. One of the players were injured.          | 10. A loyal friend never deceive you.  |
| a) One of the players was injured.           | a) A loyal friend never deceiving you. |
| b) One of the players are injured.           | b) A loyal friend never deceives you.  |
| c) One of the players have injured.          | c) A loyal friend never deceived you.  |
| d) One of the players have been injured.     | d) A loyal friend nevers deceive you.  |

### **Inference (Passage 1)**

Read the passage carefully and choose the correct answer from MCQs.

Paul usually has a very long day because he spends forty minutes driving to work every day. He usually works eight hours a day. Today he wanted to buy something nice for Alice. When he got home in the late evening, with a bunch of lovely flowers, he took his muddy boots off on the steps of the front porch. Alice would get angry if his dirty items made it as far as the welcome mat. He also took off his dusty overalls and threw them into a plastic garbage bag. Alice leaves a new bag tied to the porch railing for him every morning. He went straight to take a shower as he had been instructed by Alice. Then, he joined her to eat dinner after he had made himself “presentable,” as Alice often said. Alice prepared Paul’s favorite drink. He sat comfortably and grabbed a can of beer.

1. How long did Paul take to drive to work?
  - a. Everyday
  - b. Every evening
  - c. Forty minutes
  - d. Eight hours
2. Where did Paul put his overalls?
  - a. On the front porch
  - b. On the welcome mat
  - c. In a garbage bag

- d. In the washing machine
- 3. How often does Alice change the plastic garbage bag?
  - a. Daily
  - b. Every two days
  - c. Every week
  - d. When the bag is full
- 4. What does Paul like?
  - a. Floweres
  - b. Beer
  - c. Driving
  - d. Having dinner
- 5. What type of job does Paul appear to have?
  - a. Librarian
  - b. A manager
  - c. A doctor
  - d. A labourer

### **Inference (Passage 2)**

Read the passage carefully and choose the correct answers from the MCQs given at the end of the passage.

"Speech is a great blessing, but it can also be a great curse, for, while it helps us to make our intentions and desires known to our fellows, it can also, if we use it carelessly, make our attitude completely misunderstood. A slip of the tongue, the use of an unusual word, or of an ambiguous word, and so on, may create an enemy where we had hoped to win a friend. Again, different classes of people use different vocabularies, and the ordinary speech of an educated man may strike an uneducated listener as showing pride; unwittingly we may use a word which bears a different meaning to our listener from what it does to men of our class. Thus speech is not a gift to use lightly without thought, but one which demands careful handling; only a fool will express himself alike to all kinds and conditions of men."

- 1. How can speech be a great curse?
  - a. If we are not impressive
  - b. If we are too talkative.
  - c.If we are not understood properly.
  - d. If it is too lengthy.

2. What harm can arise from a slip of tongue?
  - a. We may increase our enemies.
  - b. We may increase our friends.
  - c. We may have no issues.
  - d. We may make enemies our friends.
3. Why is it essential to use different vocabulary for different classes of people?
  - a. Because it is ethical.
  - b. Because it is appropriate.
  - c. Because people like it.
  - d. Because it helps people understand the intended meaning.
4. Why does speech need careful handling?
  - a. Because carelessness may cause misunderstanding.
  - b. Because carelessness may add meaning to the talk.
  - c. Because carelessness is disliked by the other party.
  - d. Because carelessness may help in reaching the target meaning.
5. Who will express himself alike in all conditions?
  - a. Only a learned man.
  - b. Only an idiot.
  - c. Only an educated person.
  - d. Only an irresponsible person.

### **Inference (Passage 3)**

Read the passage carefully and choose the correct answers from the MCQs given at the end of the passage.

The great advantage of early rising is the good start it gives us in our day's work. The early riser has done a large amount of hard work before other men have got out of bed. In the early morning, the mind is fresh and there are few sounds of distraction so the work done at that time is generally well done. In many cases, the early riser also finds time to take some exercise in the fresh, morning air and this exercise supplies him with a fund of energy that will last until the evening. By beginning so early, he knows that he has plenty of time to do thoroughly all the work he can be expected to do and is not tempted to hurry over any part of it. He gets to sleep several hours before midnight, at the time when sleep is most refreshing and,

after a night's sound rest, rises the next morning in good health and spirits for the labours of the new day.

1. What is the great advantage of early rising?
  - a. We have a lazy day start.
  - b. We have a clumsy day start.
  - c. We have a good day start.
  - d. We have a happy day start.
2. How is an early riser better than a late risers?
  - a. He has good health.
  - b. He wakes up fresh.
  - c. His progress is better than others.
  - d. He is mazing for others.
3. Why is the work done in the early hours of the day well done?
  - a. Because we are fresh and there is no disturbance.
  - b. Because we are ready to work.
  - c. Because we get help from others.
  - d. Because we have time.
4. What is the impact of early rising on health?
  - a. We get a healthy morning.
  - b. We have time to take exercise to keep us energetic.
  - c. We have a healthy breakfast.
  - d. We don't get sick.
5. How does it become possible for an early riser to wake up in good health?
  - a. He gets up in good health because of fresh air.
  - b. He gets up in good health because he sleeps properly enough.
  - c. He takes breakfast timely.
  - d. His sleeps and wakes timely.

#### **Inference (Passage 4)**

Read the passage carefully and choose the correct answers from the MCQs given at the end of the passage.

The new inventions were the causes of great changes in human affairs. Railways, steamships, and telegraphs, and later aeroplanes and wireless, made travel and communication much easier and more rapid. Journeys could be carried out in about one-tenth of the time they had previously needed and it was as easy to talk to someone a continent away as if he were in the next room. Administration and government were thus made simpler enabling vast areas to be ruled and controlled from a single centre. The increased production of food and clothing and the advances in medical knowledge caused a great increase in the population of civilized countries.

1. How have travel and communication become easier and more rapid?

Travel and communication have become easier because of

- a. Politicians
- b. Education
- c. Economical growth
- d. New inventions

2. What has been the effect of important inventions on administration and government?

- a. Government can control the masses from a single center.
- b. People can contact the government easily.
- c. Criminals can be punished easily.
- d. People are afraid of administration.

3. How easier it has been made to contact people a continent away?

- a. Quite easy
- b. Not much easy
- c. as easy as talking to a person in the next room
- d. Easier than before.

4. Where has the progress taken place?

- a. In many countries
- b. In civilized countries
- c. In urban areas
- d. In rural areas

5. What has caused increase in population of civilized countries?

- a. Communication
- b. Technology

- c. Media
- d. Better food, clothing and medical facilities

### **Inference (Passage 5)**

Read the passage carefully and choose the correct answers from the MCQs given at the end of the passage.

Friends should be ready to assist one another. Kind offices ought never to be omitted, but they are especially called for in the season of affliction. 'A friend in need is a friend indeed'. We should be first at the bedside of a sick friend. While we should try to help our friends, we should never say for them anything dishonourable. If our friends do wrong, we should warn them in a friendly way. If they tell us of our faults, we should take it not only pleasantly but thankfully. This is one of the greatest services they can render us. Friends should encourage each other in well doing. This is the most important office of friendship and it should be shown more frequently in this way than in reproof.

1. What are the characteristics of a true friend?
  - a. He stands by you through thick and thin
  - b. He leaves you in the lurch.
  - c. He betrays you when you need him.
  - d. He does not interfere in your matters.
2. How will you differentiate between a true friend and a false friend?
  - a. A true friend conceals everything from you whereas a false friend does not.
  - b. A true friend stays with you in difficult times whereas a false friend does not.
  - c. A true friend respects you whereas a false friend does not.
  - d. A true friend spends money on you whereas a false friend does not.
3. What should we do when our friends do wrong?
  - a. We should ignore it.
  - b. We should encourage them.
  - c. We should warn them frankly.
  - d. We should admonish them.
4. What great service can a friend render to another friend?
  - a. Helping him in difficult times.
  - b. Telling the other friend about his faults.

- c. Supporting him in wrong doing.
  - d. Encouraging him to do good deeds.
5. What is the most important office of friendship?
- a. To support him in hard times.
  - b. To stay away in difficult times.
  - c. To encourage each other to do good deeds.
  - d. To spend money on him.

### Comprehension 1

Read the text carefully and choose the correct answers from the given MCQs.

Pakistan is a country of villages. The rural population still dominates the urban population as far as the number is considered. This is despite the fact that there is rampant migration of rural families to urban centres. Generally, the gains of being a unit of the urban population are less than the disadvantages and risks that are in-built into urban life. Crime, riots, etc are some examples of such risks of urban life. The forces that generate conditions conducive to crime and riots are stronger in urban communities than in rural areas. Urban living is living that is more anonymous. It often releases the individual from community restraints more common in tradition-oriented societies. But more freedom from constraints and controls also provides greater freedom to deviate. Living in a more impersonalized, formally controlled urban society means that regulatory orders of conduct are often directed by distant bureaucrats. The police are strangers executing these prescriptions on an anonymous set of subjects. Minor offenses in small towns or villages are often handled without resorting to official police action. As disputable, as such action may seem to be, it results in fewer recorded violations of the law compared to those in the big cities. Although perhaps causing some decision difficulties for the police in small towns, formal and objective law enforcement is not always acceptable to the villagers. Urban areas with a mass population, greater wealth, more establishments that are commercial and more products of our technology also provide frequent opportunities for theft. Victims are impersonalized, the property is insured and consumer goods in more abundance are vividly displayed and are more portable. The crime rate increases despite formal moral education given in schools.

