

CHAPTER

III

Research Methodology

नवीनमेव विज्ञानं, शोधेन समुपाज्यते।
यत्नेन लभ्यते ज्ञानं, तपसा सत्यवेदना॥

New knowledge is acquired only through. True wisdom is attained through effort, deep inquiry, and the pursuit of truth.

This verse highlights the importance of continuous research, perseverance, and dedication in discovering new truths and advancing knowledge.

CHAPTER III

RESEARCH METHODOLOGY

3.0 Introduction

This chapter outlines the research methodology employed in the study, detailing the research design, participants, sampling techniques, instruments, data collection procedures, and methods of data analysis. The study adopts an experimental research design to assess the effectiveness of the developed activities in enhancing the Listening, Speaking, Reading, and Writing (LSRW) skills of Standard IX students in Gujarati. A systematic approach has been undertaken to ensure the validity, reliability, and ethical considerations of the research process. Research methods essentially serve as the blueprint illustrating what is done, why, where, and how it is executed to fulfil the research objectives. In this investigation, the researcher has endeavoured to employ an appropriate research design, identify a suitable population and sample, formulate relevant hypotheses, select apt tools and techniques, and apply statistical methods for data analysis and interpretation.

3.1 Specification of the Problem

“Enhancement of LSRW Skills Through Activity-Based Gujarati Teaching Among Students of Standard IX.”

The goal of every language learning program is to improve students' speaking, listening, reading, and writing abilities. Given that Gujarati is the mother tongue and primary language of teaching for a sizable portion of the student body, it is imperative that the topic be given the weight it deserves. Students have already been exposed to Gujarati in lower classrooms, according to standard IX, and the researcher wants to improve their language proficiency even more. Developing a curriculum to improve students' Gujarati proficiency and evaluating its efficacy among standard IX learners were the investigator's goals.

3.2 Research Design of the Study

A well-structured research design is essential for ensuring the validity, reliability, and systematic execution of a study. The present research adopts an experimental approach, aiming to enhance Gujarati language proficiency among Standard IX students through

an Activity-Based Teaching Programme. Specifically, the study employs a quasi-experimental design, utilizing the pre-test post-test non-equivalent groups design. This design was selected as it enables the use of naturally formed experimental and control groups, ensuring comparability through pre-test scores of language skill assessments. By implementing this methodology, the study seeks to rigorously evaluate the effectiveness of the intervention while accounting for potential confounding variables, thereby enhancing the reliability of the findings.

