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Original Article

Effectiveness of an Innovative Teaching-Learning Material (TLM) Model Based on Constructivism: An Experimental Study in the Context of Sanskrit Learning among Ninth-Grade Students

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Abstract *The National Education Policy (NEP) 2020 and the National Curriculum Framework for School Education (NCF-SE) 2023 place considerable emphasis on learner-centred, experiential, activity-based, and knowledge-construction-oriented teaching and learning. In this context, Sanskrit teaching at the secondary school level needs to become more effective, engaging, meaningful, and conducive to active student participation. Against this background, the present study was undertaken to develop an innovative Teaching-Learning Material (TLM) model based on the principles of constructivism and to examine its effectiveness in enhancing Sanskrit learning among ninth-grade students. The TLM model was designed on the premise that learners construct knowledge through direct experience, active participation, collaboration, problem-solving, self-learning, reflection, and meaningful learning experiences. The researcher conducted the experimental study during the academic year 2023–2024. An experimental research method was adopted for the study. A total of 100 ninth-grade students were selected through purposive sampling and divided into two groups of 50 students each: an experimental group and a control group. The experimental group was taught Sanskrit through the constructivist-based TLM model, whereas the control group was taught through conventional teaching methods. The data obtained through the post-test were analysed using the Mean, Standard Deviation, and t-test. The findings revealed a statistically significant improvement in the academic achievement of the experimental group as compared with the control group. The use of the constructivist-based TLM model also contributed positively to students' interest in Sanskrit, classroom participation, conceptual understanding, critical thinking, collaborative learning, and self-learning abilities. The findings therefore indicate that a constructivism-based TLM model can serve as an effective, learner-centred, and experiential approach for improving the teaching and learning of Sanskrit at the secondary school level.*

Keywords: *Constructivism, Teaching-Learning Material, Sanskrit Learning, Innovative Teaching, Learner-Centred Education, Experiential Learning, Ninth-Grade Students, Academic Achievement*

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INTRODUCTION:

Sanskrit is a rich language that preserves India's intellectual traditions, philosophy, literature, science, Ayurveda, Yoga, and cultural heritage. The extensive body of knowledge available in Sanskrit provides valuable insights into the intellectual foundations of Indian culture. Therefore, the study of Sanskrit is not limited merely to the development of linguistic skills; it also contributes to the intellectual, cultural, and ethical development of learners. However, at the secondary school level, Sanskrit teaching continues to be dominated, to a considerable extent, by traditional, teacher-centred, and memorisation-oriented approaches.

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As a result, students' active participation, conceptual understanding, and interest in the subject do not always develop to the desired level. The National Education Policy (NEP) 2020 and the National Curriculum Framework for School Education (NCF-SE) 2023 emphasise that learners should construct knowledge through their own experiences, activities, observation, interaction, and collaborative learning.

The foundation of this approach lies in Constructivism, according to which learners are not passive recipients of knowledge but active participants who construct knowledge based on their experiences and interactions. Therefore, the systematic use of appropriate Teaching-Learning Materials (TLMs) in the teaching-learning process can significantly enhance students' participation, conceptual understanding, and quality of learning. In the present study, the researcher developed an innovative TLM model based on the principles of constructivism and examined its effectiveness in the context of Sanskrit learning among ninth-grade students. The model placed particular emphasis on active participation, collaborative learning, self-learning, reflection, activity-based learning, and problem-solving. The study thus attempted to make Sanskrit teaching more meaningful, experiential, engaging, and learner-centred.

Need and Significance of the Study

Following the implementation of the National Education Policy 2020, learner-centred, experiential, and competency-oriented approaches have received increasing importance in the education system. Nevertheless, Sanskrit teaching in many secondary schools continues to rely predominantly on conventional approaches. Consequently, students may not develop the desired levels of confidence, critical thinking, creativity, and motivation to learn Sanskrit. In constructivist teaching, learners construct knowledge through direct activities, interaction, collaboration, experience, and reflection. A systematic and purposeful use of TLM can support this process by strengthening students' conceptual understanding, linguistic skills, problem-solving abilities, and habits of self-learning. Hence, it was considered necessary to examine the effectiveness of a constructivist-based TLM model in Sanskrit teaching. The significance of the present study lies in its attempt to enhance the effectiveness of Sanskrit teaching through a TLM model grounded in constructivist principles and to empirically examine its effectiveness through statistical analysis. The findings may provide useful directions for Sanskrit teachers, curriculum developers, teacher educators, and researchers.