1. Which of the following would be the **best title** for the above passage?
  - a. Lure of Village Life
  - b. Rural-Urban Rift
  - c. Hazards of Urban Life
  - d. Crime and Punishment
  - e. Urban Crimes and their Reasons
2. The passage mainly **emphasises** the
  - a. need for formal moral education to be given in schools
  - b. reasons for the growing crime rate in urban centres as compared to that in rural areas
  - c. increasing crime rate in rural areas
  - d. comparative account of wealth in rural and urban areas
3. The author thinks that risks and disadvantages are
  - a. outweigh the gains of rural life
  - b. surpassed by the gains of urban life
  - c. almost negligible in rural life
  - d. more than the gains in urban life
4. Which of the following is a characteristic of an urban setting?
  - a. Less forceful social control
  - b. Minimal opportunities for crime due to better law enforcement
  - c. Deviation from freedom
  - d. Fewer recorded violations of the law Minimal = very small in size or amount; as small as possible
5. Which of the following statements is **TRUE** in the context of the passage?
  - a. Small communities have more minor crimes than urban centres.
  - b. Urban crimes cannot be prevented.
  - c. Lack of personal contact increases crimes in urban areas.
  - d. The display of consumer goods is the main cause of crime.

## Paragraph 2

Read the passage carefully and choose the correct answers for the questions given at the end of the paragraph.

Urbanization means the concentration of population in the big cities. The big cities everywhere in the world are facing this serious problem. The modern cities are growing in a very unsystematic manner due to fast industrialization. The concentration of factories also 'causes the problem of urbanization. The population of the villages migrates in large numbers to the cities in search of employment. The congested population results in environmental pollution and numerous social evils. It is the only way to check urbanization that the villages should be provided with all the facilities and better living conditions, which make the city life more glamorous.

1. What does urbanization mean?
  - a. Management of population in cities.
  - b. absorption of population in cities.
  - c. Over population in cities.
  - d. Control over population in cities.
2. What serious problems are the big cities facing?
  - a. The problem of management.
  - b. The problem of control.
  - c. The problem of absorption.
  - d. The problem of lawlessness.
3. Why does the rural population move to the urban areas?
  - a. To earn a livelihood.
  - b. To get an education.
  - c. To get medical facilities.
  - d. To get life standard.
4. What is the chief defect of a congested population?  
It causes:
  - a. Social injustice
  - b. Social evils
  - c. Pollution
  - d. Both b & C
5. What may be a suitable title for the passage?
  - a. Concentration of population
  - b. industrialization
  - c. Social Evils

## d. Urbanization

**Paragraph 3**

Read the passage carefully and choose the correct answers for the questions given at the end of the paragraph.

Our society is suffering from many social evils. One of the worst social evils is our dowry system. Dowry means, money or other items of moveable property like jewellery, furniture, and electronics which the parents give away to their daughters at the time of their marriage. It is a curse, which is prevalent almost in all sections of our society. It is an old custom but at present, it has become very widespread and problematic to both parents as well as daughters. In the past, it was a voluntary offer on the part of the parents but now it has become a compulsion and a necessary evil. It is a distressing evil for the poor parents; they have to borrow or beg a huge amount to arrange dowry for their daughters. The evil of dowry has taken a heavy toll on female life. Some families compel their daughters-in-law to bring money even after the marriage. This evil cannot be eradicated unless the entire trend of society is changed through education.

1. What kind of property is counted as dowry?
  - a. Property that can be sold.
  - b. Property that can be bought.
  - c. Property that can be moved from one place to other.
  - d. Property that cannot be moved.
2. When is the dowry given?
  - a. On the marriage of a daughter.
  - b. On the marriage of a son.
  - c. On the marriage of the poor.
  - d. On the marriage of the rich.
3. What is the current scenario of dowry?
  - a. It is no more a custom.
  - b. It is still prevalent in society.
  - c. It has been abolished.
  - d. It is being rejected.
4. Who suffers a lot because of the custom of dowry?
  - a. The family of the groom.

- b. The family of the bride.
  - c. The bride and her family.
  - d. The groom and his family.
5. How can we overcome the evil of dowry?
- a. We can overcome it through laws.
  - b. We can overcome it through education.
  - c. We can overcome it through punishment.
  - d. We can overcome it through politics.

## 7. Writing skills

### a) Discourse Completion tasks

Instructions: Complete the remaining part of the sentence.

- i. I will come .....
- ii. I hope you will .....
- iii. Don't waste your time, it's very.....
- iv. He is very nice but .....
- v. I will help you if you .....
- vi. Always help your neighbours because .....
- vii. As you sow, so .....
- viii. Life is so uncertain that .....
- ix. I have many friends but .....
- x. I can't wait for you because .....

### b) Paragraph Writing

Instructions: Write a short paragraph on any of the given topics in 70 to 100 words

Tourism      Mobiles      Friendship

## 8. Speaking skills

### a) Dialogues

Experimental Group/Control Group

Topics:

- Rising Fuel Prices
- Future Dream
- Havocs of Covid-19
- Dengue Fever
- Pollution

- Ravages of Flood
- Motorbike Racing/one Wheeling
- Importance of Outdoor Games
- Human Service
- Computer Skills
- Video Games
- Energy Crisis
- Politics

### b) Short Speeches

Give a short speech (Maximum Time: 3 minutes) on any of the given topics

Topics:

- i. Corruption   ii. Benefits of Social Media   iii. Tiktok a Blessing or a Curse

### Post-Test

Name \_\_\_\_\_

Roll No. \_\_\_\_\_

### Reading Skills

1. Reading fluency and accuracy

Instructions: Read the text assigned on Readlee portal.

2. Word processing/recognition

**Instructions:** There are different words in each line. You are required to separate them with a slash.

millionsprobablygrainsseashoresmeasured

littlenessfrighteningsignexistsexcept

dismalmaidclimbgrimattic

vacationmovedpracticalpurposeimpact

indigestiblesparcelsopportunitynonbookishreluctant

Collarsackcomfortablyacrossshoulders



x. "You are one of Pinkerton's men, I presume," he said.

- a. Think                      b. Amuse              c. Start              d. Say

#### 4. Grammar knowledge (correction of errors)

**Choose the correct option.**

- |   |                                      |
|---|--------------------------------------|
| 1. The poors should be helped               | 2. His father work in a factory.     |
| a) The poor should be helped                | a) His father is work in a factory.  |
| b) Poors should be helped                   | b) His father works in a factory.    |
| c) A poors should be helped                 | c) His father working in a factory.  |
| d) These poors should be helped             | d) His father was work in a factory. |
| 3. He is most intelligent boy in class.     | 4. Murree is a worth-seeing place.   |
| a) He is a most intelligent boy in class.   | a) Murree is worth-seeing place.     |
| b) He is an most intelligent boy in class.  | b) Murree is an worth-seeing place.  |
| c) He is the most intelligent boy in class. | c) Murree is the worth-seeing place. |
| d) He is the intelligent boy in class.      | d) Murree is a place worth-seeing.   |
| 5. Neither of the boys worked.              | 6. He reached in college late.       |
| a) None of the boys worked.                 | a) He reached college late.          |
| b) No one of the boys worked.               | b) He reached on college late.       |
| c) Neither of the three boys worked.        | c) He reached for college late.      |
| d) Any of the boys worked.                  | d) He reached over college late.     |
| 7. He said that he will come tomorrow.      | 8. Let he play cricket.              |
| a) He said that he will comes tomorrow.     | a) Let her play cricket.             |
| b) He said that he is come tomorrow.        | b) Let me play cricket.              |
| c) He said that he would come tomorrow.     | c) Let his play cricket.             |
| d) He said that he was come tomorrow.       | d) Let him play cricket.             |
| 9. One of the teachers were in the class.   | 10. His hairs are white.             |
| a) One of the teachers was in the class.    | a) His hair are white.               |
| b) One of the teachers are in the class.    | b) His hair is white.                |
| c) One of the teachers be in the class.     | c) His hairs were white.             |
| d) One of the teachers have in the class.   | d) His hairs was white.              |

#### 5. Inference (Passage 1)

Read the passages carefully and answer the questions given at the end of each passage.

The daily reading of newspapers rightly occupies a good deal of our leisure. Through the newspapers, we are presented with cinematograph-like pictures of mankind at work and play throughout the world; through them, we are daily face to face with problems which give the titles of the chapters in this book. Now most newspapers have a bias (), that is, they are more particularly concerned with the views of one section of the people and distinctly opposed to those of another section. As the proprietors (5) and editors, are anxious to sell their papers, they not infrequently (b) present their readers with one-sided views. This practice may be all very well from the selling point of view but it is very bad for a reader who always reads the same paper. One cannot exercise one's judgment very well, and look at both sides of a question; if only one side is read about and considered. In every public library will be found a variety of newspapers and in our leisure, it is an excellent plan to read both sides of a burning problem of the day as represented by different accounts. By so doing, we shall better be able to form a fair judgment of the matter and be in a position to discuss the question with our friends in a fairly impartial way.