Notation for the Quasi-Experimental Design

$$\begin{array}{ccc} O_1 & X & O_2 \\ O_3 & C & O_4 \end{array}$$

The experimental design was used for this study. Where,

O₁ and **O₃** were pre-test,

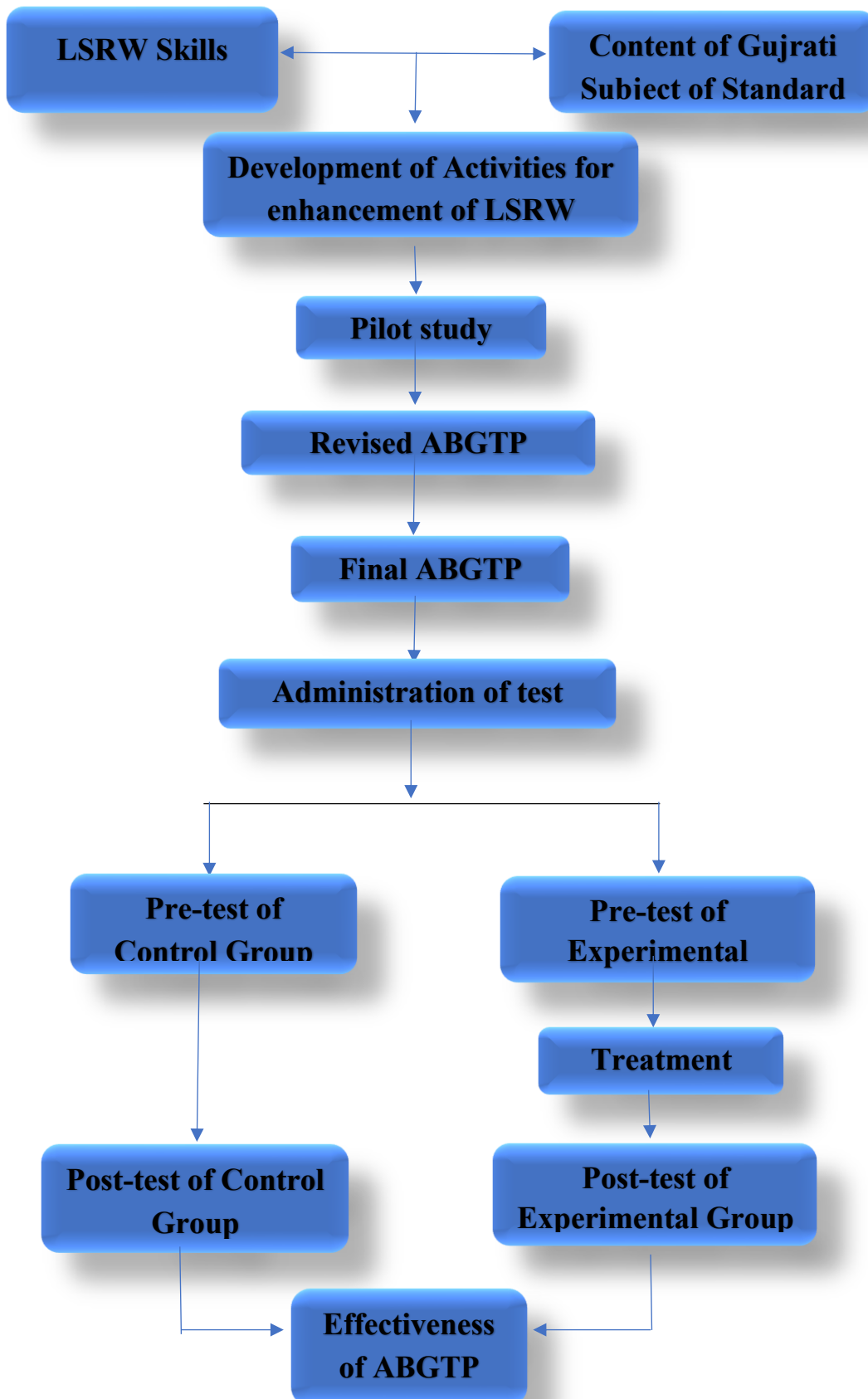
O₂ and **O₄** were post-test

X stands for Experimental Group and

C stands for Control Group

Two groups of students were identified in school settings to test whether activity-based Gujarati teaching could enhance LSRW skills. Both groups underwent pretest evaluations to verify comparability. The experiment was done in the experimental group while the control group followed traditional method. Post-test assessments measured how effectively the experiment enhance language skills in Gujarati among standard IX learners. The pretest scores ensured the two groups' equivalence before implementing the programme. Following the experiment, both groups took post-tests to analyse the effects of activity-based teaching on enhancing LSRW skills in Gujarati. In the research study design pre-test and post-test was conducted in both experimental and control group. In which experimentation was done in the experimental group and no treatment given to the the control group.

Figure 3.1: Diagrammatic Representation of the Research Design



3.3 Research Variables

Two crucial variables that were essential to the study's design and analysis were identified:

3.3.1 Independent Variables

The Activity-Based Gujarati Teaching Programme (ABGTP), which was created especially to improve the Listening, Speaking, Reading, and Writing (LSRW) abilities in Gujarati, served as the study's independent variable. By administering the ABGTP to the experimental group and monitoring its impact on the linguistic outcomes of the pupils, the researcher altered this variable. A range of exercises aimed at enhancing mastery of all four language skills made up the intervention.

3.3.2 Dependent Variable

The enhancement in LSRW skills in Gujarati was the study's dependent variable. This variable was tested to evaluate the impact of the ABGTP intervention on the students' Gujarati language skills in speaking, listening, reading, and writing. The study aimed to ascertain if the activity-based program resulted in quantifiable gains in students' language competence, with the improvement of these skills being the outcome of interest.

3.4 Population

All standard IX Gujarati-medium students registered in Gujarat Secondary and Higher Secondary Education Board (GSHSEB)-affiliated schools in Ahmedabad city during the 2022–2023 school year made up the study's population. This large population ensured that the results could be applied to a larger group of Gujarati-medium learners in the area by providing a diverse sample of pupils. This group is the intervention's target population, and the study sought to determine how the Activity-Based Gujarati Teaching Programme (ABGTP) especially affected them.

3.5 Sample

The sample for this investigation was chosen using the purposive sampling technique. The selection was based on specific criteria that ensured the inclusion of schools capable of providing the necessary infrastructure and administrative support for implementing the Activity-Based Gujarati Teaching Programme (ABGTP). School Selection Criteria were: Active student involvement and active participation in class activities, which was essential for the successful implementation of the ABGTP. The selected schools possessed sufficient resources, including a library, auditorium, and workshop room,

which were crucial for conducting various activities to enhance the students' LSRW skills. The schools had an administrative structure that supported the organization of extracurricular activities and the logistics involved in the study. The schools provided the necessary facilities and environment to evaluate student outputs and collect qualitative and quantitative feedback.

