CHAPTER 6

ANALYSIS AND INTERPRETATION OF DATA

6.1 Introduction

This chapter divided into three sections discusses the results of the study and the analyses made of the results to find out the effectiveness of using Wiki as a platform for teaching reading and writing skills for TOEFL aspirants.

The first section elaborates on the findings of the pre-training phase and provides details of the students’ efficiency, frequency and purpose of using the Internet. It also presents the findings made on their familiarity about Wiki as a Web 2.0 tool and its use for language learning. Further, it presents the findings on their awareness about TOEFL and their performances in TOEFL reading and writing before training.

The second section presents the findings made through observations, surveys and tests during training. It presents the findings made on the ability of the students to create and explore Wiki. It also presents the observations made by the researcher on the students’ learning of reading and writing strategies and also the findings of the comparison of the performance of the students in the formative assessments of the reading and writing modules. It also presents the observations made on the interactions carried out by them during training and their participation while doing collaborative tasks.

The third section presents the findings of the paired t-test on the scores obtained by the participants in the pre-test and post-test of TOEFL and TOEFL Reading and Writing. It also presents the findings of the structural equation modeling test obtained using the 5-point Likert scale questionnaire on students’ perceptions about the contribution of the features of Wiki, training plan and materials in promoting learner participation and their sequential influence on achieving the learning outcomes.
6.2 Section 1: Analysis and Interpretation of Data Collected during the Pre-Training Phase

As mentioned earlier, a study was conducted during the pre-training phase in order to plan the proposed training in TOEFL Reading and Writing using the Web2.0 tool, Wiki. It enabled the researcher to plan the proposed online training as the study provided firsthand information about the students’ knowledge about the internet, Web 2.0 tool, Wiki and TOEFL.

6.2.1 Use of the Internet by selected Students

The responses of the 100 students to the questionnaire on their usage of the Internet—efficiency, frequency in using the Internet, purpose of using the Internet and awareness of using the Internet for language learning were analysed.

Figure 6.1: Accessed the Internet Earlier

Figure 6.2: Efficiency in Using the Internet

Figure 6.3: Frequency of Using the Internet

Figure 6.4: Purpose of Using the Internet
The results revealed that 93% of the respondents had previous experience of browsing the Internet (Figure 6.1). 53% of the respondents claimed that they were efficient in using Internet, 13% as not efficient (Figure 6.2). 58% of the respondents reported that they accessed the Internet daily, 22% twice or more in a week, 9% once a week, 4% once a month (Figure 6.3). Among the 100 respondents, 51% had used the Internet earlier for sending and receiving emails, chatting through social networking sites and collecting information; 20% for sending and receiving emails and chatting through social networking sites; 12% for sending and receiving emails and collecting information; and the remaining 17% for chatting through social networking sites and collecting information (Figure 6.4). None of the respondents had used the Internet for online training.

It was clear from the results that a majority of the participants had had previous experience of using the Internet and had used them on a daily basis for collecting information and also for communicating through email and social networking sites. It was also observed that more than half of the total participants considered themselves efficient users of the Internet. Thus taking into consideration the respondents’ familiarity, efficiency, frequency and purpose of using the internet, the researcher was convinced about the proposal of conducting the training online.

6.2.2 Students Familiarity with Web 2.0 Tool, Wiki

The responses to questions on the students’ awareness about the existence of Web 2.0 tool Wiki and its use as a platform for language learning were analyzed.

Figure 6.5: Awareness about Web 2.0 Tool, Wiki

Figure 6.6: Awareness about Using Wiki for Language
The analysis revealed that 63% of the respondents were aware of the term Wiki (Figure 6.5). However, they could relate the term Wiki only with Wikipedia which they had used for collecting information. A very small percentage of only 3% responded positively to a question on the awareness of using Wiki for language learning (Figure 6.6). The analysis also revealed that none of the respondents owned a wiki workspace in the World Wide Web. It was concluded that the participants did not have any working knowledge of the tool, Wiki.

As the training was planned in a Wiki environment, it became essential for the samples to learn to use Wiki effectively. Emphasizing the need to familiarize the sample with the online training platform, Mensch (2010) regarded that “…an online preparation class that familiarizes students to the platform and the technology involved becomes essential to ensure the student’s success in the virtual classroom” (p.2). Hence it was decided to conduct an orientation on Web 2.0 tool, Wiki.

6.2.3 Students Awareness of TOEFL

The responses to the questions that aimed at understanding the students’ familiarity with TOEFL - its types, registering methods, skills tested, questioning pattern, duration, total score, accepted scores and its validity - was analyzed. The analysis revealed that the average of total correct answers was only 1.00. It was evident from the data that the respondents’ knowledge about TOEFL was very limited and so it was decided to discuss the testing system (TOEFL) in general before offering training in specific test items.

6.2.4 Students’ Performance in TOEFL Reading before Training

Responses to the pre-test on TOEFL Reading by the 92 students who completed the training were analysed. Further, the time taken by the students to complete the reading test was also monitored. The methods used by the students to find out the answers, as recorded by the students themselves, were also analysed. According to ETS scoring standards, the reading section is scored with a score range of 0-30. A score between 22 and 30 is rated as high, between 15 and 21 as intermediate, and between 0 and 15 as low.
Analysis of the scores obtained by the students revealed that only 1% of the sample fell under ‘high’, 12% ‘intermediate’ and 87% ‘low’ level of reading skill (Figure 6.7). The students did not specify any method that was used for answering the reading questions. The average time taken for answering the reading questions was 78.10 minutes as against the time limit of 60-80 minutes specified by ETS. It was concluded that the reading competency level of the majority of the students was ‘low’ though the average time taken was well within the time limit specified by ETS.

It is clear from the review of selected studies that reading achievement of skilled readers is due to their strategy use. Further, explicit instruction in reading strategies has a positive effect on the reading achievement of less skilled or unskilled readers. Using reading strategies appropriately may be of great help to non-native readers because it can serve as an effective way of overcoming language deficiency and obtaining better reading achievement on language proficiency tests (Aghaie and Zhang, 2012). According to Carrell, Gajdusek and Wise (1998) also direct or explicit instruction in reading strategies consistently produces positive results in comprehension. Hence it was decided to adopt explicit instruction in reading strategies to enable the students to arrive at correct answers within the time limit specified.

6.2.5 Students’ Performance in TOEFL Writing before Training

The responses of 92 students who completed the training were considered for analysis for pre-test on TOEFL Writing. The time taken by the students to complete the

![Figure 6.7: TOEFL Reading Level of Learners before Training](image)
independent writing task and the integrated writing task was also monitored. The strategy used by the students while writing the essays, as recorded by them, was also considered. The responses of the students were rated from 0 to 5 using TOEFL writing rubrics relating to organization, clarity, coherence, accuracy, relevance, preciseness and flawless language. The mean score on the two writing tasks for each of the students was calculated and then converted to scaled score of 0 to 30 using the TOEFL scale of conversion table stipulated by ETS. According to ETS, score ranging from 24 to 30 are rated as ‘good’, from 17 to 23 as ‘fair’ and from 1 to 16 as ‘limited’.

Analysis of the scores of the students revealed that 3% of them fell under the category ‘fair’ and the rest (97%) under the category ‘limited’, thus indicating that none of the students’ writing was ‘good’ (Figure 6.8). The average time taken by the students was 66.57 minutes as against the 50 minutes stipulated by ETS. The students did not specify any strategies that were adopted by them while writing the responses. Their responses lacked coherence, clarity, precision and accuracy owing to the fact that they were not aware of following any strategy while writing.

The review of selected studies showed that the process approach to writing is one of the most widely adopted teaching models to develop writing skills. The studies revealed that the process approach to teaching writing showed development of students into active, independent writers (Jacob and Talshir, 1998), improvement in student’s writing ability (Mahon and Yau, 1992), development in writing skills (Cheung and Chan, 1994). The writing process is a tool used to enable students to
efficiently express their feelings, thoughts and knowledge. The more students learn how to use this process efficiently, the more they can express themselves efficiently. It is a road map through which the students’ thoughts and actions are monitored from the beginning of writing to the production of work (Tompkins, 1990). Hence it was decided to adopt the process approach to teach writing and explicitly provide instruction in the strategies to enable the students to write well-organized, error-free essays within the specified time limit.