1. What is the use of reading newspapers?
  - a. They give us pleasure
  - b. They give us sock
  - c. Our free time is passed well
  - d. We get information
2. What is the chief defect of the newspapers?
  - a. Mostly they are useless
  - b. Mostly, they are partial
  - c. Mostly, they change our mind
  - d. Mostly, we are not impacted
3. What is the danger in reading only one paper?
  - a. We get true information
  - b. We get wrong information
  - c. We don't get the true picture of an issue
  - d. We see different sides of an issue
4. Why do the editors present one-sided view of an issue?
  - a. For monetary gains
  - b. For forming public opinion
  - c. For informing people

- d. For keeping people aloof
- 5. What is the advantage in consulting more than one paper?
  - a. We get busy
  - b. We get many sided picture of an issue
  - c. We get no information
  - d. We get biased opinion

### **Inference (Passage 2)**

Courage is a mental state, an affair of the spirit, and so it gets its strength from spiritual and intellectual forces. How these forces are blended produces the two types of courage. The first, an emotional state that urges a man to risk injury or death, is physical courage. The second, a more reasoning attitude that enables him coolly to state his career, happiness, and his whole future on his judgment of what he thinks is either right or worthwhile, is moral courage. I have never met a person with moral courage who shouldn't when it was really necessary, face bodily danger. Moral courage is a higher and rarer virtue than physical courage.

- 1. Spiritual and intellectual forces are the source of a \_\_\_\_\_?
  - a. Spiritual state
  - b. Mental state
  - c. Physical state
  - d. Normal state
- 2. What are two types of courage?
  - a. Mental and Physical courage
  - b. Spiritual and mental courage
  - c. Physical and moral courage
  - d. None of these
- 3. What is physical courage?
  - a. Courage that involves threats to life
  - b. Courage that involves threat to prestige
  - c. Courage that involves risk of financial loss
  - d. Courage that involves risk of educational loss
- 4. What is moral courage?
  - a. Ability to judge right
  - b. Ability to judge wrong
  - c. Both A & B

- d. None of these
- 5. Why is moral courage rated higher?
  - a. Because if a person has moral courage he also owes physical courage
  - b. Because moral courage is higher
  - c. Because moral courage is better
  - d. Because moral courage is stronger

### **Inference (Passage 3)**

Some years, ago, a military attempted to kill himself in Hydel Park. The pistol missing fire, he drew his sword, but his hand lost grip and was arrested immediately by a poor man near the spot whom he had not observed. Resenting this obstruction, the military officer attempted to stab his deliverer. The poor man said, “Stab me, sir, if you think proper to escape. I fear death as little as you do but I have more courage. For more than twenty years, I have lived in affliction and poverty, and yet I trust in God for trust and support.” This military officer was struck dumb by this spirited lesson, burst into tears, gave the poor fellow a purse of money and lived to be his greatest benefactor.

- 1. What did a military do?
  - a. Tried to attack enemy
  - b. Tried to commit suicide
  - c. Tried to rescue someone
  - d. Tried to escape in Hydel Park
- 2. Whom did he not observe?
  - a. The man who arrested him
  - b. The man who was chasing him
  - c. The man who was killing him
  - d. The man who gave him the sword
- 3. What was the reaction of the military officer on obstruction?
  - a. He was thankful
  - b. He resisted
  - c. He killed the man
  - d. he got angry
- 4. Who did claim to have more courage?
  - a. The military officer
  - b. The rescuer

- c. both
  - d. Neither of the two
5. What is the end of the story?
- a. The man still committed suicide
  - b. The man killed the poor man as well
  - c. The man was arrest by the police
  - d. The man did not commit suicide

#### **Inference (Passage 4)**

It is impossible for a well-educated, intellectual or brave man to make money the chief object of his life. All healthy people like their dinner, so all healthy-minded people like making money, but the main object of their life is not money; it is something better than money. A good soldier, for instance, mainly wishes to do his fighting well. He is glad of his pay, very properly so, but his main notion of life is to win battles, not to be paid for winning them. So of the doctors. They like fees, no doubt, yet if they are brave and well-educated, the entire object of their life is not fees. They on the whole desire to cure their patient and lose the fee than kill him and get it. And so with all other brave and rightly trained men. Their work is first their fee second very important but still second. But in every nation - there are a vast number of people who are ill-educated, cowardly, and more or less stupid. And with those people, the fees is first and work second just as with brave people the work is first and the fee second.

1. Does an educated, intellectual or brave man make money the chief object of his life?
  - a. Yes
  - b. No
  - c. always
  - d. sometimes
2. What is the wish of a good soldier?
  - a. He wishes to win the war
  - b. He wishes to avoid fight
  - c. He wishes to fight well
  - d. He wishes to fight cowardly
3. What is the utmost desire of the doctors?
  - a. They want to earn fee

- b. They want to cure their patients
  - c. They wish the people to get sick
  - d. Patients are a source of income for them.
4. What do the ill-educated and cowardly people prefer?
- a. They prefer money
  - b. They prefer human service
  - c. They prefer only their job
  - d. They prefer fees and work
5. What is the key difference between educated and ill-educated people?
- a. Educated people work for money
  - b. Ill-educated people work with passion.
  - c. Both work for money
  - d. Educated people work to serve humanity whereas ill-educated work to earn money only.

### **Inference (Passage 5)**

Children should learn to be honest, sincere and open-hearted to their parents. An artful, hypocritical child is one of the most unpromising characters in the world. You should have no secrets which you are unwilling to disclose to your parents. If you have done a wrong, you should openly confess it and beg forgiveness which a parent's heart is ready to bestow. If you wish to undertake anything, ask for their consent. Never begin anything in the hope that you can conceal your design. Sincerity in a child will make up for many faults. Of children, he is the worst who watches the eyes of his parents, and pretends to obey as long as they see him but, as soon as they have turned away, does what they have forbidden.

1. What should be the children's attitude towards their parents?
- a. They should keep their secrets
  - b. They should share things with their parents honestly and frankly.
  - c. They should cheat their parents
  - d. They should go against their parents' will
2. What should children do if they have done some wrong?
- a. They should admit their mistake and beg forgiveness
  - b. They should not disclose it to anyone
  - c. They should tell it to their friends only
  - d. They should share it with their teachers

3. What should children do before undertaking anything?
  - a. They should plan it properly.
  - b. They should keep it a secret.
  - c. They should get their parents' permission.
  - d. They should do it confidently.
  
4. What characteristics may make up for a child's faults?
  - a. Secrecy
  - b. Rudeness
  - c. Sin
  - d. sincerity
  
5. Who is the worst child in this world?
  - a. A child who shows no respect to his parents.
  - b. A child who keeps his secrets.
  - c. A child who goes against the will of parents
  - d. A child who disobeys his parents.

#### **6. Comprehension (Passage 1)**

Read the text carefully and choose the correct answers from the given MCQs.

Genetic variation is the cornerstone of evolution, without which there can be no natural selection, and so a low genetic diversity decreases the ability of a species to survive and reproduce, explains lead author Yoshan Moodley, Professor at the Department of Zoology, University of Venda in South Africa. Two centuries ago, the black rhinoceros – which roamed much of sub-Saharan Africa had 64 different genetic lineages; but today only 20 of these lineages remain, says the paper. The species is now restricted to five countries, South Africa, Namibia, Kenya, Zimbabwe and Tanzania. Genetically unique populations that once existed in Nigeria, Cameroon, Chad, Eritrea, Ethiopia, Somalia, Mozambique, Malawi and Angola have disappeared. The origins of the 'genetic erosion' coincided with colonial rule in Africa and the popularity of big game hunting. From the second half of the 20th century, however, poaching for horns has dramatically depleted their population and genetic diversity, especially in Kenya and Tanzania.

Choose the correct answer.

1. What is important for evolution?
  - a. Large population
  - b. Survival of the fittest
  - c. Genetic variation
  - d. Mixing of species
2. Sub Sharan Africa has lost how many black rhino genetic lineages in 200 years?
  - a. 20
  - b. 30
  - c. 64
  - d. 44
3. Genetically unique black rhinoceros have been lost in all of the following countries, except?
  - a. Nigeria
  - b. Malawi
  - c. Tanzania
  - d. Chad
4. From the second half of the 20th century what has caused a dramatic fall in the black rhinoceros population?
  - a. colonial rule
  - b. fall in genetic diversity
  - c. poaching
  - d. big game hunting
5. Genetic diversity is proportional to \_\_\_\_\_.
  - a. The ability of a species to survive and reproduce
  - b. Extinction
  - c. Species population
  - d. In breeding

**Comprehension (Passage 2)**

Read the passage carefully and choose the correct answers for the questions given at the end of the paragraph.