Experimental group comprising 57 standard IX students, this group participated in the ABGTP. Control group: Consisting of 69 standard IX students, this group followed the traditional teaching methods without the intervention of the ABGTP. Group Equivalence was done to ensure equivalence between the groups, the pretest LSRW skill scores in Gujarati were used as a benchmark. This made it easier to verify that, prior to the intervention, the language proficiency of the two groups was equivalent. The purposive sampling approach, therefore, ensured that the selected schools and students were representative of the study's objectives and conducive to meaningful analysis of the ABGTP's impact.

3.6 Phases of the Research

3.6.1 Phase I: Development of the Activity Based Gujarati Teaching Program

The first phase involved developing the Activity-Based Gujarati Teaching Programme to enhance the language skills of standard IX students. The steps for development were as follows:

1. Textbook Analysis (Secondary Level, LSRW Emphasis)

A comprehensive analysis of the Standard IX Gujarati textbook was done to examine its alignment with the development of LSRW skills. The analysis focused on the study assessed the presence and integration of LSRW skills within the textbook to determine their role in language acquisition. The textbook's thematic structure, linguistic complexity, and pedagogical approach were reviewed to understand how effectively it facilitates skill development. The extent to which the existing textbook materials provide opportunities for enhancing LSRW skills was explored, identifying areas where supplementary activities could be incorporated.

2. Detailed Textbook Review for Activity Scope

A meticulous review of the textbook content was carried out to identify components that could be utilized for activity-based learning. The analysis covered with the variety of prose selections, including narratives, essays, and expository texts, was examined for their potential in fostering reading and comprehension skills. The study explored the

inclusion of poetic forms to assess their role in enhancing phonetic awareness, rhythm, and interpretative skills. The grammar components embedded within the textbook were analysed to determine how effectively they support language structure and writing proficiency. The use of reading passages for comprehension exercises was evaluated, particularly their effectiveness in enhancing reading skills and critical thinking. The findings of this review informed the development of activity-based instructional strategies tailored to the existing curriculum.

3. Consultation of Semester One Syllabus

To ensure curriculum alignment, the semester one syllabus standardised by the Gujarat Secondary Education Board (GSEB) was thoroughly examined. This step ensured that the proposed activities complemented the prescribed syllabus and adhered to the educational objectives set by the investigator.

4. Draft Plan and Expert Feedback

An initial framework for the Activity-Based Gujarati Teaching Programme was developed based on insights gained from the textbook analysis and syllabus review. This draft plan was presented to language educators and subject matter experts for validation. Refinement of activity designs to enhance their pedagogical effectiveness. Adjustments to ensure the feasibility and applicability of activities in real classroom settings. Incorporation of best practices to optimize student engagement and learning outcomes.

5. Pilot Study and Finalization

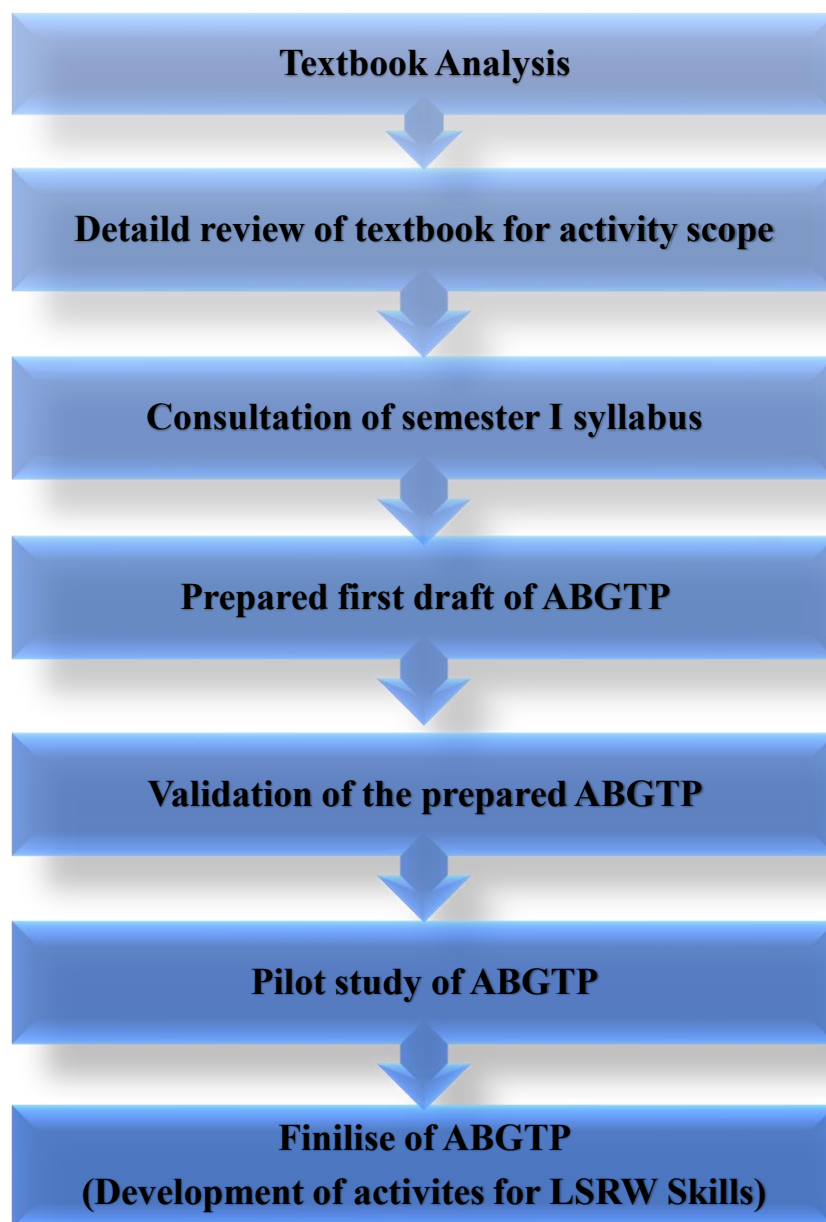
To evaluate the viability and efficacy of the planned activity-based program, a pilot study was carried out. This phase involved: I. Implementation in a Sample Group. The preliminary version of the program was administered to a select group of students to evaluate its impact on LSRW skill development. II. Student Feedback and Performance Analysis: Learner responses and test results were systematically analysed to identify the program's effectiveness. Based on empirical findings, necessary modifications were made to the activities. The final Activity-Based Gujarati Teaching Programme was then structured for broader implementation.