6.3 Section 2: Analysis and Interpretation of Data Collected during the While-Training Phase

During training, the researcher studied through observations, surveys and tests, the ways in which the students handled the training module. Their ability to handle the learning tool Wiki and the TOEFL reading and writing tasks was analysed. Differences in their reading and writing achievement between the first and second formative assessments were studied. An observation on the learning of strategy taught and its use while working out the tasks was also made. Further, interactions carried out by them during training for any assistance and for completing the collaborative tasks were also observed.

6.3.1 Students’ Ability in Creating Wiki

The ability of the students in creating Wiki at PB works and editing the wiki was assessed by visiting the Wikis created by the students. It was observed that all the students had successfully created a Wiki for themselves and had edited it in order to introduce themselves and describe their expectations from the course.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>No. of Students</th>
<th>Total No. of Students</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed on their Own</td>
<td>54</td>
<td>100</td>
<td>54</td>
</tr>
<tr>
<td>Received Assistance</td>
<td>46</td>
<td>100</td>
<td>46</td>
</tr>
<tr>
<td>Used Wiki for Seeking Assistance</td>
<td>04</td>
<td>46</td>
<td>9</td>
</tr>
</tbody>
</table>

Table 6.1: Description of how the students handled the task of creating Wiki
<table>
<thead>
<tr>
<th>Criteria</th>
<th>No. of Students</th>
<th>Total No. of Students</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Used Other Modes for Seeking Assistance</td>
<td>42</td>
<td>46</td>
<td>91</td>
</tr>
<tr>
<td>Received Assistance at Course Wiki from Instructor</td>
<td>02</td>
<td>04</td>
<td>50</td>
</tr>
<tr>
<td>Received Assistance at Course Wiki from Fellow Learners</td>
<td>02</td>
<td>04</td>
<td>50</td>
</tr>
<tr>
<td>Received Assistance from Instructor through other modes (in person/mobile phone)</td>
<td>12</td>
<td>42</td>
<td>29</td>
</tr>
<tr>
<td>Received Assistance from Fellow Learners through other modes (in person/mobile phone)</td>
<td>30</td>
<td>42</td>
<td>71</td>
</tr>
</tbody>
</table>

Analysis of the survey responses to the questions on the way the students handled the task of creating and exploring Wiki revealed that the majority of the students (i.e., 54%) completed on their own the task of creating a Wiki at pbworks and inviting the instructor to visit their space. The rest of them sought the help of either the instructor or fellow learners (Table 6.1). It was clear that more than half of the students were able to understand and execute the task independently.

Among the 46 students who received assistance, 4 (i.e. 9%) used the learning environment, Wiki, to raise and clarify their doubts and 42 (i.e. 91%) through other modes. Of the 4 students who used Wiki, two students were assisted by fellow learners and the other two by the instructor. Of the 42 students who sought other modes for help, 71% received assistance from fellow learners and 29% personally met the instructor and received clarification. It was concluded that the participants who experienced difficulties in doing the task could complete the task with a little assistance.
It was inferred from the feedback given on the ‘reflections’ page, that these students experienced difficulties in locating the link for creating basic, free Wiki for educational purpose and in accessing the front page of their Wiki and editing it.

However, only 7% of the students completed the task within the time set.

It was concluded that the orientation given enabled the students to use Wiki and that they would be able to use it as a platform for learning.

6.3.2. Students’ Performance in Reading and Writing

The effectiveness of reading and writing instruction through Wiki during the training was studied by considering Kirkpatrick’s (1967) hierarchical model of learning outcomes. The analysis of the effectiveness of teaching reading and writing through Wiki was carried out during the while-training phase by focusing on:

1. The extent to which the students learnt reading and writing strategies during instruction and used them for handling questions given. This was done based on the observations made by the researcher to evaluate the training effectiveness based on learning criteria in Level 2 of Kirkpatrick’s (1967) hierarchical model of training outcomes.

2. The extent to which the students were able to perform in the first and second formative assessments on reading and writing. This was done based on the analysis made by comparing the performance scores to study the behaviour criteria of the participants in Level 3 of Kirkpatrick’s (1967) hierarchical model of training outcomes.
(3) The students’ perception of the usefulness of the strategy and learning objects as expressed in the reflections page and as responses to survey questions provided every week. This was done based on the analysis made of participants’ responses to study the affective and attitudinal reactions of the participants, reactions criteria in Level 1 of Kirkpatrick’s (1967) hierarchical model of training outcomes.

(4) The number of interactions between student(s) and instructor, and between student and student, which were carried out in the reflections page to raise and clarify doubts. This formed the learning criteria in Level 2 of Kirkpatrick’s (1967) hierarchical model of training outcomes. This was done based on the observations made by the researcher to evaluate how the learners learnt by seeking and clarifying doubts during training.

(5) Participation of learners in collaborative tasks on reading and writing. This was done based on the observations made by the researcher to find out how the learners were able to learn from their peers during training, the learning criteria in Level 2 of Kirkpatrick’s (1967) hierarchical model of training outcomes.

6.3.2.1 Students’ Learning of Reading Comprehension Strategies

Observations on students’ learning of reading comprehension strategies were made during the 10-week instruction period on reading, i.e. from Week 3 to Week 12 of training.

It was observed that during Week 3 the students were able to make a self-analysis of their reading speed as directed in the YouTube video and evaluate their comprehending ability. Practice exercises to improve their reading speed along with their comprehension carried out using Spreeder showed only a little improvement. It revealed that with a majority of the students, when the time taken to read a passage decreased, the comprehending ability also decreased. However, Spreeder was regarded by students as a beneficial tool for reading a text quickly and predicting the main idea of a text. To a question on the usefulness of Spreeder, the students responded positively. It was also evident from the descriptive feedback given by the students in the reflections page.
In fact one student wrote,

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yes i agree with u all. spreader is useful. I hav a point to make. When i increased the chunk size i was not able to understand the matter that much. i think i can overcome this by extra practice. I enjoyed reading with spreader.
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The headings and illustrations were also used as clues by the students to predict the main idea. They also predicted the main idea by reading the first sentences of paragraphs, and the first and last sentences of the concluding paragraph. Of all the three methods i.e. speed reading, clue-based reading and reading the first sentences of all the paragraphs, the students preferred the method of reading the first sentences of all paragraphs to predict the main idea of the passage and this was evident from the reflection given by a student in Wiki.

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I found week 4 exercise useful for skimming than week 3 exercise. In this I need not read full passage. I can manage with this in case of passage with no headings or pictures.(shyam CSE)
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The sub-skill of Scanning (taught in unit 2 of week 5) was used by the students to answer factual and negative factual questions. The students were able to match the keywords in the question and the passage. They then read the sentence in which the key word occurred and also read the preceding and following sentences. Finally, they compared the information with the given answer options before choosing the correct option. It was observed that the students did not express any difficulty in applying this strategy while doing the first formative assessment. In fact, one student reflected that he was able to understand the process and hence could answer factual and negative factual questions effectively. The students’ response to the questionnaire also reflected that a large majority of the students strongly agreed about the usefulness of
the scanning strategy in answering factual and negative factual questions. Their performance also showed improvement in answering such questions.

From the students’ responses to the questions on using contextual clues, it was observed that they experienced difficulty in identifying the clue word from the same sentence in which the word occurred or sentences adjacent to it. They were not able to derive the right answer from the choices. This resulted in a little improvement in their performance. However, in response to the survey questions relating to the usefulness of the YouTube video that modeled the strategy of using contextual clues, 50% of the students ‘strongly agreed’ as useful, 46% ‘agreed’. Further, with regard to the question on the usefulness of the instruction on the application of the strategy, 96% responded that they ‘strongly agreed’ and 4% ‘agreed’. Thus it was evident that the guidance offered through YouTube and initial instructions helped the students to handle the tasks effectively.

The difficulty experienced by the students in using contextual clues to find out the implicit meaning was also evident from the doubt raised by a student in the reflections and feedback. As a clarification to the doubts raised, the instructor modelled the way the contextual clues could be used for finding out the right answer and also pointed out the possible mistakes a student would commit while answering that particular reading question. Expressing their difficulty through feedback, a few students wrote:

Answering vocabulary and inference questions were difficult. It was not like answering factual questions where no confusion between options, I could easily find answer. But vocabulary and inference I was confused. (Nivedha IT)

Yes nivedha, I agree to what you say. I too struggled to decide the correct answer (Revathy IT)

It was evident that not much improvement in performance was found in the first formative assessment test in making inferences. However, the students’ responses to the usefulness of the learning objects were positive. Their responses to the questions on the usefulness of PowerPoint presentation and self-evaluation quiz activity showed that 50% of them strongly agreed and 46% agreed that the PowerPoint provided input on the strategy of making inferences. A large majority of students (90%) agreed that the self-evaluation quiz activity acted as a prelude to TOEFL inference questions.
Observations on attempts to integrate strategies like understanding the rhetorical structure and type of detail, scanning and making inferences showed that the students could apply scanning and understanding the rhetorical structures but faced problems with making inferences. They experienced difficulty in choosing the right answer. It was also observed that they were able to handle the method questions better than the purpose and attitude questions. The responses to questions on the usefulness of the word and audio files that were used in the module showed that 63% strongly agreed, 28% agreed as useful. It was clear that the explanation provided through word file and audio file helped the students to answer the authors’ method, purpose and attitude questions.