A great philosopher Francis Bacon says in his essay, "Reading maketh a full man, conference a ready man, and writing an exact man." It is through reading we

acquire knowledge and wisdom. The books and reading material widen our outlook; with help of the good books, we can also acquire noble virtues. Another benefit of reading is that it gives us peace of mind and satisfaction. It is a constructive source of recreation. When we are tired, fed up and sad, the work of the great writers gives us strength, refreshes our soul and makes us all optimists. Besides the books contain many valuable ideas, which inspire us to work hard and work for a noble cause. Healthy reading of books also guides us in the future. The habit of reading should be developed in our children from the very beginning. We should also avoid such reading as might pollute our minds and souls.

1. According to Bacon an exact man is made through.
  - a. Reading
  - b. Writing
  - c. Listing
  - d. Speaking
2. How can we develop noble virtues?
  - a. We can develop noble virtues through good teachers.
  - b. We can develop noble virtues through good parents.
  - c. We can develop noble virtues through good friends.
  - d. We can develop noble virtues through good books.
3. How can we get strength when we are sad and tired?  
We can get strength by:
  - a. Taking medicine.
  - b. Reading the books of great writers.
  - c. Taking proper rest.
  - d. Sleeping properly.
4. What is the chief benefit of healthy reading?
  - a. It keeps us aware.
  - b. It relaxes our mind.
  - c. It supports learning.
  - d. It guides us for our future.
5. What is the chief defect of unhealthy reading?
  - a. It strengthens our mind
  - b. It spoils our mind.
  - c. It gives pleasure

- d. It nourishes our inner self.

### **Comprehension (Paragraph 3)**

Read the passage carefully and choose the correct answers for the questions given at the end of the paragraph.

"Contentment" is a state of mind in which a man shows satisfaction upon the possession of a certain amount of wealth. It does not relate to poverty or riches; a poor man may be satisfied but the rich may be dissatisfied and restless. Contentment does not mean that a person should always depend upon fate setting aside endeavours. It means a situation in which a man makes his due efforts and whatever he receives in return, he expresses his gratitude to God instead of complaints. He does not tend to long for something better than his present condition. But on the other side, a person who lacks contentment is regarded as ambitious and insatiable. He wants to reach beyond the limits his qualities allow him. Discontentment to some extent is a healthy state but excess of it may result in misery or ill health and sometimes entire disaster. It is a matter of deep concern that in the present modern world, a few men might be living in contentment but all others might be dissatisfied, in worries and cares of life. We all should be grateful to God and contented. A poet says that contentment is spring without autumn.

1. What kind of statement of mind is called contentment?
  - a. Satisfaction with having a lot of wealth.
  - b. Satisfaction on having more.
  - c. Satisfaction with having a specific amount of wealth.
  - d. Satisfaction with having unlimited wealth.
2. Does contentment relate to poverty or riches?
  - a. To some extent
  - b. To a large extent
  - c. Yes
  - d. NO
3. Who expresses his gratitude to God instead of complaints?
  - a. A discontented man
  - b. A contented man
  - c. An educated man
  - d. An uneducated man

4. Does a contented man have a desire to improve his standard of life?
  - a. Yes
  - b. No
  - c. It varies from person to person.
  - d. a little bit.
  
5. What is the key difference between a contented and discontented man?
  - a. A contented man is always satisfied with his economical state but the other is not.
  - b. A discontented man is always satisfied with his economical state but the other is not.
  - c. Both of them are not satisfied with their economic condition.
  - d. Both of them are satisfied with their economic condition.

## 7. Writing skills

### a) Discourse Completion tasks

Instructions: Complete the remaining part of the sentence.

- i. Can you please .....
- ii. If you try to run fast ...
- iii. Don't spoil your time otherwise .....
- iv. Work hard so that .....
- v. I do exercise regularly because .....
- vi. He is slow but .....
- vii. Never lose heart because .....
- viii. Since you are my friend .....
- ix. I will not join you today because .....
- x. He said that .....

### b) Paragraph Writing

Instructions: Write a short paragraph on any of the given topics in 70 to 100 words

Computers Skills      Hard work is a key to success      Tourism

## 8. Speaking skills

### a) Dialogues

Experimental Group/Control Group

**Topics:**

- Arrival of Spring season
- Tiktok
- Internet
- WhatsApp
- Use of Readlee App in Learning English
- Earthquake
- Science and present progress
- Importance of sports
- Price hike
- Driving skills
- Personal grooming
- Importance of English language
- Power of social media

**b) Short Speeches**

Give a short speech (Maximum Time: 3 minutes) on any of the given topics

Topics:

- i. Physical fitness      ii. Role of media in society      iii. Benefits of Youtube

## Appendix C: Questionnaire on Students' Perceptions Regarding the Use of AI-Based Applications

Your views on the use of AI-based apps in English language teaching at the college level.

Instructions: You can choose only one answer from the given options.

1 = Strongly disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly agree

Sr. No.	Statement	Options
1.	1. I think that AI-based apps are good for English language learning activities.	<div>1    2    3    4    5</div> <div><input type="checkbox"/>   <input type="checkbox"/>   <input type="checkbox"/>   <input type="checkbox"/>   <input type="checkbox"/></div>
2.	2. AI-based apps are good for reading activities	<div>1    2    3    4    5</div> <div><input type="checkbox"/>   <input type="checkbox"/>   <input type="checkbox"/>   <input type="checkbox"/>   <input type="checkbox"/></div>
3.	3. AI-based apps are good for writing activities	<div>1    2    3    4    5</div> <div><input type="checkbox"/>   <input type="checkbox"/>   <input type="checkbox"/>   <input type="checkbox"/>   <input type="checkbox"/></div>
4.	4. AI-based apps are good for speaking activities	<div>1    2    3    4    5</div> <div><input type="checkbox"/>   <input type="checkbox"/>   <input type="checkbox"/>   <input type="checkbox"/>   <input type="checkbox"/></div>
5.	5. AI-based apps are good for Vocabulary and grammar learning.	<div>1    2    3    4    5</div> <div><input type="checkbox"/>   <input type="checkbox"/>   <input type="checkbox"/>   <input type="checkbox"/>   <input type="checkbox"/></div>
6.	6. I will learn more if I could use AI-based apps.	<div>1    2    3    4    5</div> <div><input type="checkbox"/>   <input type="checkbox"/>   <input type="checkbox"/>   <input type="checkbox"/>   <input type="checkbox"/></div>
7.	7. Sharing learning material through AI-based apps is beneficial and effective for language learning	<div>1    2    3    4    5</div> <div><input type="checkbox"/>   <input type="checkbox"/>   <input type="checkbox"/>   <input type="checkbox"/>   <input type="checkbox"/></div>
8.	8. I should keep using AI-based apps for English Language Learning.	<div>1    2    3    4    5</div> <div><input type="checkbox"/>   <input type="checkbox"/>   <input type="checkbox"/>   <input type="checkbox"/>   <input type="checkbox"/></div>

9.	9. Reading through AI-based App Readlee helped me to improve my reading skill.	1	2	3	4	5
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.	10. Reading English with Readlee was more like a fun for me.	1	2	3	4	5
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11.	11. I managed to read my English textbooks through Readlee quite easily.	1	2	3	4	5
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.	12. I understood what I read in English through Readlee	1	2	3	4	5
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.	13. The assignments on the Readlee app were quite helpful in learning the English language	1	2	3	4	5
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14.	14. The assignments on the Readlee app helped me improve my reading pace.	1	2	3	4	5
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.	15. The assignments on the Readlee app helped me improve my comprehension.	1	2	3	4	5
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16.	16. The assignments on the Readlee app helped me improve my writing when I wrote answers to the questions	1	2	3	4	5
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17.	17. The assignments on the Readlee app helped me improve my speaking when I answered the questions through speaking	1	2	3	4	5
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18.	18. The assignments on the Readlee app helped me improve my pronunciation.	1	2	3	4	5
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19.	19. My vocabulary has expanded because of reading assignments on the Readlee app.	1	2	3	4	5
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

20.	20. @ voice aloud reader was beneficial for model reading.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
21.	21. I learnt pronunciation and reading style from the App @ voice aloud reader.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
22.	22. The app Entelechy supported me in assessing my comprehension through automated feedback.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
23.	23. It was a fun to assess my comprehension through Entelechy	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
24.	24. AI-based Apps helped me to learn the correct use of English language.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25.	25. The use of AI-based Apps helped me reduce my dependence on teacher for learning English language.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
26.	26. Learning English through AI-based Apps makes learning a Personal/ private matter, with a choice of programs and concepts to be learnt.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
27.	27. The use of AI-based apps has increased my motivation to learn English language in and outside the classroom	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
28.	28. I feel motivated when I use AI-based Apps for learning English.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
29.	29. Using AI-based Apps in learning English is very effective.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>

30.	30. All language teachers should incorporate the use of AI-based Apps for English language teaching.	1	2	3	4	5
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31.	31. Using AI-based apps in language learning wastes a lot of time.	1	2	3	4	5
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32.	32. I did not like using AI-based apps for learning English.	1	2	3	4	5
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33.	33. Traditional ways of language teaching are more effective in contrast to AI-powered language teaching.	1	2	3	4	5
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34.	34. The use of AI-based apps is costly	1	2	3	4	5
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35.	35. It is difficult to pay for the apps I used in this research.	1	2	3	4	5
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## Appendix D: Interview Questions

**Note: Interview questions in this study are developed based on the formulation of the problem and the purpose of the research.**

1. How has been your English language learning experience with AI-powered Apps?
2. Do you think AI-powered Apps contributed to your English language learning? If yes, please rate your level of satisfaction.
3. Would you keep using AI-based Apps for learning English in the future? If yes Why? If no why not?
4. What is the most striking feature in AI-based Apps that you think is amazing?
5. Did you meet any challenges while using the AI-based Apps during the current research project? If yes, please list them.
6. What would you prefer if you were asked to choose from traditional English language teaching methods or AI-assisted language teaching methods?
7. Should I retain the use of AI-powered apps to teach English language teaching at the intermediate level?
8. How far do you think your interest level was enhanced through the use of AI-based apps in English language learning?
9. Would you recommend the use of AI-based apps to other English language learners? If yes Why? If no why not?
10. Which of the 3 apps do you think was most effective? Also, explain the reason?