This systematic and iterative approach ensured that the developed instructional program was both research-driven and pedagogically sound, contributing to the enhancement of Gujarati language education at the secondary level.

3.6.2 Phase II: Implementation of ABGTP

The ABGTP was implemented in experimental group between August 2022 and January 2023. Pretests were administered to the experimental and control groups before to deployment in order to assess their current proficiency in LSRW skills. Additionally, this made group equivalency checks easier. The control group continued receiving conventional training after the experimental group received the ABGTP. The post-test phase demonstrated the program's influence on LSRW skills in Gujarati by enabling a comparison of skill improvement between the two groups.

Figure 3.2: Development of the programme



3.6.3 Phase III Analysis of effectiveness of the ABGTP

To assess the programme's effectiveness, pretest and post-test scores were compared within and between the groups. Feedback (via rating scales, reaction scales, and open-ended responses) also provided qualitative insights into student experiences and the programme's transformative potential. By triangulating quantitative and qualitative data, the investigator could comprehensively evaluate how successfully the ABGTP elevated LSRW skills in the Gujarati subject.

Figure 3.3: Implementation of the Programme



3.7 Data Collection Tools and Methods

The following tools were used in the study:

- 1. LSRW Skill Test**
- 2. Rating Scale** (to assess performance in speaking and reading skills)
- 3. Reaction Scale** (to capture student responses to the ABGTP)
- 4. Feedback Sheet** (open-ended survey for deeper qualitative insights)

3.7.1 LSRW Skill Test

The LSRW Skill Test was painstakingly created to evaluate the four core language skills speaking, listening, reading, and writing while staying in line with the Gujarat Secondary Education Board's (GSEB) Standard IX Gujarati curriculum. Essential language skills such as grammar, prose, poetry, sentence structure, vocabulary, and comprehension are all fairly covered throughout the test. A fair mark allocation, with 20 points allotted to each of the four skills, for a total of 80 points. The use of parallel test versions for pre-tests and post-tests to ensure consistency and minimize practice effects. Reliability and validity of the test were established through expert consultation, incorporate the suggestions and observation and pilot administration, ensuring its effectiveness in measuring students' actual skill levels.

Listening Skill Test in Gujarati

To evaluate students' listening comprehension abilities, a structured Listening Skill Test was developed, consisting of twenty marks distributed across four sections with five marks each. The test incorporates diverse auditory tasks designed to assess different aspects of listening proficiency. Audio-based tasks include with fill-in-the-blanks. Students complete missing words based on an audio prompt. Students identify synonyms of words presented in the audio clip. Audio comprehension passages were played, followed by comprehension and need to reflect in writing form in answer sheet. Students answer direct factual questions from the audio material. Evaluation method was as per the responses are assessed using a predefined answer key, ensuring objective and standardized scoring. The test is designed to measure students' ability to comprehend spoken Gujarati in academic and real-life contexts. The structured assessment framework ensures a comprehensive and reliable evaluation of LSRW skills, facilitating empirical details of the test are given in the table no 3.1