The improved performance of the students in answering reference questions in the first formative assessment showed that they were able to identify the function of the referent and connect the ideas appropriately. Through the feedback provided by the students it was evident that they enjoyed performing the tasks using games and quizzes aimed to familiarize them with pronouns, adjectives and adverbs that act as reference words.

The games uploaded were very interesting. I usually don't spend much time on computer games but these games were enjoyable and very informative. I took off an hour to play all the games and I also saw to that I finished all levels. It was definitely a better way of learning.

Srimathi ECE-B.

Week 9 was a propeller for me to get into the joy of pronoun with full enjoyment. velocities in ECE-B.

Week 9 lesson has truly made learning fun. Those games were very interesting and I really enjoyed learning through them.

G. Shanmuga Priya ECE-B

The games proved to be a great form of diversion from the monotonous other strategy based wiki lessons.

Treasure hunt I enjoyed the most...
While doing the exercises separately, playing these games brings us out from data and develops our interest...

(Surya ECE-B)

The treasure hunt game was the one I liked the most. It was really enjoyable to play the game though this was a machine. I showed my emotions - laughter, disappointment, smile, sound of excitement... it removed the monotony.

V. Venkatesh ECE-B

Moreover, questionnaire responses to whether the grammar games and quizzes promoted fun learning revealed that a majority of the students (97%) strongly agreed that they were fun and made learning interesting, and the remaining 3% responded that they agreed. 92% strongly agreed that the games and quizzes refreshed their
knowledge of grammar, 4% agreed and the remaining 4% neither agreed nor disagreed. The students’ responses to a question on the usefulness of modelling the application of the strategy revealed that 49% ‘strongly agreed’ as useful and the remaining 51% ‘agreed’ as useful.

From the student’s performance in the first formative assessment it was observed that they were able to use paraphrasing strategy without much difficulty in answering sentence restatement or simplification questions. From the responses to the questions on the usefulness of self-test, it was observed that 69% of the respondents strongly agreed and 12% ‘agreed’ that it was useful. Describing the utility of the self-test tool, a few students had remarked:

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week 10: I found it very interesting with the uploaded stuff and I learnt to deliver things in a way that suited me in a very effective manner.
Rishabh, ECE B'

Self-test showed how good I am at writing in my own words whatever I read. I could see lots of words highlighted. I understood that I had reproduced most of the words in the text. I reworked on the write-up and minimized the highlights. Thank you mam for introducing this tool. Rahul, CSE

Self-test helped us to write better, Mumina (CSE B)
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Similarly, responding to the question on the usefulness of the quiz in paraphrasing, 45% of the respondents strongly agreed that the quiz was useful, 39% agreed and 16% neither agreed nor disagreed. The majority of the respondents (52%) strongly agreed and 48% agreed that the Slide Share presentation which described the processes involved in paraphrasing helped them to answer sentence restatement questions.

It was observed that the students integrated various strategies learnt to answer sentence addition questions. During the first formative assessment, it was observed that a few students were not able to differentiate between contextual clue words and cohesive devices. Further, they were not able to integrate other strategies to add a sentence and establish coherence. This was clear from the doubt raised by one of the students:

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Can any one of you help me with answering sentence addition question? particularly the one about alchemist. What is the right answer B or D? (Naren)
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to which, a fellow student responded:
The instructor addressed the student’s need thus:

Responding to a question about the quiz activity, it was observed that 96% of the students strongly agreed and 4% agreed that it promoted fun learning. A student reflected about the quiz activity thus:

Thus, from the observations and analysis made, the positive impact of the training on reading strategy use and the usefulness of training materials on students’ learning achievement (Level 1 and 2 of Kirkpatrick’s (1967) hierarchical model of training outcomes) were evident.

6.3.2.2 Students’ Performance in Formative Assessment Tests I and II on Reading

The performance of the students in the second formative assessment on all reading question types showed improvement when compared to the first formative assessment. The bar diagram (Figure 6.9) shows an increase in mean scores on all reading question types in the second formative assessment in comparison with the first. Table 6.2 shows the difference in mean scores between formative assessment I and II.

In formative assessment I the mean scores were: 25.75 for factual and negative factual questions, 27.36 for vocabulary questions, 17.10 for inference questions, 17.10 for author’s purpose, method and attitude, 42.27 for reference questions, 27.77 for sentence restatement question, 26.85 for sentence addition and 18.24 for summary and
chart questions. In formative assessment II the mean scores were: 27.38 for factual and negative factual questions, 29.41 for vocabulary questions, 18.34 for inference questions, 20.07 for author’s purpose, method and attitude question, 48.75 for reference question, 32.64 for sentence restatement, 28.55 for sentence addition and 19.50 for summary chart questions.

**Table 6.2: Difference in Mean Scores between Formative Assessment I and II in Reading**

<table>
<thead>
<tr>
<th>Reading Question Types</th>
<th>No. of Students</th>
<th>Mean Scores of FAT I</th>
<th>Mean Scores of FAT II</th>
<th>Difference Between Mean Scores of FAT I and II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factual and Negative questions</td>
<td>92</td>
<td>25.75</td>
<td>27.38</td>
<td>1.63</td>
</tr>
<tr>
<td>Vocabulary questions</td>
<td>92</td>
<td>27.36</td>
<td>29.41</td>
<td>2.05</td>
</tr>
<tr>
<td>Inference questions</td>
<td>92</td>
<td>17.10</td>
<td>18.34</td>
<td>1.24</td>
</tr>
<tr>
<td>Questions on author’s purpose, methods and attitude</td>
<td>92</td>
<td>17.10</td>
<td>20.07</td>
<td>2.97</td>
</tr>
<tr>
<td>Sentence restatement questions</td>
<td>92</td>
<td>27.77</td>
<td>32.64</td>
<td>4.87</td>
</tr>
<tr>
<td>Reference questions</td>
<td>92</td>
<td>42.27</td>
<td>48.75</td>
<td>6.48</td>
</tr>
<tr>
<td>Sentence Addition questions</td>
<td>92</td>
<td>26.85</td>
<td>28.55</td>
<td>1.70</td>
</tr>
<tr>
<td>Complete the Summary and Chart questions</td>
<td>92</td>
<td>18.24</td>
<td>19.50</td>
<td>1.26</td>
</tr>
</tbody>
</table>

Based on the difference in mean scores of the students’ performance in formative assessment I and II, those are presented in the Table. 6.2, the following observations were made:
• Of all the question types, the students performed better in answering reference questions in both formative assessment I and II. Further, the second formative assessment mean score (48.75) was greater than the first formative assessment mean score (42.27) and the difference in mean score was 6.48. From this it could be concluded that the instruction and the learning tasks provided to identify the function of the referent and appropriately connect the ideas had had an effect on the learner performance. It was also observed that the feedback and explanation given for practice exercises had helped the students to enhance their performance further in the second formative assessment test.

• When compared with formative assessment I mean score (27.77), the students had performed better in formative assessment II in answering sentence restatement or simplification questions that resulted in the increase in the mean score of formative assessment to 32.64 with a difference of 4.87. It was observed that the students were able to handle the questions without any difficulty during the first formative assessment, which showed the effect of the instruction and learning tasks. Further the feedback and explanation given for the performance in first assessment was also considered a reason for the improved performance in the second assessment test.

• The effect of summarizing strategy, the learning tasks given for its application, the feedback and explanation given for the practice tasks had an effect on the students’ responses to summary chart questions. It was clear that their scores in the second formative assessment test improved when compared to their mean scores in the first formative assessment.

• The mean score of students’ performance in the second formative assessment test in answering factual and negative factual questions (27.38) was greater than the mean score in the first (25.75), with a difference in mean score of 1.63. This showed the effect of instruction, learning tasks and additional inputs on using scanning strategy. It is necessary to make two important observations at this juncture: (1) The students showed a
little improvement in applying the strategy in the first formative assessment; (2) This type of question comprises the major portion of TOEFL reading and the impact of the score in this particular type will be high on the overall score. The additional inputs that were given considering these two points could also be attributed to the improved performance.