## Appendix E: Permission Letter



☎:051-3200134

گورنمنٹ آف پنجاب  
ہائر ایجوکیشن ڈیپارٹمنٹ  
گورنمنٹ ایسوسی ایٹ کالج آف کامرس  
دھیری، کہوٹہ (راولپنڈی)

[gic.kahuta.pindi@gmail.com](mailto:gic.kahuta.pindi@gmail.com)



ای میل ایڈریس:

Yasar Riaz  
Instructor (English)  
Govt. Associate College of Commerce, Kahuta

Subject: **Permission to Conduct Research at Government Associate College of Commerce, Kahuta**

Dear Yasar Riaz,

I am writing to grant you permission to conduct your research titled "Improving Pakistani College Students' English Language Skills Using AI-Based Applications: An Experimental Research" at Government Associate College of Commerce, Kahuta.

Your research aims to investigate the effectiveness of AI-based applications in enhancing English language skills among Pakistani college students. This topic aligns with our institution's goals of promoting innovative teaching methodologies and improving educational outcomes.

Please coordinate with our administration to finalize any logistical arrangements necessary for your research activities. We trust that you will adhere to ethical standards and respect the college's policies throughout the duration of your study.

We wish you success in your research endeavors and look forward to the valuable insights your study will provide.

Best regards,

**Dated: August 01, 2022**

**Principal**  
**Government Associate College of Commerce**  
**Kahuta, District Rawalpindi**

## **Appendix F: Informed Consent Form**

Letter of Invitation and Consent Form for the Participants of the Current Research

Study Title: “Improving Pakistani College Students’ English Language Skills Using AI- Based Applications: An Experimental Research.”

**Dear Participant,**

Before agreeing to participate in this research, I strongly encourage you to read the following explanation of this study. This statement describes the purpose and procedures of the study. Also described is your right to withdraw from the study at any time.

### **Explanation of Procedures**

This study is designed to experiment with using AI-based applications to improve college students’ English language skills. I am conducting this study to learn more about this question since it has not been studied much in the past. Participation in the study involves the use of AI-based applications for a period of 32 weeks of AI-powered English language learning. A pre-test will be conducted before the start of the research whereas a post-test will be conducted at the end of the research. The participants will be required to fill in a questionnaire to share their English language learning experience with AI-based apps after the post-test. Moreover, the interviews will also be conducted to have participants’ opinions/perceptions regarding the use of AI-powered Apps for learning the English language at the college level. The interviews will be audio-taped and later transcribed for the purpose of data analysis. I will arrange these interview at you’re your college.

### **Risks and Discomforts**

There are no risks or discomforts that are anticipated from your participation in the study. Potential risks or discomforts include possible emotional feelings of sadness when asked questions during the interview.

## **Benefits**

The anticipated benefit of participation is the opportunity to discuss feelings, perceptions and concerns related to the experience of teaching/learning English language and to contribute to decision-making for upcoming educational career.

## **Confidentiality**

The information gathered during this study will remain confidential in secure premises during this project. Only the researcher will have access to the study data and information. There will not be any identifying names on the interview/discussion transcripts; they will be coded and the key to the code will be kept locked away. Your names and any other identifying details will never be revealed in any publication of the results of this study. The tapes will be destroyed at the completion of the study. The results of the research will be published in the form of a thesis/research paper and may be published in a professional journal or presented at professional meetings. It may also be published in book form. The knowledge obtained from this study will be of great value in guiding professionals to be more effective in English developing syllabi, language teaching, testing and assessment at college level.

## **Withdrawal**

You are free to withdraw consent and discontinue participation in this project at any time without prejudice or penalty. You are also free to refuse to answer any question I might ask you.

## **Further Questions and Follow-Up**

You are welcome to ask the researchers any questions that occur to you during the survey or interview. If you have further questions once the research is completed, you are encouraged to contact the researcher using the contact information given below. If, as a result of participating in this study you feel the need for further, longer- term support, you are welcome to contact me at **Government Associate College of Commerce, Kahuta, Rawalpindi, Pakistan.** (My work place).

I, \_\_\_\_\_ (name; please write clearly), have read the above information. I freely agree to participate in this study. I understand that I am free to refuse to answer any question and to withdraw from the study any time. I understand that my responses will be kept anonymous.

Participant Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Parents'/Guardians's Signature: \_\_\_\_\_

**Check those that apply:**

- ☐ I would like a copy of my interview transcript\_\_\_\_\_
- ☐ I would like information about the study results\_\_\_\_\_
- ☐ I would be willing to be contacted in the future for a possible follow-up interview\_\_\_\_\_

Write your address clearly below. Please also provide an email address if you have one.

Mailing address:

Email address:

Researcher contact information:

Yasar Riaz

Contact: +923345419151

Address: Department of English Government Associate College of Commerce,  
Kahuta, District Rawalpindi, Pakistan.

## Appendix G: Lesson Plans

Appendix G contains only five lessons as sample though 80 lessons in total were delivered during the whole research phase.

### Lesson Plan 1

Class:	Intermediate Part II	Subject: English
Chapter:	The Dying Sun by: James Jeans	Duration: 30
Minutes		
Date:	September 01, 2022	Teacher's Name: Yasar
Riaz		

---

#### General Objectives

- To give students information about the size of the earth, starts and other planetary systems.
- To give students knowledge about the beginning of life on earth and forming of planets in the universe.

#### Specific Objectives

- To improve students' English language skills including reading, writing, listening and speaking.
- To improve students' level of vocabulary
- To improve and enhance students' knowledge of grammar
- To improve students' level of comprehension and inference

#### Teaching Material

During the lesson: Textbook, Whiteboard, Marker

After the lesson: Textbook, Smartphone/Tablet/Computer/Laptop

#### Brain storming

Do you know?

- What is the size of Universe?
- How do the stars travel?
- How did the planets come into existence?

#### Announcement of the topic

##### The Dying sun by: James Jeans

Model Reading by the Teacher in the classroom

(Target: 50 % of the whole chapter is to be covered on day one.)

#### The Dying Sun

A few stars are known which are hardly bigger than the earth, but most of them are so large that hundreds of thousands of earths could be packed inside each and leave room to spare; here and there we find an immense star large enough to contain millions and millions of earths. And the total number of stars in the universe is probably something like the total number of grains of sand on all the seashores of the world. Such is the littleness of our home in space when measured up against the total substance of the universe.

These millions of stars are wandering about in space. A few form groups which journey in company, but most of them travel alone. And they travel through a universe so immense that it is very, very rare event indeed for one star to come anywhere near to another. For the most part each star makes its voyage in complete loneliness, like a ship on

an empty ocean. In a scale model in which the stars are ships, the average ship will be well over a million miles from its nearest neighbour. From this it is easy to understand why a star seldom finds another anywhere near it.

### Partial feedback

- Tell the meaning of the following words  
Immense, Voyage
- Who is the writer of this chapter?
- How do the stars travel?

We believe, however, that some two thousand million years ago, this rare event took place, and that another star, wandering blindly through space, happened to come near the sun. Just as the sun and moon raise tides on the earth, so this second star must have raised tides on the surface of the sun. But they would be very different from the little tides which the small mass of the moon raises in our oceans; an immense tidal wave must have traveled over the surface of the sun, at last forming a mountain so high that we can hardly imagine it. As the cause of the disturbance came nearer and nearer, the mountain would rise higher and higher. And before the second star began to move away again, its tidal pull had become so powerful that this mountain was torn to pieces and threw off small parts of itself into space. These small pieces have been going round the sun ever since. They are the planets, great and small, of which our earth is one.

### Final Feedback

- How did the planets come into existence?
- When did this rare event take place?

### Assignment

- Listen to the same text at your home through the Mobile App “@ Voice Aloud Reader” for Model Reading
- Read the same text aloud through Readlee portal at your home and answer the following questions in both spoken and written form. Press submit button after completing the task.  
What is the text about? (Speak and record through READLEE)  
What is the most inspiring idea in the text? (Speak and record through READLEE)  
What is the size of a common star? (Write and submit the answer through READLEE)  
What are the planets? Write and submit the answer through READLEE)
- Solve the quiz through the link shared in WhatsApp group.