Table 3.1: Listening Skills Test Components

Sr. No.	Components	Type of Questions	Marks
1	Audio Track 1 (Transcript) – Synonyms	Fill in the blanks with synonyms	5
2	Audio Track 2 (Statements) – Action Words	Listen and identify the action words	5
3	Audio Track 3 (Transcript) – Passage	Fill in blanks with missing words	5
4	Audio Track 4 (Poem) – Key Information	Answer questions on poet, theme, etc.	5
Total			20

3.7.2 Speaking Skill Test in Gujarati

The Speaking Skill Test is designed to assess students' ability to express themselves fluently and coherently in spoken Gujarati. The test consists of four distinct tasks, each carrying 5 marks, making a total of twenty marks. The tasks are carefully structured to evaluate various aspects of spoken communication, including pronunciation, fluency, coherence, and vocabulary usage. Test Structure components and Evaluation Criteria are based on the performance.

1. Self-Introduction for five marks. Students deliver a 1-minute introduction covering their name, background, interests, and aspirations. Evaluated based on rating scale on clarity, coherence, confidence, and vocabulary usage.
2. Picture Description for five marks. Students describe a given image in two minutes, focusing on details, interpretation, and coherence. Assesses descriptive language skills, fluency, and ability to articulate thoughts effectively.
3. Extempore Speaking for marks. Students are given a topic on the spot and must speak for 3 minutes without prior preparation. Evaluates spontaneity, logical structuring of ideas, and expressive fluency.
4. Storytelling for five marks. Students narrate a short story based on given key points within 4 minutes. Assessed based on creativity, narrative flow, pronunciation, and expressive ability. Evaluation method was with using rating scale to ensure objective and

consistent evaluation across all components. Key assessment parameters include fluency, pronunciation, coherence, vocabulary richness, and confidence in speech. This structured framework ensures a comprehensive assessment of students' speaking abilities, facilitating a clear measurement of their oral proficiency in Gujarati.

Table 3.2: Speaking Skill Test Components

Sr. No.	Component	Task	Marks
1	Self-introduction	1-minute intro	5
2	Picture Description	2-minute description of an image	5
3	Extempore	3-minute talk on the given topic	5
4	Storytelling	4-minute narration based on given points	5
Total			20

3.7.3 Reading Skill Test in Gujarati

The Reading Skill Test is designed to assess students' reading proficiency in Gujarati, focusing on both oral reading and silent reading comprehension. The test aims to evaluate students' ability to pronounce, articulate, and interpret literary texts accurately while assessing their comprehension skills. This test ensures a holistic assessment of fluency, accuracy, and understanding in reading. The assessment is divided into two major components: 1. Oral Reading Tasks – Evaluating fluency, pronunciation, and expressive reading. 2. Silent Reading Tasks – Measuring comprehension and interpretation skills. Each component carries 5 marks, with a total of 20 marks allocated across the four tasks. Test Components and Evaluation Criteria Oral Reading Tasks was for 10 Marks. Poetry Recitation 5 Marks. Students are required to orally recite a given poem with proper pronunciation, intonation, and rhythm. Evaluation criteria are based on pronunciation accuracy, fluency, expression, and adherence to meter. Prose Reading for 5 Marks. Students read an assigned prose passage aloud to assess articulation and clarity. Evaluation criteria was accuracy in pronunciation, fluency, appropriate pausing, and tone variation. Silent Reading Tasks for 10 Marks. Poem Comprehension for 5 Marks. Students answer comprehension-based questions after silently reading a given poem. Evaluation Criteria: Understanding of themes, literary devices, and central ideas. Prose

Comprehension for 5 Marks. Students read a prose passage silently and respond to fact-based and inferential questions. Evaluation criteria are ability to extract key details, infer meaning, and interpret textual nuances. Method of administration and Scoring. The test is administered individually for oral reading and in a written format for comprehension tasks. Responses are evaluated using a rubric-based scoring system to ensure consistency and fairness. Oral reading assessment follows a standardized evaluation of fluency, pronunciation, and expression. Comprehension responses were analysed for clarity, accuracy, and depth of understanding.

The Reading Skill Test is an essential component in assessing students' linguistic competence and ability to engage with texts meaningfully. By evaluating both oral and silent reading, the test provides insights into students' decoding skills, pronunciation accuracy, fluency, comprehension abilities, and interpretative skills. The structured framework ensures a comprehensive and reliable measurement of students' reading proficiency in Gujarati.