- It was observed that the students performed better in finding out the implicit meaning in the given passage in the second formative assessment test. The mean scores for inference questions in the second and first formative assessment tests were 18.34 and 17.10 respectively. The difference in the mean score was 1.24. This reflects the students’ difficulty in arriving at the right answer for inference questions during the first assessment test. Further, they had to make inferences while answering rhetorical questions. Considering their performance and the use of inferencing strategy while answering other types of questions, in addition to feedback, additional inputs were given. Therefore, it may be concluded that instruction in making inferences, learning tasks, feedback and additional inputs contributed towards the improved performance.

- The students were able to identify contextual clues correctly to guess the meaning of the given word in the second formative assessment test, with the mean score increasing to 29.41 from the first formative assessment mean score of 27.36, with a difference of 2.05. This shows the positive influence of instruction, tasks, feedback and additional inputs on their performance. As the students faced difficulty in answering vocabulary questions during the first assessment and as the total number of vocabulary questions in TOEFL reading is equal to factual questions, additional inputs were provided. Therefore, the additional inputs given could also be attributed as the reason for students’ improved performance.

- It was observed that the students were able to integrate the strategies they had already learnt and added the given sentence at appropriate place to make it coherent (Appendix IX). This is evident from the mean score of
the second formative assessment test (28.55), which was greater than that of the first formative assessment mean score (26.85) by a difference of 1.70. The students showed improvement during the first assessment itself and hence it is concluded that instruction, learning tasks and feedback had a positive impact on the students’ performance in the formative assessments.

- The effect of instruction on understanding the type of detail and structures is clear from the mean score of second assessment (20.07), which was greater than the first assessment mean score (17.10) with a difference of 2.97. It was observed during the first assessment that the students were able to handle easily questions related to the method used by the author but experienced difficulty in handling purpose and attitude questions. Therefore, in addition to the feedback, additional inputs on handling purpose and attitude questions were given. It is concluded that the instruction, tasks, feedback and additional inputs were regarded as the contributing factors for the improved performance in the second formative assessment.

Figure 6.9: Increased Mean Scores of TOEFL Reading in Formative Assessments
From the above analysis it can be concluded that instruction in reading strategies and learning tasks provided during training improved the performance of the students in the first formative assessment. It was also concluded that feedback and explanation, and additional inputs given after the first formative assessment further enhanced their performance in the second formative assessment. Thus the evaluation of the extent to which the participants had applied the training in terms of performance (Level 3 of Kirkpatrick’s (1967) hierarchical model of learning outcome) showed positive results.

6.3.2.3 Students’ Learning of Process Approach to Writing

Observations on the students’ learning of writing skills using the process approach were made during the 10-week instruction in writing i.e. from Week 13 to Week 22 of training.

It was observed that the students were able to plan their essay by adopting the techniques of brainstorming, note-making and outlining while doing the exercises given for the pre-writing stage of writing independent and integrated essays. They brainstormed and generated ideas using techniques like listing, clustering and charting in order to plan the independent writing tasks. This was not done by the participants before training. The lessons given during training were considered by them to be useful and this is evident from their feedback posted on the reflections page.

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(G. Vijay-CSE B)
The week 13 exercises helped us to address one of the most important problems one encounters while writing an essay, namely organization and subsequently furnishing a nearly perfect expression of the mind on the given topic. Brainstorming helps us not just in drafting an essay but also in speeding the thinking process and hence sharpens one’s mind. The exercises were well constructed almost from scratch, making effective use of the internet and it’s resources.

(Veera-CSE B)
The WEEK 13 ex. helped me to learn how to present an essay. Before doing the week 13 assignment I never knew that writing an essay involved so many steps and I used to write whatever comes to my mind while writing, as a result my presentation was horrible and clumsy. The instructions provided for week 13 was also clear and simple. The usage of Internet resources was more effective especially for the charting method. Thanks mam for creating this e learning platform.
It was also observed that the students enjoyed using the diagramming and design software ‘Creately’ (Appendix IX) for clustering and ‘Venn diagram Maker’ for charting. However, they felt that the use of these online tools for planning was laborious when compared to the listing method. Hence it was concluded that they preferred the listing method for planning their independent essays. The students reflected on the utility of the graphic organizers and their preference towards using listing method:

From their responses to the questionnaire it was observed that 68% strongly agreed, 20% agreed and 12% neither agreed nor disagreed to the question about the usefulness and entertaining aspect of ‘Creately’ and ‘Venn Diagram Maker’.

Similarly, during the practice on planning integrated essays, it was observed that the students noted down the ideas presented in the lecture and reading passage which was not done by them before training. As a result during practice they were able to recollect the important ideas that were focused upon in both the lecture and the passage, and include them in their writing. In response to the questionnaire on the usefulness of the practice exercise given for noting down ideas, 34% ‘strongly agreed’ and 46% agreed as useful. Similarly, all the students reacted positively to the usefulness of Voki avatar for listening to the short audio that was given for practice.
In other words 63% ‘strongly agreed’ and the remaining 37% ‘agreed’ to the usefulness of Voki avatar. It was clear from students’ responses to the questionnaire and writing tasks that instruction on note-making helped them to improve their writing.

It was observed that the students were able to use the tools and complete the task but had difficulty in uploading the outcome of the tasks. They could not upload the answers at the appropriate place and hence the page appeared disorganized.

However they overcame this difficulty and this was evident from their later uploads. Even their responses to the questions about difficulty in uploading files to the Course Wiki also confirmed that they experienced difficulty in uploading the pages initially which they were able to overcome at a later stage. 74% of the students ‘strongly agreed’ that they experienced difficulty in uploading the files at appropriate place during the initial stage and that they could overcome that at the later stage.

The students were able to prepare an outline based on the ideas generated using ‘Essay Map’ (Appendix IX) for the independent writing task and the template created by the instructor for the integrated writing task. These tools helped them to organize their writing. Their response to the question on the usefulness of Essay Map in outlining the essay showed that 68% strongly agreed and 32% agreed that it was useful. Some of the reflections on the usefulness of the Essay Map tool were:

The independent essays written during the pre-test did not show the use of writing process strategies. They did not contain specific introductory, body and concluding paragraphs. The ideas were neither properly organized nor exemplified. They contained organizational, grammatical and spelling errors. On the contrary, the essays written immediately after the writing process instruction revealed the use of writing strategies at least by a few participants,
It was observed that unlike the pre-test responses, the responses to the integrated writing task that was written in the first formative assessment showed some improvement. A few students were able to introduce the main idea of the passage and the main idea of the lecture. Some responses included more important ideas than in the pre-test but did not include all the important ideas presented in the lecture. This was because the students took notes during the practice sessions which they failed to do during the pre-test. However, they were not able to make note of all the ideas presented. As a result, they could not establish effective connections between all the important ideas presented in the lecture and the passage. The points that were not noted by the students were listed and how they could be connected was illustrated by the instructor through feedback. It was also observed that a few students could paraphrase the ideas presented in the reading passage and connect them with the ideas presented in the lecture. This is in sharp contrast with the pre-test responses in which students merely copied sentences from the reading passage. Some of the students were able bring in a little organization and coherence to their responses with the available ideas. However, their responses also contained grammatical errors and poor sentence constructions. This was also explained by the instructor through feedback.

It was observed that responses to the first formative assessment on both independent and integrated writing tasks showed a little improvement in performance as against the pre-test performance. The instruction and the learning task could be regarded as the reason for the improved performance.

Further, the template provided for writing five-paragraph essays was regarded as useful by the students. From the students’ response on the usefulness of the template, it was evident that 50% of them strongly agreed, 37% agreed and 13% neither agreed nor disagreed as useful.

Thus from the observations and analysis made, the positive impact of the training on the writing strategy use and the usefulness of training materials on students’ learning achievement (Level 1 and 2 of Kirkpatrick’s (1967) hierarchical model of training outcomes) was evident.
6.3.2.4 Students’ Performance in Formative Assessment Tests I and II on Writing

Analysis of the student responses to independent and integrated writing tasks in the second formative assessment showed improvement. The Figure 6.10 shows an increase in the mean score in the formative assessment II of both independent and integrated writing tasks and the Table 6.3 shows the difference in the mean scores between formative assessment I and formative assessment II in both independent and integrated writing tasks. The mean score for the independent writing task in the first formative assessment was 7.27 and in the second 8.06. The mean score for the integrated writing task in the first formative assessment was 7.49 and in the second 8.01.