Statement of the Problem

The National Education Policy 2020 and the National Curriculum Framework for School Education 2023 advocate learner-centred, activity-based, and knowledge-construction-oriented teaching. However, the application of these principles in secondary-level Sanskrit teaching remains relatively limited. Consequently, students' active participation, conceptual understanding, and academic achievement may not reach the desired level. Against this background, the researcher considered it necessary to develop an innovative Teaching-Learning Material (TLM) model based on constructivist principles and examine its effectiveness.

The problem of the present study was therefore stated as follows:

"What is the effect of an innovative Teaching-Learning Material (TLM) model based on constructivism on the academic achievement of ninth-grade students in Sanskrit learning?"

Objectives of the Study

The objectives of the present study were:

1. To study the existing status of Sanskrit learning among ninth-grade students.
2. To develop an innovative Teaching-Learning Material (TLM) model based on the principles of constructivism.
3. To implement the developed TLM model in classroom teaching.
4. To study the academic achievement of students through the constructivist-based TLM model.
5. To compare the effectiveness of conventional teaching methods and TLM-based teaching.
6. To study the effect of the TLM model on students' participation, conceptual understanding, self-learning ability, and interest in Sanskrit.
7. To formulate useful suggestions for making Sanskrit teaching more effective.

Hypotheses

Null Hypothesis (H_0)

There is no statistically significant difference between the academic achievement of students taught through conventional teaching methods and that of students taught through the constructivist-based TLM model.

Alternative Hypothesis (H_1)

The academic achievement of students taught through the constructivist-based TLM model is statistically significantly higher than that of students taught through conventional teaching methods.

Review of Related Literature

A critical review of related literature is essential for establishing the direction and conceptual foundation of any research study. In the context of the present research, literature related to constructivism, learner-centred teaching, Teaching-Learning Materials, the National Education Policy 2020, and the National Curriculum Framework for School Education 2023 was reviewed. The National Education Policy 2020 advocates an approach in which learners construct knowledge through experience, activity, collaboration, and reflection. Similarly, NCF-SE 2023 places significant emphasis on learner-centred, experiential, and competency-oriented teaching-learning processes. Both policy documents recognise the effective use of teaching-learning materials as an important means of enhancing

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students' understanding, participation, and quality of learning. Jean Piaget, one of the major proponents of constructivism, emphasised that learners construct knowledge on the basis of their experiences. Lev Vygotsky highlighted the significance of social interaction, collaborative learning, and teacher guidance in the process of knowledge construction. Jerome Bruner emphasised Discovery Learning and suggested that learning through discovery can contribute significantly to meaningful and lasting learning. Recent research has also indicated that activity-based learning, visual teaching-learning materials, problem-based learning, collaborative learning, and the systematic use of different TLMs can positively influence students' learning motivation, linguistic skills, critical thinking, and academic achievement. The critical review of available literature indicates that comparatively limited research has been conducted to empirically examine the effectiveness of a comprehensive TLM model based specifically on constructivist principles for Sanskrit teaching. The present study therefore attempts to address this research gap by empirically examining the effectiveness of a constructivist approach in Sanskrit teaching.

Research Methodology

Research Method

The Experimental Method was adopted for the present study. To examine the effectiveness of the Teaching-Learning Material model developed on the basis of constructivist principles, a Pre-test–Post-test Control Group Design was employed. The researcher conducted the experimental intervention during the academic year 2023–2024.

Sample

A total of 100 ninth-grade students from a secondary school in Karad city, Satara district, Maharashtra, were selected through purposive sampling. The students were divided into two groups:

1. Experimental Group: 50 students
2. Control Group: 50 students

The experimental group was taught using the constructivist-based TLM model developed by the researcher, whereas the control group was taught through conventional teaching methods.

Research Tools

The following tools were used in the study:

1. Constructivism-based Teaching-Learning Material (TLM) model
2. Pre-test
3. Post-test
4. Academic Achievement Test
5. Observation Record
6. Student Participation Record

Statistical Techniques

The data obtained from the study were analysed using:

1. Mean
2. Standard Deviation
3. t-test

Nature of the Constructivism-Based TLM Model

The Teaching-Learning Material model developed for the present study was based on the principles of constructivism. According to this model, the learner is not a passive recipient of knowledge but an active participant who constructs knowledge through experience, activity, discussion, collaboration, and reflection.