Table 3.3: Reading Skill Test Components

Sr. No.	Component	Type of Questions	Marks
1	Poetry Recitation	Oral reading (3 minutes)	5
2	Prose Reading	Oral reading (3 minutes)	5
3	Poem Comprehension	Answer questions on the poem	5
4	Prose Comprehension	Answer questions on the passage	5
Total			20

3.7.4 Writing Skill Test in Gujarati

The Writing Skill Test is designed to evaluate students' ability to express their thoughts coherently, creatively, and structurally in written Gujarati. This test assesses key writing competencies, including content organization, language accuracy, creativity, and adherence to formal writing conventions. The test consists of four structured tasks, each carrying 5 marks and total 20 marks. The components are carefully selected to examine different aspects of written expression, such as descriptive, creative, and formal writing. Test Components and Evaluation Criteria were the essay writing for 5 Marks. Students write a 300-word essay on a given topic within 10 minutes. Evaluates coherence,

structure, vocabulary, grammar, and originality of ideas. Complete a line of poem for 5 Marks. Students are provided with an incomplete poem and must add 8 additional stanzas to maintain rhythm and meaning. Assesses creativity, poetic structure, rhyming scheme, and language fluency. Letter Writing for 5 Marks. Students compose a formal letter (e.g., application, complaint, or request) in 10 minutes. Evaluates format accuracy, clarity, tone, and grammatical correctness. Report Writing for 5 Marks. Students write a descriptive report based on a given scenario or event within 10 minutes. Assesses factual presentation, clarity, conciseness, and structured writing. The test is conducted in a written format, and responses are evaluated using a scoring system. The evaluation focuses on content relevance, coherence, grammar, creativity, and adherence to formatting rules. Essays and reports are graded based on idea development, logical flow, and clarity, while poetry completion is assessed on creativity and poetic structure. The Writing Skill Test provides a comprehensive assessment of students' linguistic proficiency in written Gujarati. By incorporating different writing styles, the test ensures a balanced evaluation of both creative and formal writing abilities. This structured assessment framework enables educators to gauge students' strengths and areas for improvement in written communication.

Table 3.4: Writing Skill Test Components

Sr. No.	Component	Type of Questions	Marks
1	Essay Writing	300 words, 10 minutes	5
2	Complete a Poem	8 stanzas, 10 minutes	5
3	Letter Writing	Formal letter (10 minutes)	5
4	Report Writing	Descriptive report (10 minutes)	5
Total			20

3. 8 Scales of Rating

A rating scale is a methodical instrument used in scholarly research to gauge performance levels, attitudes, skills, and talents. It provides a quantitative assessment of subjective or qualitative aspects, ensuring objectivity, reliability, and standardization in data collection and analysis. To ensure objective and standardized assessment, rating scales were developed for evaluating students' Speaking and Reading skills in Gujarati. The scales were designed based on key performance indicators, ensuring a structured and reliable evaluation process. A total of two rating scales were prepared, each incorporating ten

components relevant to the respective skill area. The evaluation was conducted using a five-point scale, with scores converted to a final mark based on overall performance.

3.8.1 Rating Scale for Speaking Skill

The Speaking Skill Rating Scale assesses students' oral communication abilities based on 10 key components, including which are given in the table 3.

Table3.5: Components of the Speaking Skill Rating Scale

Sr. No.	Component	Description
1	Clarity of Pronunciation	Accuracy and clarity in pronouncing words and sounds.
2	Diction and Fluency	Smoothness of speech, proper articulation, and ease of communication.
3	Grammar Accuracy	Correct use of tenses, sentence structure, and syntax.
4	Logical Coherence	Organization of ideas, relevance, and sequential flow in speech.
5	Facial Expression and Gestures	Non-verbal communication, including facial expressions and body language.
6	Confidence and Engagement	Level of self-assurance and ability to engage the listener effectively.
7	Vocabulary Usage	Appropriateness and richness of words used.
8	Tone Modulation	Variation in pitch, stress, and emotion while speaking.
9	Pausing and Emphasis	Effective use of pauses and stress for clarity and impact.
10	Overall Communication Effectiveness	Holistic evaluation of the speaker's ability to convey the message successfully.

Each component was rated on a 5-point scale, where: 1 = Poor, 2 = Below Average, 3 = Satisfactory, 4 = Good, 5 = Excellent. The total score is summed and converted to a final mark out of 5 for each speaking task.

3.8.2 Rating Scale for Reading Skill

The Reading Skill Rating Scale evaluates students' reading proficiency based on 10 key aspects, including:

Table3.6: Components of the Reading Skill Rating Scale

Sr. No.	Component	Description
1	Recognition of Letters/Words	Ability to recognize and correctly read individual letters and words.
2	Pronunciation Accuracy	Correct pronunciation of words and sounds while reading aloud.
3	Reading Pace and Fluency	Smoothness and speed of reading, maintaining a natural flow.
4	Voice Modulation	Appropriate changes in pitch, volume, and tone while reading.
5	Expression and Intonation	Use of facial expression and voice to convey emotions or meaning in the text.
6	Confidence While Reading	Displaying assurance and clarity while reading aloud.
7	Comprehension of Text	Understanding the meaning of the text and ability to respond to questions.
8	Pausing and Phrasing	Effective use of pauses and appropriate phrasing to enhance comprehension.
9	Error-free Articulation	Reading without significant errors in pronunciation or phrasing.