**Table 6.3: Differences in the Mean Scores between Formative Assessment I and II in Writing**

<table>
<thead>
<tr>
<th>Types of Writing Tasks</th>
<th>No. of Students</th>
<th>Mean Scores of FAT I</th>
<th>Mean Scores of FAT II</th>
<th>Difference Between Mean Scores of FAT I and II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent Writing Task</td>
<td>92</td>
<td>7.27</td>
<td>8.06</td>
<td>0.79</td>
</tr>
<tr>
<td>Integrated Writing Task</td>
<td>92</td>
<td>7.49</td>
<td>8.01</td>
<td>0.52</td>
</tr>
</tbody>
</table>

Observations made during the evaluation of the students’ responses to the given prompt in the second formative assessment showed that the number of students who were able to identify enough points to substantiate the main idea had increased. The introductory paragraphs of a majority of students in the independent writing task in the first formative assessment did not meet the requirements of an introduction. It was evident that the feedback given relating to writing introductions showed some improvement. The learners were able to introduce to the readers the points based on which they proposed to support, refute, or analyse the main idea.

In some of the responses in the first assessment, the ideas put forth in the body paragraphs were found to be relevant. However they were not properly organized or
exemplified (Appendix IX). They also contained grammatical errors and faulty sentence constructions which showed that they either overlooked the mistakes or were ignorant of the correct usage and construction. This was brought to the notice of the students through feedback.

Besides, in a few responses, most of the ideas presented were taken from books, the Internet and also from the answer uploads of fellow learners and hence were not original. It was in this situation that the open nature of Wiki acted as a limitation. The instructor through feedback asked the students to refrain from plagiarism. They were encouraged to present their own thoughts rather than borrow from other sources as it would help them to score better. The responses written after the feedback showed a little improvement when compared to the first assessment test. In other words, the number of responses with good introduction and well organized body paragraphs had increased. The ideas put forth in these responses were organised to the extent that there was no overlapping of ideas. They were found to be original. However, the learners had not exemplified them in detail with reasons and examples in the body paragraphs. A dearth in content was observed. Prevalence of grammatical errors and faulty sentence structures were also observed.

It could be concluded that this achievement in organization of ideas had had an effect on the improvement in the mean score for the second formative assessment test (8.06) as against the mean score for the first (7.27), with a difference of 0.79. Thus the positive effect of instruction on writing, especially the feedback, could not be ignored as some of the responses of the second assessment showed improvement in planning and organization of ideas while writing independent essays.

From the evaluation of the students’ responses to the integrated writing task in the second formative assessment test, it was observed that a number of students were able to state the main idea of the lecture and the main idea of the passage (Appendix IX). This is in sharp contrast to the first formative assessment test where only some of them could state the main idea of the lecture and the passage. Similarly, these responses included all the important ideas presented in the passage and the lecture, but while connecting them in some of the responses the ideas were misinterpreted and in a few they were vague. These responses contained language errors which in some cases
led to obscurity in understanding and in a few they were very minor and so did not hamper the overall understanding of the connections made. It was observed that a very few responses were well written which included all the important ideas stated in the passage and the lecture; effective connections were made between them and contained minimal language errors. From these observations it could be inferred that the students showed some improvement in their writing which led to the increase in the mean score for the second formative assessment (8.01) as against the mean score for the first (7.49), with a difference of 0.52.

From the Table 6.3 it can be inferred that in the second formative assessment the students showed improved performance in both independent and integrated writing tasks. The step-by-step instructions on the processes involved in writing, the function of each paragraphs and the feedback given using the tool ‘Jing’ could be taken as the reasons for the students’ improved performance in writing. Thus, the evaluation of the extent to which the participants had applied the training in terms of performance (Level 3 of Kirkpatrick’s (1967) hierarchical model of learning outcome) showed a positive result.

![Figure 6.10: Increased Mean Scores of TOEFL Writing in Formative Assessments](image-url)
6.3.2.5 Interactions Carried out during Training

Interaction occurred at four levels during training: (i) interaction between user and interface, (ii) interaction between user and content, (iii) interaction between the student and instructor, (iv) interaction between student and student.

Interactions with interface and content by the user are more common in any computer-mediated learning but interactions between instructor and student, and between student and student could be made possible only by using Web 2.0 technologies. Therefore, this section, presents elaborately the observations made on the interactions carried out between students and the instructor as well as between and among students.

It was observed that during training, interactions between the user (instructor/student) and the interface took place by using the features of Wiki like creating pages, editing pages, adding links, uploading files, inserting plugins, and revising or retrieving previous editions. Interactions between the user and content occurred whenever the information posted by the instructor were accessed by the students or vice-versa.

It was observed that during training student-instructor and student-student interactions occurred mainly for two reasons: for seeking and providing assistance, and to reflect upon the perceptions related to the usefulness of the training. The assistance sought by the students for handling difficulties in technical (handling the tool) and content areas (application of strategies/macro skills on reading and writing) was provided both by the instructor and the fellow learners. The feedback about the usefulness of the strategy and learning objects was also provided by the students on the reflections page. It was observed that interactions took place through other modes like personal meeting and mobile phones though the students were encouraged to use the Wiki for these purposes.
Table 6.4: Interactions Carried out in the Reflections Page of RW Enhancement Wiki

<table>
<thead>
<tr>
<th>Components</th>
<th>No. of Messages</th>
<th>Total No. of Messages</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Messages related to doubts on technical aspect</td>
<td>20</td>
<td>122</td>
<td>16</td>
</tr>
<tr>
<td>Messages related to doubts on subject content</td>
<td>24</td>
<td>122</td>
<td>20</td>
</tr>
<tr>
<td>Messages related to feedback on training effectiveness</td>
<td>78</td>
<td>122</td>
<td>64</td>
</tr>
</tbody>
</table>

Table 6.5: Student-Student and Student-Instructor Interactions for Raising or Clarifying Doubts

<table>
<thead>
<tr>
<th>Components</th>
<th>No of Messages</th>
<th>Total No. of Messages</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Messages related to content area doubts clarified by fellow learners</td>
<td>8</td>
<td>24</td>
<td>33</td>
</tr>
<tr>
<td>Messages related to content area doubts clarified by instructor</td>
<td>16</td>
<td>24</td>
<td>67</td>
</tr>
</tbody>
</table>

It was observed that out of 92 participants who took the training, 56 students (i.e. 61%) had edited the wiki to raise or clarify the doubts sought, or to provide feedback. It was evident that more than half of the students had interacted through Wiki. From the Table 6.4 it is clear that a total of 122 messages were posted on the reflection page: 16% dealt with problems in handling the tool like opening YouTube embedded, uploading files and using software like ‘Creately’ (These problems were addressed by the instructor); 20% with content area doubts on using the strategies on reading and writing tasks (These were clarified by the instructor and fellow learners). From the
Table 6.5 it is clear that 33% of the doubts related to content area were clarified by fellow learners and the rest 67% by the instructor. This showed the possibility of using Wiki to express and address learning difficulties. It was observed that 64% of the messages were related to feedback on training effectiveness. They were posted in the reflections page only by the students. This helped the instructor to understand the learners’ perceptions of the training.

Thus, based on these observations and analysis, it was concluded that the scope for expressing and addressing learning difficulties at Wiki during training was possible, which would in turn enhance the learners’ performance. Further, feedback given by students would enable the instructor to improve the training methods. Thus level 1 and 2 of Kirkpatrick’s (1967) hierarchical model of learning outcome were evaluated.

6.3.2.6 Collaborative Tasks during Training

Participation of the students in group tasks given for reading and writing was observed. Two group tasks were assigned to find out the possibility of learning the macro skills of reading and writing collaboratively. In the group task on reading, the students were expected to skim through the text to find the gist of the passage. In the group task on writing, they were expected to write five-paragraph essays for both independent and integrated essays. The students discussed and participated by editing the Wiki.

Figure 6.11: A sample of the Discussion Carried Out for Planning the Group Task on Reading
From the Figure 6.11, it is clear that in the group task on skimming a passage much of the discussion on the discussion board of rwenhancement Wiki was on planning the task like assigning roles, fixing a deadline for the completion of tasks, requesting and providing email address of the members (to provide access to the Wiki since the task was proposed to be carried out in the Wiki of one of the students).