1. And before the \_\_\_\_\_ star began to move away again, its tidal pull had become so powerful that this mountain was torn to pieces and threw off small parts of itself into space.

- 1st
- 2nd
- 3rd
- 4th

2. And they travel through a universe so immense that It is very, very rare event indeed for \_\_\_\_\_ star to come anywhere near to another.

- 1

- b) 2
  - c) 3
  - d) 4
3. These \_\_\_\_\_ of stars are wandering about in space.
- a) Hundreds
  - b) Thousands
  - c) Millions
  - d) Trillions
4. A few stars are known which are hardly bigger than the \_\_\_\_\_, but most of them are so large that hundreds of thousands of earths could be packed inside each and leave room to spare.
- a) Moon
  - b) Earth
  - c) Sun
  - d) Mars
5. We find an immense star large enough to contain \_\_\_\_\_ and millions of earths.
- a) Hundreds
  - b) Thousands
  - c) Millions
  - d) Trillions
6. Most of the stars travel alone. (Alone means?)
- a) Separately
  - b) Collectively
  - c) Fast
  - d) Random
7. It is easy to understand why a star seldom finds another star near it. (Seldom means?)
- a) Often
  - b) Commonly
  - c) Rarely
  - d) Suddenly
8. We can hardly imagine it. (Imagine means?)
- a) Sell
  - b) Buy
  - c) Think
  - d) Believe
9. There we find an immense star. (Immense means?)
- a) Small
  - b) Bright
  - c) Dull
  - d) Large
10. Just as the sun and moon raise tides on earth. (Tides means?)
- a) Waves
  - b) Attraction
  - c) Light
  - d) Roots

## Lesson Plan 2

Class:	Intermediate Part II	Subject: English
Chapter:	The Dying Sun (Part 2) by: James Jeans	Duration: 30 Minutes
Date:	September 02, 2022	Teacher's Name: Yasar Riaz

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### General Objectives

- To give students information about the size of the earth, stars and other planetary systems.
- To give students knowledge about the beginning of life on earth and forming of planets in the universe.

### Specific Objectives

- To improve students' English language skills including reading, writing, listening and speaking.
- To improve students' level of vocabulary
- To improve and enhance students' knowledge of grammar
- To improve students' level of comprehension and inference

### Teaching Material

During the lesson: Textbook, Whiteboard, Marker

After the lesson: Textbook, Smartphone/Tablet/Computer/Laptop

### Brain storming

Do you know?

- What is the size of Universe?
- How do the stars travel?
- How did the planets come into existence?

### Announcement of the topic

#### The Dying Sun by: James Jeans

Model Reading by the Teacher in the classroom

### The Dying Sun

The sun and the other stars we see in the sky are all extremely hot-far too hot for life to exist on them. So also no doubt were the pieces of the sun when they were first thrown off. Gradually they became cooler, until now they have very little heat of their own left, their warmth coming almost entirely from the radiation which the sun pours down on them. In course of time one of these cooling pieces gave birth to life. We do not know how, when or why this happened. It started in simple organisms, whose living power consisted chiefly in their being able to reproduce themselves before dying. But from these humble beginnings came a stream of life which, growing ever more and more complex, has in the end produced beings whose lives are largely centred in their feelings and ambitions, their sense of beauty, and the religions in which lie their highest hopes and noblest desires.

Although we cannot speak with any certainty, it seems most likely that the human race came into existence in some such way as this. Standing on our little grain of sand, we try to discover the nature and purpose of the universe which surrounds our home in space and time. Our first feeling is something like fear. We find the universe frightening because of its immense distances which we do not understand, frightening because of the stretches of time so great that we cannot imagine them, making the whole of human history so very small in comparison, frightening because of our extreme loneliness, and because of the littleness of our home in space - a millionth part of a grain of sand out of all the sea-sand in the world. But above all else, we find the universe frightening because we cannot find any sign that life like our own exists anywhere in it except on the earth. Indeed, for the most part, empty space is so cold that all life in it would be frozen. Most of the

matter in space is so hot as to make life on it impossible. Life does not seem to have any part in the plan of the universe which produced our planetary system. Calculation shows that there can be only very few such systems in space. Yet, so far as we can see, life of the kind we know on earth can exist only on planets like the earth. It needs suitable physical conditions for its appearance, the most important of which is a temperature at which substances can exist in a liquid state.

### **Partial feedback**

- Tell the meaning of the following words  
Gradually, Ambitions
- Why does the writer call earth a grand of sand?
- Where can life exist?

The stars themselves are far too hot for this. We may think of them as a collection of fires scattered through space, providing warmth in surroundings where the temperature is at most some four degrees above absolute zero, that is, about 484 degrees of frost on the Fahrenheit scale. In the immense stretches of space beyond the Milky Way, it is colder still. Away from the fires there is this un-imaginable cold of hundreds of degrees of frost; close up to them there is a temperature of thousands of degrees, at which all solids melt, all liquids boil.

Life can exist only in a narrow belt surrounding each of these fires at a certain distance where the temperature is neither too hot nor too cold. Outside these belts life would be frozen; inside it would be burnt up. A rough calculation shows that all such temperature belts, within which life is possible, all added together, make up less than a thousand million millionth part of the whole of space. And even inside them, life must be very rare, for it is extremely unusual for suns to throw off planets as our sun has done. Probably only one star in 100,000 has a planet going round it at the right distance for life to be possible on it.

### **Final Feedback**

- What is the text about?
- What is most interesting in the text?

### **Home Assignment**

- Listen to the same text at your home through the App “@ Voice Aloud Reader” for Model Reading
- Read the same text aloud through Readlee portal at your home and answer the following questions in both spoken and written form. Press submit button after completing the task.  
(Speak and record through READLEE)  
(Speak and record through READLEE)  
(Write and submit the answer through READLEE)  
Write and submit the answer through READLEE)  
Solve the quiz through the link shared in WhatsApp group.

1. The sun and the other stars we see in the sky are all extremely \_\_\_\_\_ for life to exist on them.

- a) Large
- b) Small
- c) Hot
- d) Cool

2. Standing on our little \_\_\_\_\_ of sand, we try to discover the nature and purpose of the universe which surrounds our home in space and time.

- a) Home

- b) Planet
  - c) Grain
  - d) Wall
3. Indeed, for the most part, empty space is so \_\_\_\_\_ that all life in it would be frozen.
- a) Cold
  - b) Hot
  - c) Small
  - d) Large
4. We may think of them as a collection of \_\_\_\_\_ scattered through space. \*
- a) Water
  - b) Fires
  - c) Air
  - d) Smoke
5. Life can exist only in a narrow \_\_\_\_\_ surrounding each of these fires at a certain distance where the temperature is neither too hot nor too cold. \*
- a) Road
  - b) Street
  - c) Belt
  - d) Line
6. It seems most likely that....(likely means?)
- a) Surely
  - b) Probably
  - c) Amazing
  - d) Surprising
7. Another star wandering blindly through space. (Wandering means?)
- a) Walking
  - b) Moving
  - c) Roaming
  - d) Dancing
8. Gradually the parts of the sun became cooler. (Gradually means?)
- a) Soon
  - b) Slowly
  - c) Easily
  - d) Hardly
9. Some two thousand million years ago this rare event took place. (Rare means?)
- a) Happy
  - b) Sad
  - c) Scarce
  - d) Important
10. The sun and other stars we see in space are extremely hot. (Extremely means?)
- a) Mildly
  - b) Only
  - c) Greatly

d) Mainly

1. \_\_\_\_\_ Method has helped us in solving many problems.

- a) Scientific
- b) Inductive
- c) Deductive
- d) Technical

2. All of us have benefited greatly from the use of \_\_\_\_\_ method in solving problems.

- a) Inductive
- b) Deductive
- c) Scientific
- d) Technical

3. We are now generally less fearful than our fathers and grandfathers were.

- a) Fearful
- b) Rich
- c) Strong
- d) Intelligent

4. Suppose you had been an unusually \_\_\_\_\_ little fellow and had lived through that first year.

- a) intelligent
- b) Honest
- c) Strong
- d) Short tempered

5. Today babies are born in \_\_\_\_\_ where there is little likelihood of their getting a disease.

- a) Homes
- b) Nurseries
- c) Villages
- d) Hospitals

6. It is against the law to throw \_\_\_\_\_ in the streets.

- a) Garbage
- b) Money
- c) Water
- d) Food

7. Today we are better able to explain happenings which used to be considered strange and mysterious. (Mysterious means)

- a) Strong
- b) Weak
- c) Secret
- d) Criminal

8. We are also more critical in our thinking than our ancestors. (Ancestors mean)

- a) Forefather

- b) Father
- c) Aunts
- d) Uncles

9. Life was most uncertain. (Uncertain means)

- a) Predictable
- b) Sure
- c) Unpredictable
- d) Hard

10. A person who lived to be more than thirty years of age was indeed fortunate.

(Fortunate means)

- a) Unfortunate
- b) Unlucky
- c) Unhappy
- d) Lucky

### Lesson Plan 3

Class: Intermediate Part II Subject: English  
 Chapter: Using the Scientific Method P1 By: Darrel Barnard & Lon Edwards

Date: 05-10-2024 Duration: 30 Minutes  
 Teacher's Name: Yasar Riaz

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#### General Objectives

- To inform students about the scenarios and people's lives before the scientific advancements.
- To give students knowledge about the impact of the use of scientific method on human life.