10	Overall Reading Effectiveness	Holistic evaluation of the reader's ability to convey the message clearly and accurately.
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This table ensures a **comprehensive evaluation** of **reading skills**, focusing on both **technical and expressive** aspects of reading in Gujarati. Each component is rated on a 5-point scale, following the same 1 to 5 rating criteria. Each component was rated on a 5-point scale, where: 1 = Poor, 2 = Below Average, 3 = Satisfactory, 4 = Good, 5 = Excellent. The total score is summed and converted to a final mark out of 5 for each reading task. The cumulative score is used to determine the final reading proficiency rating. These rating scales ensure a systematic and fair assessment of students' oral and reading proficiency, providing valuable insights into their linguistic development.

3.9 Scale of Reaction

To gauge students' responses to the Activity-Based Gujarati Teaching Programme (ABGTP), a five-point Likert scale was created. The initial draft of the scale comprised 47 statements, which were refined based on expert feedback and underwent pilot testing. After iterative revisions, the final version of the reaction scale included a total of 51 statements, categorized into distinct dimensions related to the effectiveness of the teaching program. These dimensions aimed to capture students' perceptions of the various elements of the program, including their experience with specific activities and their perceived improvements in the four core language skills: Listening, Speaking, Reading, and Writing (LSRW).

Table 3.7: Components of the Reaction Scale

Sr. No.	Components	Statements
1	Activity-Based Teaching	(11 statements)
2	Activities for LSRW	(19 statements)
3	Enhancement of Listening	(5 statements)
4	Enhancement of Speaking	(5 statements)
5	Enhancement of Reading	(5 statements)
6	Enhancement of Writing	(6 statements)

Each of these components was designed to measure specific aspects of the program, including student engagement, perceived skill improvement, and the effectiveness of activity-based learning in enhancing the various language skills. The scale was administered after the completion of the ABGTP to gain a holistic understanding of students' reaction on the program's overall impact.

3.10 Feedback Sheet

Twelve open-ended questions made up the feedback sheet, which was designed to provide students a chance to share their thoughts and personal experiences with the Activity-Based Gujarati Teaching Programme (ABGTP). Students' impressions of how their Listening, Speaking, Reading, and Writing (LSRW) skills changed during the course of the program were explicitly captured by this qualitative technique.

To know skill development, the feedback sheet sought to explore students' preferences regarding the activities employed in the ABGTP, highlighting which activities they found most engaging or effective, and which they found less favourable. The open-ended nature of the items allowed for a detailed understanding of students' insights, including the reasons behind their preferences, perceived challenges, and suggestions for improving the program. This rich qualitative data was used to further refine the program and enhance its effectiveness.

3.11 Data Collection Procedure

To guarantee precision, dependability, and a thorough assessment of the Activity-Based Gujarati Teaching Programme (ABGTP), data collection for this study was carried out in an organised way. The steps that make up the process are as follows:

1. Permission and Ethical Considerations

Prior to initiating the data collection process, permission was obtained from the both school principals and educational authorities of the university and institute. Ethical considerations were adhered to, ensuring that all students voluntarily participated in the study with their consent.

2. Pretest Administration

To determine a baseline of Listening, Speaking, Reading, and Writing (LSRW) abilities for both the control and experimental groups, the pretest was given during the first week of August 2022. Additionally, it ensured that the two groups' proficiency levels at the beginning of the study were equal.

3. Implementation of the ABGTP

The Activity-Based Gujarati Teaching Programme (ABGTP) was implemented daily in the experimental group's final two class periods and for an additional three classes on Saturdays from August 2022 to January 2023. This schedule allowed the researcher to systematically incorporate a variety of activities designed to strengthen the four core LSRW skills. During this phase, the control group continued with traditional instructional methods.

4. Post-Test Administration

The post-test was given in January 2023, at the end of the ABGTP implementation. In order to maintain consistency, the parallel version of the LSRW skill test was utilized, and this test reflected the pretest measurements. Any gains in language skills brought about by the intervention were evaluated using the post-test.

5. Reaction Scale Administration

After completing the ABGTP, students in the experimental group were given the Reaction Scale. The scale included a number of assertions about different program elements, its activities, structure, and the perceived gains in LSRW abilities. Students used a five-point Likert scale, from strongly disagree to strongly agree, to indicate how much they agreed with each statement.