**Figure 6.12: A Sample of the Discussion Carried Out while Performing the Group Task on Reading**

Similarly, Figure 6.12 shows that that while performing the task of skimming and finding the gist in the student Wikis, the students appreciated each other for their contribution, pointed out errors in form in a subtle manner, edited them and also revised the responses posted. In some cases, when the gist of the text was correctly predicted in the beginning itself, the scope for discussion became limited.
Day 1: brainstorming!

I think computer is an important invention which has led to rapid development in all sectors and which in turn has been beneficial to the people of our country (Pavithran)

NICE ONE. BUT LET'S SEE WHAT SUGGESTIONS OTHER'S ARE GIVING (Sruthy)
I believe television is a very powerful medium which has enabled people to know about the happenings of the world through news channels and also for entertainment purpose. It has in a way given a platform for people to showcase their talents through reality shows. Also the other important invention that I thought about was dialysis machine and also black box or also something more common like digital watch, calculator, camera. something very common like smartphones? maybe? what say? (Sruthy)

well the're all the most beneficial but they're kinda common, don't ya think? what about radio and wireless communication (Subhadra)

ya its far subha ...How about something new?? (Sowmya)
we don't have enough informations about black box II (Saethan)
Internet is a viable option but one of the Most common ones so what about less common stuff like PHONES, MOTOR , LIGHT BULB, PRINTING PRESS
Or even Air planes! though a few of the above are agreeably not from the recent few decades, they are tremendously useful! (Subhadra v)

Okay... I think it's a good idea (Sr Kavi)

But I think internet is the best invention in the last 100 years!! In this present generation we can do anything if we have internet in our hand. We can communicate, share, learn, work, shop, play etc. (Sr Kavi)

This century is otherwise called as the digital era and this cannot be without a reason so let's choose something that we use in our common life and which is also very much helpful and also has reduced our work load. I also accept with Srikavi's idea of internet we will see till tomorrow and finalize on our topic (Pavithran)

yeaah! I totally agree with srikavi!
what about others?? (Gowrish)
i think its the good idea too. (Sowmya)
i too agreee(sruthy)

ok I think we can decide upon internet.
1 they are used for almost many purposes
2 used for talking, learning, social networking, storing music, various applications, communicate,and many more! (Sruthy)
everyone okay with this?

Ya...you are right Shruthy... we cant even imagine a world without internet...
i think its one of the most beneficial invention in past 10 decades..I agree with you... (Sowmya)

yeah that's true, even l agree with that! (Saethan)

I agree too...
Moreover, internet is now becoming like an important part of human!! (Srikavi)

Figure 6.13: A Sample of Discussion carried out by a group of Students while doing Collaborative Writing

In the group tasks on writing, as shown in Figure 6.13 the students posted their ideas, came to a consensus on the ideas to be included in the essay, organized the ideas posted and also revised their writing. It was observed that all the students posted their ideas related to the task. The task of outlining and organizing to achieve coherence was done only by one or two students of the group. In some cases during revision, all
the ideas posted, whether they were significant or insignificant, correct or incorrect, were retained as some of the students hesitated to correct the postings of others. Only the grammatical and mechanical errors were corrected. But in some cases, in spite of appropriateness of the ideas they were revised by members. It was observed that an active discussion and consensus on improving or deleting those ideas did not happen. Therefore it is concluded that students were exposed to a lot of ideas generated by peers, but they were not able to bring perfection to their writing collaboratively and the end task remained disorganized. However, the students regarded group tasks as beneficial as they felt that they could learn from their peers the different ways of handling the given task.

Further, the students reported that they were able to acquire life skills in addition to reading and writing skills; 57% of the students ‘strongly agreed’, 37% ‘agreed’ and 6% neither agreed nor disagreed that this activity enhanced their team management skills. Regarding the execution of leadership quality, problem solving and decision making skills, 67% of the students ‘strongly agreed’, 27% ‘agreed’ and 6% neither agreed nor disagreed that the activity provided scope for executing these life skills.

It may be concluded that exchange of views among students in the group tasks in all groups happened while planning the execution of the tasks. But while performing the tasks, only in a few groups, the members, in addition to positing their ideas, interacted by giving reasons for agreeing, disagreeing, improvising the ideas and sentences posted by others. This enabled peer learning. This could be attributed as one of the reasons for the improved performance of some of the students in the second assessment on writing. Thus the effect of collaborative tasks in Wiki during training (level 2 of Kirkpatrick’s (1967) hierarchical model of learning outcome) was evaluated.

6.4 Section 3: Analysis and Interpretation of the Data Collected after Training

The total scores obtained by the participants in the post-test on TOEFL reading and writing were compared with the TOEFL ETS scoring standards and the students’ reading and writing competence were accordingly graded. Further, the pre-test and post-test scores were compared and statistically analyzed to find out significant differences, if any, in the performance of the students after training. This was done to
find out the extent to which the training enhanced the reading and writing skills of the students, level 4 results criteria of Kirkpatrick’s (1967) hierarchical model of training outcomes.

In addition, the data collected through the survey questionnaire was analysed to find out the contribution of the learning platform, instructional plan and materials for learner participation and their sequential influence on achieving the learning outcomes. This was done to find out the perceptions of the students about the effectiveness of the tool, instructional plan and materials, level 1 reactions criteria of Kirpatrick’s (1967) hierarchical model of training outcomes.

6.4.1 Difference in the Performance of students after Training

Major statistical measures of central tendency, mean and standard deviation were calculated for analysing the performance scores. Further, the test of significance (paired t-test) was conducted to find out the level of significance of improvement in performance after training.

Mean was calculated using the formula,

\[ \bar{X} = \frac{\sum x}{n} \]

Where, \( X \) = score obtained by the participants; and \( N \) = number of scores (92); Standard deviation was calculated by using the formula,

\[ S = \sqrt{\frac{\sum (x - \bar{X})^2}{n - 1}} \]

where, \( X \) = Individual score; \( \bar{X} \) = Mean of all scores; and \( N \) = number of scores (92).

The calculation of mean and standard deviation showed that the performance of the students had improved after training. However, to find out whether the difference in performance was significant or not, the paired t-test was conducted.

A paired sample t-test is a statistical test used to determine whether there was a significant difference between the average values of the same measurement made
under two different conditions. Both measurements are made on each unit in a sample, and the test is based on the paired differences between these two values. The formula of paired t-test is:

\[ t = \frac{\bar{d}}{\sqrt{\frac{n \cdot (\bar{d}^2) - \bar{d}^2}{n-1}}} \]

where, \( d = \) Sum of differences; and \( n = \) No of subjects.

The paired t-test was applied on the following data in the present study.

- Pre-test and post-test on TOEFL Awareness,
- Pre-test and post-test on TOEFL Reading, and
- Pre-test and post-test on TOEFL Writing.

The level of significance was determined based on t-value and p-value. SPSS 20.0 was used for finding the level of significance.

6.4.1.1 Students’ General Awareness of TOEFL after Training

The effectiveness of reading lessons on TOEFL was evaluated by comparing the performance data of the students in pre-test and post-test on TOEFL awareness using paired sample t-test.

Table 6.6: Difference in Performances of Learners between Pre-test and Post-test in TOEFL Awareness

<table>
<thead>
<tr>
<th>Tests</th>
<th>Mean</th>
<th>SD</th>
<th>t-value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td>1.00</td>
<td>1.59</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-test</td>
<td>4.93</td>
<td>3.09</td>
<td>13.89</td>
<td>&lt;0.001**</td>
</tr>
</tbody>
</table>

Note: ** denotes significance at 1% level

The analysis revealed that the p-value was less than 0.01 indicating that there was a significant difference in performance at 1% level. It is clear from the Table 6.6 that
the mean score of the post-test was greater than that of the pre-test and hence it was concluded that the orientation given was effective. From the improved performance it can be inferred that the students were able to access the particular weekly lesson, navigate through the links, learn the content and attempt the test.

6.4.1.2 Students’ TOEFL Reading and Writing Performance after Training

The scores obtained by the students in the post-test on TOEFL Reading and Writing were evaluated based on ETS guidelines.

![Pie chart showing TOEFL Reading Levels of Learners after Training]

**Figure 6.14: TOEFL Reading Levels of Learners after Training**

The comparative analysis of the pre-test and post-test scores on TOEFL reading as shown in the Figure 6.11 revealed that 6% of the students fell under high level, 28% under intermediate and 66% under low as against the pre-test score of 1% sample under high level, 12% under intermediate and 87% under low level. An increase at all levels was found. It must be stated that the average time taken for completing the post-Test was 59 minutes as against 78.10, the average time taken during pre-Test.
The comparative analysis of the pre-test and post-test scores of TOEFL Writing as shown in the Figure 6.12 revealed that 3% of the students fell under the category of ‘good’, 4% under ‘fair’ and 93% under ‘limited’, as against the pre-test scores in which none of the students was under the category of ‘good’, 3% under ‘fair’ and the rest (97%) under the category ‘limited’. A slight increase at all levels was obvious.