#### Specific Objectives

- To improve students' English language skills including reading, writing, listening and speaking.
- To improve students' level of vocabulary
- To improve and enhance students' knowledge of grammar
- To improve students' level of comprehension and inference

#### Teaching Material

During the lesson: Textbook, Whiteboard, Marker

After the lesson: Textbook, Smartphone/Tablet/Computer/Laptop

#### Brain storming

Do you know?

- What do you think how the use of scientific method impacted our lives?
- What common services are rendered by science in the present age in human society?

#### Announcement of the topic

#### Using the Scientific Method P1

By: Darrel Barnard & Lon Edwards

#### Model Reading by the Teacher in the classroom

All of us have benefited greatly from the use of scientific method in solving problems such as those dealing with the maintenance of health, the production and preservation of foods, the construction of our homes, and the improvement in communication and transportation. Not only have our ways of living changed, but people themselves have also been changed. Today we are better able to explain happenings which used to be considered strange and mysterious. Although there is still need for improvement, we are now generally less fearful than our fathers and grandfathers were. We are also more critical in our thinking than our ancestors.

This lesson should help you understand how the use of scientific method has improved living conditions and changed people. It should also help you understand how you can make better use of the scientific method in your everyday living.

**Better Control of Disease:** If you had been born two hundred years ago, you would have had about one chance in eight of living to be one year old. In other words, in those days about seven out of eight babies died before reaching their first birthday. Suppose you had been an unusually strong little fellow and had lived through that first year. Very likely, before you were six years old, you would have had smallpox, and by the time you reached the age of twelve, you would undoubtedly have had measles, whooping cough, scarlet fever, and diphtheria. Even then your battle for life was not over. Yellow fever, malaria, typhus, cholera, typhoid fever, and even

influenza, once started, spread through a community. Life was most uncertain. A person who lived to be more than thirty years of age was indeed fortunate. It is unbelievable that such conditions could have existed so short a time ago. Today babies are born in hospitals where there is little likelihood of their getting a disease. Young people are treated to protect them against smallpox, diphtheria, and typhoid fever. Today a person can expect to live to be almost seventy years old. In other words, more than thirty years have been added to the expected length of man's life. These changes have been made possible by use of the scientific method to solve such problems as the causes of disease and its prevention.

### Partial feedback

- Were our ancestors more critical than us?
- What diseases were fatal in the past?

**Better Sanitary Conditions.** It is difficult to imagine what sanitary conditions in some of our larger cities were like only one hundred years ago. Into the narrow, unpaved, and poorly drained city streets household garbage and other refuse were thrown. Animals wandered through the streets, feeding upon the garbage. Outdoor toilets were common, many of them situated where human wastes drained into wells from which people obtained drinking water.

Today our city streets are paved and well drained, and they are cleaned regularly. It is against the law to throw garbage in the streets. Sewage from all sections of a city is carried through sealed pipes to disposal plants. Through the use of the scientific method it has been demonstrated that unsanitary conditions cause the spread of diseases like cholera and dysentery. Today most city governments have departments of keep the cities clean and thereby prevent the spread of certain diseases.

A century ago it was common practice in many cities to bring water b for household use. Water had to be carried a considerable distance from the well to home. It was, therefore, used very sparingly for bathing and cleaning purposes. Often it came from sources that contained disease-producing germs.

Towns and cities today have water systems that usually provide water enough for household use. One of the most important problems in the growth of cities has been to provide sufficient water to meet the many needs of an increasing population. Los Angeles has solved the problem by bringing water to the city from the Colorado River, 544 kilometres away. Carried through a pipeline, or aqueduct, a thousand million litres of water are delivered to the district daily. This is a remarkable advance from the bucket system of supplying homes with water.

### Final Feedback

- Where did people throw garbage and waste in the past?
- What were the sources of fetching water to home in the past?

### Home Assignment

- Listen to the same text at your home through the App “@ Voice Aloud Reader” for Model Reading
- Read the same text aloud through Readlee portal at your home and answer the following questions in both spoken and written form. Press submit button after completing the task.

#### (Speak and record through READLEE)

- What is the text about?
- What is the most inspiring idea/thing in the text?

#### (Write and submit the answer through READLEE)

- How did Los Angeles solve the issue of bringing water to cities?
  - What our ancestors were afraid of?
- Solve the quiz through the link shared in WhatsApp group.

1. \_\_\_\_\_ Method has helped us in solving many problems.
  - e) Scientific
  - f) Inductive
  - g) Deductive
  - h) Technical
2. All of us have benefited greatly from the use of \_\_\_\_\_ method in solving problems.
  - e) Inductive
  - f) Deductive
  - g) Scientific
  - h) Technical
3. We are now generally less fearful than our fathers and grandfathers were.
  - e) Fearful
  - f) Rich
  - g) Strong
  - h) Intelligent
4. Suppose you had been an unusually \_\_\_\_\_ little fellow and had lived through that first year.
  - e) intelligent
  - f) Honest
  - g) Strong
  - h) Short tempered
5. Today babies are born in \_\_\_\_\_ where there is little likelihood of their getting a disease.
  - e) Homes
  - f) Nurseries
  - g) Villages
  - h) Hospitals
6. It is against the law to throw \_\_\_\_\_ in the streets.
  - e) Garbage
  - f) Money
  - g) Water
  - h) Food
7. Today we are better able to explain happenings which used to be considered strange and mysterious. (Mysterious means)
  - e) Strong
  - f) Weak
  - g) Secret
  - h) Criminal
8. We are also more critical in our thinking than our ancestors. (Ancestors mean)
  - e) Forefather
  - f) Father
  - g) Aunts

h) Uncles

9. Life was most uncertain. (Uncertain means)

- e) Predictable
- f) Sure
- g) Unpredictable
- h) Hard

10. A person who lived to be more than thirty years of age was indeed fortunate.

(Fortunate means)

- e) Unfortunate
- f) Unlucky
- g) Unhappy
- h) Lucky

- To inform students about the scenarios and people's lives before the scientific advancements.
- To give students knowledge about the impact of the use of scientific method on human life.

- To improve students' English language skills including reading, writing, listening and speaking.
- To improve students' level of vocabulary
- To improve and enhance students' knowledge of grammar
- To improve students' level of comprehension and inference

During the lesson: Textbook, Whiteboard, Marker  
After the lesson: Textbook, Smartphone/Tablet/Computer/Laptop

Do you know?

- How has the use of scientific method improved our lives?
- What diseases were common in the past?
- What were people's old fears?

## Using the Scientific Methods (Darrel Barnard & Lon Edwards)

More Food and Better Food. Changes have taken place, too, in our eating habits. Through the use of science we have learned that it is healthful to eat many kinds of food, and we have learned how to provide ourselves with a variety of foods throughout the year. People who lived a century ago probably enjoyed eating as much as we do today, but they could not have as many different kinds of food. Most of their foods had to be produced on their own farms or in their own gardens. Since fresh vegetables could be obtained only during the growing season, people living in cold climates had none during the winter months. Thrifty housewives preserved their home grown vegetables and fruits by canning, pickling, or drying them for use during the cold weather. Meats were preserved by salting and drying or by freezing when the weather was cold enough. Seafoods were generally available only along the coast, fish and shellfish could be eaten soon after they were caught.

Regardless of where people live today, they can obtain some fresh fruits, meats and vegetables throughout the year. By the quick-freeze method, vegetables, fruits, seafoods, and meats of various kinds can be preserved so that they are both nutritious and enjoyable. Modern methods of selecting, grading, and processing foods have removed the risk or danger of poisoning from canned foods, dehydration, or the removal of water from such foods as milk, eggs, potatoes, and apples, has proved a practical method of preservation.

Our eating habits are not the only things in our lives changed by the use of science. Because we have used science to learn more about the processes and materials in our surroundings and about

the methods of controlling them, we have been able to improve our ways of building houses, our methods of communication and transportation, and even the way we spend our leisure time.

### **Partial feedback**

- Tell the meaning of the following words  
Probably, dehydration
- How was food preserved in the past?

**Better Attitudes.** By an attitude, we mean the way we feel toward some idea or some event. If a person believes that wearing some kind of charm will prevent him from having bad luck, he will wear the charm, and will feel uncomfortable without it. Feelings which involve fears such as this are called superstitions. Superstitious people believe in signs of good or bad luck, and their lives are greatly influenced by such signs.

Superstitious beliefs are being overcome by using the scientific method to demonstrate that there is no sound basis for them. Few people today believe that diseases are caused by evil spirits. Though astrology and fortune-telling are still practised, they do not influence the lives of as many people as they once did. It has been learned that there is always a good natural reason for everything that happens to people. As a result, most people no longer fear black cats, broken mirrors, and the number 13.