6. Administration of the Feedback Sheet

After completing the reaction scale, students in the experimental group were also asked to complete an open-ended feedback sheet. This provided qualitative insights into their personal experiences with the program. Students could express which activities they enjoyed, where they felt improvements were made in their LSRW skills, and suggest modifications for future iterations of the ABGTP.

7. Information Gathering and Evaluation

All of the data from the participating schools was gathered by the investigator herself. Both the experimental and control groups were given the LSRW skills pretest. While the control group adhered to the conventional curriculum, the experimental group was the only one to use the ABGTP. The findings may be directly compared because both groups took the post-test at the conclusion of the semester. Only the experimental group was given the reaction scale and feedback form in order to get a qualitative assessment of the program's efficacy.

This detailed procedure ensured that the data collected was comprehensive and allowed for both quantitative and qualitative analysis of the ABGTP's impact on student proficiency in Gujarati.

3.12 Data Analysis

Given the quasi-experimental methodology and ordinal character of some variables, quantitative analysis mostly used nonparametric tests. The Mann-Whitney U Test used to compare post-test results for LSRW skills between the experimental and control groups. The experimental group's within-group changes from the pretest to the post-test were assessed using the Wilcoxon Signed-Rank Test. Frequencies, percentages, and intensity indices for reaction scale data are used in descriptive analysis. Thematic analysis of open-ended feedback sheet responses in a qualitative manner.

The data collected from various instruments, including the pretest and post-test for LSRW skills, reaction scale, and feedback sheet, were analysed using appropriate quantitative and qualitative methods to ensure robust evaluation of the Activity-Based Gujarati Teaching Programme (ABGTP). The analysis was carried out as follows:

Analysis of Quantitative Data

The following nonparametric tests were used because of the quasi-experimental design and the ordinal character of some variables:

✎ Test of Mann-Whitney U:

The post-test results for the four fundamental LSRW skills listening, speaking, reading, and writing were compared between the experimental and control groups using this assessment. For comparing independent groups, the Mann-Whitney U test was perfect because the data did not fit the assumptions of parametric tests (like a normal distribution).

✎ Wilcoxon Signed-Rank Test:

The experimental group's within-group changes from the pretest to the post-test were assessed using the Wilcoxon Signed-Rank Test. It assesses whether there were significant improvements in LSRW skills within the same group after undergoing the ABGTP. This nonparametric test is appropriate for paired samples and measures the differences in ranks of the scores between two related samples.

2. Descriptive Analysis for Reaction Scale

The reaction scale data were analysed using descriptive statistics. This involved calculating frequencies and percentages to represent how students responded to each statement on the reaction scale. Intensity indices to evaluate the overall strength of student reactions, providing insight into the students' level of agreement with various aspects of the ABGTP.

These measures allowed for a comprehensive understanding of how the students perceived the activities and whether they felt their skills were enhanced by the program.

3. Qualitative Analysis of Feedback Sheet

The responses from the open-ended feedback sheet were analysed using thematic analysis. This approach allowed the researcher to identify recurring themes, patterns, and insights in students' narratives. Thematic analysis provided an in-depth understanding of students' personal experiences with the program, including preferred activities and those that students found challenging, perceived improvements in LSRW skills, suggestions for future iterations of the ABGTP, providing valuable insights for refinement of the program.

Table 3.9: Objectives, Tools, and Analysis Techniques

Sr. No.	Objectives	Tool	Data Analysis Technique
1	Develop an Activity-Based Programme to enhance LSRW skills in Gujarati for standard IX.	ABGTP	Descriptive Analysis
2	Implement the developed programme among standard IX students.	ABGTP	Descriptive Analysis
3	Study the effectiveness of the developed programme in terms of: (a) Efficiency in Listening Skills in Gujarati (b) Efficiency in Speaking Skills in Gujarati (c) Efficiency in Reading Skills in Gujarati (d) Efficiency in Writing Skills in Gujarati	Skill Test	Mann-Whitney U Test, Wilcoxon Signed-Rank Test
4	Study the effectiveness via the reaction of students to the ABGTP	Reaction Scale	Frequency, Percentage, Intensity Index
5	Study the effectiveness via feedback sheet students about the ABGTP	Feedback Sheet	Descriptive Analysis

By using a combination of quantitative and qualitative analysis techniques, the study was able to provide a comprehensive evaluation of the ABGTP's effectiveness in enhancing

LSRW skills and its reception among students. To analysing the data in this manner, the investigator aimed to empirically assess whether the developed Activity-Based Gujarati Teaching Programme effectively enhances LSRW skills among standard IX students. The insights gleaned from reaction scales and feedback sheets further illustrate the qualitative dimensions of student engagement and perceived improvements in language ability.