The average time taken to complete the post-test was 50.38 minutes against the average time of 66.57 minutes taken to complete the pre-test.

In order to find out the level of significance of improvement on reading and writing, the scores obtained by the students in the pre-test and post-test were compared by applying the paired t-test.

**Table 6.7: Difference in Performance of Learners between Pre-test and Post-test in TOEFL Reading**

<table>
<thead>
<tr>
<th>Tests</th>
<th>Mean</th>
<th>SD</th>
<th>t-value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td>21.89</td>
<td>9.10</td>
<td>3.019</td>
<td>0.003**</td>
</tr>
<tr>
<td>Post-test</td>
<td>24.70</td>
<td>13.67</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The comparison of the performance data of the pre-test and post-test on TOEFL Reading revealed that the p-value was less than 0.01; there was significance at 1% level. From the Table 6.7 it is clear that the mean score of post-test was greater than that of the pre-test, indicating that the training in TOEFL Reading was effective.
Table 6.8: Difference in Performance of Learners between Pre-test and Post-test in TOEFL Writing

<table>
<thead>
<tr>
<th>Tests</th>
<th>Mean</th>
<th>SD</th>
<th>t-value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td>1.79</td>
<td>1.16</td>
<td>4.696</td>
<td>&lt;0.01**</td>
</tr>
<tr>
<td>Post-test</td>
<td>2.26</td>
<td>1.64</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Similarly, when the performance data of the pre-test and post-test in TOEFL Writing was compared, it was clear that the p-value was less than 0.01; there was significance at 1% level. From the Table 6.8 it is clear that the mean score of post-test was greater than that of the pre-test, indicating that training on TOEFL Writing was effective.

It was concluded that the students performed better as the training given in TOEFL Reading and Writing was effective.

### 6.4.2 Students’ Perceptions of Training Effectiveness

In order to find out the contribution of features of Wiki and the training plan and materials towards learner participation and their sequential influence on learning outcomes, responses of the students to the 5-point Likert questionnaire were analysed through Structural Equation Modelling (SEM) using SPSS AMOS. Structural Equation Modelling is a statistical technique for testing and estimating causal relations using a combination of statistical data and qualitative causal assumptions. Analysis of the data was done to prove that the features of Wiki, training plan and materials improved learner participation in the training and they together enabled the students to achieve learning outcomes. The variables used in the structural equation model were:

**I. Observed, dependent variables**

1. Learner Participation

2. Learning Outcomes

**II. Observed, independent variables**

1. Editing
2. Flexibility
3. Collaboration
4. Settings
5. Inserting Plugins
6. Adding Links
7. Creating Pages
8. Uploading files
9. Restoration
10. Training Plan and Materials

III. Unobserved, independent variables

1. e1: Error term for Learner Participation
2. e2: Error term for Learning Outcomes

Hence the number of variables in the SEM was as follows:

- Number of Variables in this model: 14
- Number of observed variables: 12
- Number of unobserved variables: 02
- Number of independent variables: 12
- Number of dependent variables: 02
Figure 6.16: Structural Equation Model of Training in TOEFL Reading and Writing in Wiki
Table 6.9: Variables in the Structural Equation Model Analysis

<table>
<thead>
<tr>
<th>Variables</th>
<th>Un-standardized Co-efficient</th>
<th>S.E.</th>
<th>Standardized Co-efficient</th>
<th>t-value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learner Participation ← Editing</td>
<td>0.687</td>
<td>0.345</td>
<td>0.075</td>
<td>1.993</td>
<td>0.046*</td>
</tr>
<tr>
<td>Learner Participation ← Flexibility</td>
<td>0.575</td>
<td>0.467</td>
<td>0.038</td>
<td>1.232</td>
<td>0.218</td>
</tr>
<tr>
<td>Learner Participation ← Collaboration</td>
<td>0.525</td>
<td>0.354</td>
<td>0.025</td>
<td>1.482</td>
<td>0.138</td>
</tr>
<tr>
<td>Learner Participation ← Settings</td>
<td>0.757</td>
<td>0.336</td>
<td>0.061</td>
<td>2.251</td>
<td>0.024*</td>
</tr>
<tr>
<td>Learner Participation ← Inserting Plugins</td>
<td>1.535</td>
<td>0.477</td>
<td>0.137</td>
<td>3.216</td>
<td>0.001**</td>
</tr>
<tr>
<td>Learner Participation ← Adding Links</td>
<td>0.492</td>
<td>0.143</td>
<td>0.080</td>
<td>3.452</td>
<td>&lt;0.001**</td>
</tr>
<tr>
<td>Learner Participation ← Creating Pages</td>
<td>4.328</td>
<td>0.559</td>
<td>0.298</td>
<td>7.746</td>
<td>&lt;0.001**</td>
</tr>
<tr>
<td>Learner Participation ← Uploading files</td>
<td>1.738</td>
<td>0.732</td>
<td>0.052</td>
<td>2.374</td>
<td>0.018*</td>
</tr>
<tr>
<td>Learner Participation ← Restoration</td>
<td>4.251</td>
<td>1.057</td>
<td>0.177</td>
<td>4.020</td>
<td>&lt;0.001**</td>
</tr>
<tr>
<td>Learner Participation ← Training Plan and Materials</td>
<td>0.569</td>
<td>0.133</td>
<td>0.119</td>
<td>4.290</td>
<td>&lt;0.001**</td>
</tr>
<tr>
<td>Learning Outcome ← Learner Participation</td>
<td>0.034</td>
<td>0.003</td>
<td>0.833</td>
<td>12.62</td>
<td>&lt;0.001**</td>
</tr>
</tbody>
</table>

Note: 1. * denotes significance at 5% level; 2. ** denotes significance at 1%
Un-standardized and standardized coefficients were calculated in order to find out the effect of one variable on the other. The coefficient of Editing Wiki for learning was 0.687 and represents the partial effect of editing towards learner participation in the learning environment Wiki holding the other variables as constant. The estimated positive sign implies that the effect was positive which means that learner participation in Wiki would increase by 0.687 for every unit increase in editing of wiki for learning; the coefficient value was significant at 5% level. In other words, it can be concluded that the participation of the learners in the learning environment, Wiki, increased significantly whenever it was edited by the learner.

The coefficient value of Flexibility offered by Wiki in learning was 0.575 and represents the partial effect of flexibility towards learner participation in the learning environment Wiki holding the other variables as constant. The estimated positive sign implies that the effect was positive which means that learner participation in Wiki would increase by 0.575 for every unit increase in the flexibility offered by Wiki for learning; this coefficient value was not significant at 5% level. In other words, the flexibility offered by the learning environment Wiki increased the participation of the learners in the training given using Wiki but it was not significant. This was due to the reason that the flexibility offered was taken for granted by most of the students. It was observed during training that a majority of the students did not complete the tasks assigned on scheduled time and completed the training much behind schedule. However, a large majority of the students reported that they did not miss any of the lessons and were able to complete all the tasks though they were behind schedule. They reported that owing to the demands of the regular course they considered completing the training more important than completing it within the time schedule.

The coefficient value of Collaboration in Wiki for learning was 0.525 and represents the partial effect of collaboration towards learner participation in the learning environment Wiki holding the other variables as constant. The estimated positive sign implies that the effect was positive and that learner participation in Wiki would increase by 0.525 for every unit increase in collaboration in Wiki for learning; this coefficient value was not significant at 5% level. In other words, the facility of collaborating and interacting provided in the learning environment, Wiki, increased learner participation but it was not significant. It was clear from the survey responses
that though the students were positive about using Wiki as a platform for collaboration and interaction, there were certain reasons for not actively participating. They reported that they were hesitant to post their opinions on others’ posting and edit others’ postings in the Wiki. Some students did not want fellow learners to evaluate them based on their ideas and language competency and hence refrained from contributing actively. In case of doubts regarding understanding the lessons they sought clarification mostly with peers and rarely with the instructor using mobile phone or when they met for their regular course. They used the learning platform only to clarify the doubts that were common to all the students like uploading answer files, difficulty in using certain learning objects especially ‘Spreader’ and ‘Creately’ software.