By the scientific method, it has been demonstrated that ideas are not necessarily true because they have been believed for a long time. Ideas must now be supported by facts in order to be acceptable to the scientist or to people who use the scientific method.

The discoveries of scientists have helped people develop an attitude of open-mindedness. They are more willing to look for new truths than to assume that what has been considered true will always be true. Because people have had to change their old ideas as a result of new discoveries made by scientists, they are less likely to accept conclusions as final.

### **Final Feedback**

- How many people believe today that diseases are caused by evil spirits?
- Do people fear black cats, broken mirrors and the number 13 today?

### **Home Assignment**

- Listen to the same text at your home through the App “@ Voice Aloud Reader” for Model Reading
- Read the same text aloud through Readlee portal at your home and answer the following questions in both spoken and written form. Press submit button after completing the task.

#### **(Speak and record through READLEE)**

- i. What is the text about?
- ii. How has the scientific method helped us in different fields of life?

#### **(Write and submit the answer through READLEE)**

- i. How was food preserved in the past?
  - ii. What is the modern method of preserving food?
- Solve the quiz through the link shared in WhatsApp group.

#### **Choose the correct answer.**

1. Changes have taken place, too, in our \_\_\_\_\_ habits.
  - a) Sleeping
  - b) Living
  - c) Eating
  - d) Playing

2. Thrifty housewives \_\_\_\_\_ their home grown vegetables and fruits by canning, pickling, or drying them for use during the cold weather.
- a) Preserved
  - b) Cooked
  - c) Stitched
  - d) Made
3. By the \_\_\_\_\_, vegetables, fruits, seafoods, and meats of various kinds can be preserved\*
- a) Inductive method
  - b) Deductive method
  - c) Scientific method
  - d) Quick-freeze method
4. By an attitude we mean the way we feel toward some idea or some event.
- a) Attitude
  - b) Method
  - c) Way
  - d) Description
5. Feelings which involve fears such as this are called \_\_\_\_\_.
- a) Omen
  - b) Strange
  - c) Superstitions
  - d) Bad
6. Thrifty housewives preserved their home grown vegetables and fruits by canning, pickling, or drying them for use during the cold weather. (Thrifty means)
- a) Old
  - b) Clever
  - c) Careful
  - d) Educated
7. Regardless of where people live today, they can obtain some fresh fruits, meats and vegetables throughout the year. (Regardless means)
- a) Conditional
  - b) Definitely
  - c) Sure
  - d) Irrespectively
8. Science has changed even the way we spend our leisure time. (Leisure means)
- a) Spare
  - b) Business
  - c) Play
  - d) Situation
9. Feelings which involve fears such as this are called superstitions. (Superstitions mean)
- a) Terrorism

- b) Misconception
- c) Ideas
- d) Belongings

10. Though astrology and fortune-telling are still practiced, they do not influence the lives of as many people as they once did. (Astrology means)

- a) Magic
- b) Foretelling
- c) Charm
- d) Impact

## Lesson Plan 5

Class: Intermediate Part II  
 Chapter: Why Boys Fail in College (Herbert E. Hawkes)

Subject: English

Date: 12-09-2022

Duration: 30 Minutes  
 Teacher's Name: Yasar Riaz

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### General Objectives

- To inform students about the common causes of failure in college.
- To enable the students to avoid habits that might cause their failure in college.
- To enable students understand how they can succeed during the college career.

### Specific Objectives

- To improve students' English language skills including reading, writing, listening and speaking.
- To improve students' level of vocabulary
- To improve and enhance students' knowledge of grammar
- To improve students' level of comprehension and inference

### Teaching Material

During the lesson: Textbook, Whiteboard, Marker

After the lesson: Textbook, Smartphone/Tablet/Computer/Laptop

### Brain storming

- Do you know what common causes of students' failure in college are?
- How can we avoid failure during the college career?

### Announcement of the topic

**Why Boys Fail in College (Herbert E. Hawkes)**

Model Reading by the Teacher in the classroom

Of the boys who do not reach their natural academic boundary during the course of their college career, but who fail to get through, there are two main classes: those who try, and those who do not try. Many boys attempt seriously to make good, and really have the native ability to do so, but find it almost impossible to sit at a desk and concentrate on the tasks assigned. There is the boy who sits down to study, opens his book, but before starting on his work says to himself, "I think that I had better sharpen my pencil; it needs it badly." And when he has sharpened it, he observes that all his pencils need sharpening. And so on, until his time is gone and nothing has been done. Such nervous habits are not easy to uproot, and, so far as I can see cannot be eradicated by anyone but the boy himself. Others can see the difficulty, but the boy must take himself by the collar and make himself cultivate a poise and calm that smothers the fidgets. Until he does this, he does not really try, although he thinks he's trying and often spends more time in the presence of an open book than many a boy of equal ability who does good work.

### Partial feedback

- What are the two main classes of the students who fail to get through in the college?
- Can others help a student to make him avoid his failure?

A common cause of failure is a mistaken ambition for the boy on the part of his parents. More often than I should wish, I find a boy who is not showing any interest in his work, and who

is not trying to do it with any distinction, because he is following a direction, mapped out by his parents, that runs counter to all of his interests and abilities. I have made a number of very warm enemies among the parents of college students by telling them that I am certain that the good Lord never intended their son to be a physician, or a dentist, or an engineer. It may be that the boy has ability enough to be anyone of these things, but the long and short of it is, he does not want to be. He wants to be a theatrical manager, or a businessman, or a book-illustrator. It may be unreasonable for the boy to turn his back on a fine opening in the dental profession in favour of business. But reason cannot control all of these matters. As well argued with a person that he ought to like onions when he detests them. As a general thing, the boy wins out in such controversies. And he should. Also, be it said, the parent whom I have offended usually comes around after a term of years and tells me that his son was right and that he is thankful to me for taking the part of the boy in the argument. If such a boy fails, it is because he cannot bring himself to try to do the work that is distasteful to him, and that he feels is leading him in the wrong direction. If the college is alive to its work of advice, such cases are caught before the failure is complete.

Another type of boy who does not try is the very bright boy who has always done his school work without effort, and who has never learned what real application is. He supposes that he can float through college with as little effort as he did through school. I sometimes think that the bright boy who has always depended on his ability to get things quickly, is the most pitiable object among all our failing students. For it is almost a tragedy to see all of this keenness going to waste, and to feel that the entire opportunity which the college has to offer is passed up because of a too receptive mind. The cure for this sort of thing is again not easy, for it involves an entire change of attitude, and the forming of a completely new set of habits. No one can do this but the boy himself. All that the rest of us can do is to point out what is the matter.

### Final Feedback

- What is a mistaken ambition?
- Who is a bright boy?

### Home Assignment

- Listen to the same text at your home through the App “@ Voice Aloud Reader” for Model Reading
- Read the same text aloud through Readlee portal at your home and answer the following questions in both spoken and written form. Press submit button after completing the task.

**(Speak and record through READLEE)**

- i. What do you understand by the text?
- ii. How many classes of the boys are there who fail?

**(Write and submit the answer through READLEE)**

- i. Does the mistaken ambition cause failure?
  - ii. Who are the bright boys?
- Solve the quiz through the link shared in WhatsApp group.

1. Of the boys who do not reach their natural academic boundary during the course of their college career, but who fail to get through, there are \_\_\_\_\_ main classes.

- a) Two
- b) Three
- c) Four
- d) Five

2. Such \_\_\_\_\_ habits are not easy to uproot, and, so far as I can see cannot be eradicated by anyone but the boy himself.

- a) Bad
- b) Good

- c) Nervous
  - d) Strange
3. A common cause of failure is a \_\_\_\_\_ ambition for the boy on the part of his parents.
- a) Strange
  - b) Mistaken
  - c) Good
  - d) Bad
4. If the college is \_\_\_\_\_ to its work of advice, such cases are caught before the failure is complete.
- a) Good
  - b) Alive
  - c) Dead
  - d) Active
5. Another type of boy who does not try is the very \_\_\_\_\_ boy who has always done his school work without effort, and who has never learned what real application is. Choose the correct option.
- a) Dull
  - b) Intelligent
  - c) Defaulter
  - d) Bright
6. Such nervous habits are not easy to uproot. (Uproot means)
- a) Cultivate
  - b) Eradicate
  - c) Start
  - d) Nourish
7. The boy must take himself by the collar and make himself cultivate a poise and calm that smothers the fidgets. (Cultivate means)
- a) Develop
  - b) Eradicate
  - c) Purchase
  - d) Plant
8. A common cause of failure is a mistaken ambition for the boy on the part of his parents. (Mistaken ambition means)
- a) Simple ambition
  - b) Strange ambition
  - c) Wrong ambition
  - d) No ambition
9. Because he is following a direction, mapped out by his parents. (Mapped out means)
- a) Drawn
  - b) Withdrawn
  - c) Given

d) Planned

10. As well argued with a person that he ought to like onions when he detests them.

(Detests means)

- a) Likes
- b) Dislikes
- c) Buys
- d) Sells