The coefficient value of Settings in Wiki for learning was 0.757 and represents the partial effect of settings towards learner participation in the learning environment Wiki holding the other variables as constant. The estimated positive sign implies that the effect was positive and that learner participation in Wiki would increase by 0.757 for every unit increase in settings in Wiki for learning; this coefficient value was significant at 5% level. In other words, the real classroom ambience, pleasant style and the security settings provided in the learning environment, Wiki, had significantly increased learner participation in the Wiki.

The coefficient value of Inserting Plugins in Wiki for learning was 1.535 and represents the partial effect of inserting plugins towards learner participation in the learning environment, Wiki holding the other variables as constant. The estimated positive sign implies that the effect was positive and that learner participation in Wiki would increase by 1.535 for every unit increase in inserting plugins in Wiki for learning; this coefficient value was significant at 1% level. In other words, the participation of the learners in the learning environment Wiki increased significantly when learning objects like videos, audios and slide share presentations were inserted as plugins. The students reported that the videos, audios and Slideshare presentations helped them to get rid of the monotony of online learning. According to them, they also served as supplementary materials which enabled them to learn from experts.
The coefficient value of Adding Links in Wiki for learning was 0.492 and represents the partial effect of adding links towards learner participation in the learning environment, Wiki, holding the other variables as constant. The estimated positive sign implies that the effect was positive and that learner participation in Wiki would increase by 0.492 for every unit increase in adding links in Wiki for learning; this coefficient value was significant at 1% level. In other words, the participation of the learners in the learning environment Wiki increased significantly when the links of websites were added. The learners participated actively through easy navigation of the web links added.

The coefficient value of Creating Pages in Wiki for learning was 4.328 and represents the partial effect of creating pages towards learner participation in the learning environment, Wiki, holding the other variables as constant. The estimated positive sign implies that such effect was positive and that learner participation in Wiki would increase by 4.325 for every unit increase in creating pages in Wiki for learning; this coefficient value was significant at 1% level. In other words, the feature of creating pages offered by Wiki had significantly increased the participation of the learners in the training. The students felt this feature offered by the Wiki enabled them to learn the lessons and proceed with the learning tasks in an organized manner.

The coefficient value of Uploading Files in Wiki for learning was 1.738 and represents the partial effect of uploading files towards learner participation in the learning environment, Wiki, holding the other variables as constant. The estimated positive sign implies that the effect was positive and that learner participation in Wiki would increase by 1.738 for every unit increase in uploading files in Wiki for learning; this coefficient value was significant at 1% level. In other words, learner participation in the learning environment Wiki had increased significantly whenever word files or audio files were uploaded in the Wiki.

The coefficient value of Restoration in Wiki for learning was 4.251 and represents the partial effect of restoration (restoration of content) towards learner participation in the learning environment, Wiki, holding the other variables as constant. The estimated positive sign implies that the effect was positive and that learner participation in Wiki would increase by 4.251 for every unit increase in restoration of content in Wiki for learning; this coefficient value was significant at 1% level. In other words, learner participation in the learning environment Wiki had increased significantly whenever file restoration was performed in the Wiki.
learning; this coefficient value was significant at 1% level. In other words, the facility of restoring the content posted using the feature ‘history’ had significantly increased learner participation in the learning environment, Wiki. It was concluded from the survey responses that the learners felt that the information posted in the Wiki remained secured even after several editions and that they could be restored by using the feature of history.

The coefficient value of Training Plan and Materials provided in Wiki for learning was 0.569 and represents the partial effect of training plan and materials towards learner participation in the learning environment, Wiki, holding the other variables as constant. The estimated positive sign implies that the effect was positive and that learner participation in Wiki would increase by 0.569 for every unit increase in training plan and materials provided in Wiki for learning; this coefficient value was significant at 1% level. In other words, the training plan and the materials posted in the Wiki by the instructor had significantly increased the participation of learners in the training.

Thus based on the standardized co-efficient value, it is concluded that creating pages (0.298) was considered the most important feature of Wiki that had influenced learner participation. Next to creating pages feature, the students felt restoration (0.177) as the feature that contributed towards their participation in the training. Thirdly, the students considered the feature of inserting plugins (0.137) as the reason for their active participation in the training. This was followed by features like adding links, editing, settings and uploading files. After these features of Wiki, the feature that contributed to learner participation was collaboration and interaction. Next to collaboration, the feature that contributed towards their participation was flexibility.

Regarding the training plan and materials, the students were affirmative about their influence on their participation in the training and this was further proved by the significance of p-value.

From the above analysis as shown in Table 6.9 and Figure 6.13 it is clear that all the features of Wiki identified by the researcher and the training plan and materials had a positive effect on learner participation and they in turn had an effect on learning outcomes but the degree of their effect on one another varied.
Structural equation modeling evaluates whether the data fit a theoretical model. In order to evaluate the model, Chi-Square/df ($x^2$/d.f.), GFI, AGFI, CFI, RMR and RMSEA were calculated. These were calculated using the SPSS AMOS software.

Table 6.10: Model Fit Indices from AMOS Structural Modeling

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value</th>
<th>Suggested Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-Square</td>
<td>30.353</td>
<td>-</td>
</tr>
<tr>
<td>Chi-Square/ df ($x^2$/d.f.)</td>
<td>3.372</td>
<td>&lt;5.00 (Hair et al., 1998)</td>
</tr>
<tr>
<td>Goodness of Fit Index (GFI)</td>
<td>0.934</td>
<td>&gt;0.90 (Hu and Bentler, 1999)</td>
</tr>
<tr>
<td>Adjusted Goodness of Fit Index (AGFI)</td>
<td>0.927</td>
<td>&gt;0.90 (Bagozzi and Yi, 1988)</td>
</tr>
<tr>
<td>Comparative Fit Index (CFI)</td>
<td>0.980</td>
<td>&gt;0.90 (Hu and Bentler, 1999)</td>
</tr>
<tr>
<td>Root Mean Square Residuals (RMR)</td>
<td>0.037</td>
<td>&lt;0.08 (Bagozzi and Yi, 1988)</td>
</tr>
<tr>
<td>Root Mean Square Error of Approximation (RMSEA)</td>
<td>0.045</td>
<td>&lt;0.08 (Gerbing and Anderson, 1992)</td>
</tr>
</tbody>
</table>

According to Gerbing and Anderson (1992), the criteria for an acceptable model are as follows: RMSEA of 0.08 or lower; CFI of 0.90 or higher. The fit between the data and the proposed measurement model can be tested with a chi-square goodness-to-fit (GFI) test where a probability of greater than or equal to 0.9 indicates a good fit (Hu and Bentler, 1999). The GFI of this study was 0.934, which was more than the recommended value of 0.90. The other measures fitted satisfactorily: AGFI was 0.927 (higher than 0.90 - Bagozzi and Yi, 1988); CFI was 0.980 (greater than 0.90; Hu and Bentler, 1999); RMR was 0.037 (lower than 0.08 - Bagozzi and Yi, 1988) and RMSEA was 0.045 (lower than 0.08 - Gerbing and Anderson, 1992). The values indicate a good, absolute fit of the model. Thus the Goodness of Fit indices support the model fit and these indices indicate the acceptability of this structural model.
It is concluded from the analysis that the features of Wiki, training plan and materials did influence learner participation in the training and they all contributed towards the learning outcome of achieving improved performance in TOEFL reading and writing.

Some of the views expressed by the students also confirmed these about the training given using Wiki. To mention a few, the students had reflected on the positive aspects of collaboration and at the same time they had highlighted the difficulties involved in coordinating the group for completing the task.

Reflections by the students about the flexibility offered confirmed the point that it was taken for granted, which resulted in delay in completion of the tasks. However, for some students it facilitated them to complete the tasks in time irrespective of space.

Reflections on lessons given through videos, games and SlideShare presentations and other learning objects confirmed their contribution towards learner participation.
Reflections of the students revealed that they benefitted through instructional environment, materials and methodology adopted.

Thus, it was concluded that the training given in TOEFL Reading and Writing using Wiki was effective, thus proving the experimental hypothesis: “Students who aspire to do TOEFL would perform better in reading and writing when they are offered training with the Web 2.0 technology Wiki”.

6.5 Conclusion

It is evident from the study that students can be trained effectively in reading and writing skills even beyond a traditional classroom with the help of the Web 2.0 tool, Wiki. The analysis of the data has proved the improvement shown by the subjects after training through Wiki. Further, the responses given by the students authenticate the learning opportunities provided through the technological tool. The next chapter will provide the limitations faced by the researcher, recommendations for teachers and administrators, and suggestions for future research.