Accordingly, active student participation was placed at the centre of the teaching-learning process.

The major components of the model were as follows:

1. Flashcards

Colourful flashcards were used to facilitate the understanding of vocabulary, grammatical concepts, and various linguistic elements. For example, flashcards representing different Lakāras of Sanskrit verbs were used. Flashcards requiring students to match the appropriate subject, object, and verb were also provided.

Through these activities, students constructed grammatically appropriate sentences independently and developed a clearer understanding of grammatical concepts.

2. Activity Worksheets

A variety of activity worksheets were developed to enable students to understand concepts through active participation. These included activities such as:

1. filling in the blanks,
2. selecting the appropriate case ending,
3. matching synonyms,
4. constructing Sanskrit sentences based on pictures, and
5. Arranging jumbled words to form meaningful sentences.

These activities promoted active participation and helped students engage directly with the learning content.

3. Collaborative Learning

Students engaged in collaborative learning through small-group discussions, exchange of ideas, and collective problem-solving.

For example, each group was provided with a Sanskrit passage and asked to identify nouns, pronouns, verbs, and adjectives occurring in the passage.

This activity promoted communication skills, peer learning, cooperation, and collective understanding.

4. Question-Generation Activities

Students were encouraged to formulate their own questions and ask them to their peers. For example, based on a given prose passage, students independently constructed questions beginning with Sanskrit interrogative words such as “कः?”, “का?”, “किम्?”, and “कुत्र?” This activity promoted critical thinking, analytical ability, and linguistic expression.

5. Problem-Based Learning

Situational problems related to Sanskrit grammar, vocabulary, and sentence construction were presented to the students. For example, students were given sentences containing incorrect case usage or inappropriate verbs and were asked to identify the errors and reconstruct the sentences correctly. This

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activity helped develop students' problem-solving ability and expressive skills.

6. Self-Learning

Supplementary learning materials were made available to students for independent study. This encouraged self-directed learning, increased confidence, and helped students develop greater independence in the learning process.

7. Reflective Learning

After each learning activity, students were encouraged to reflect upon their own learning process and assess the concepts they had learned. This reflective component promoted self-assessment and contributed to more meaningful and lasting learning.

9. Data Analysis and Findings

The data obtained through the post-test were analysed using the Mean, Standard Deviation, and t-test.

The following findings emerged from the analysis:

1. The mean achievement score of the experimental group was higher than that of the control group.
2. The t-test analysis indicated that the obtained p-value was less than 0.05; therefore, the null hypothesis was rejected.
3. Students taught through the constructivism-based TLM model demonstrated a statistically significant improvement in academic achievement.
4. Students' classroom participation, conceptual understanding, and self-learning abilities showed positive development.
5. The students developed a more positive attitude towards Sanskrit and demonstrated increased motivation to learn the subject.

Discussion

The findings of the study indicate that the constructivism-based TLM model provides students with opportunities to construct knowledge through direct experience, discussion, interaction, and collaboration. Consequently, the learning process becomes more meaningful, engaging, and sustainable. According to Piaget's constructivist theory, learners construct knowledge on the basis of their experiences. Vygotsky's social constructivist perspective emphasises collaborative learning and teacher guidance as important components of knowledge construction. Bruner's concept of Discovery Learning suggests that knowledge discovered by learners themselves can be more meaningful and enduring. The findings of the present experimental study conducted by the researcher during the academic year 2023–2024 are consistent with these theoretical perspectives. The improved performance of the experimental group suggests that providing learners with opportunities to participate actively in the learning process can contribute significantly to their academic achievement and conceptual understanding.

Conclusion

The present study demonstrates that a Teaching-Learning Material (TLM) model based on constructivist principles can bring about significant improvement in students' academic achievement, conceptual understanding, classroom participation, and self-learning ability. The constructivist-based approach was found to be more learner-centred, experiential, activity-oriented, and engaging than conventional teaching. The findings of the experimental intervention conducted by the researcher during the academic year 2023–2024 indicate that appropriately designed TLM can play an important role in making Sanskrit teaching more effective and meaningful at the secondary school level. The study therefore concludes that the systematic integration of constructivist principles and innovative TLM into Sanskrit teaching can provide learners with richer opportunities for active participation, collaboration, reflection, problem-solving, and independent learning.

Recommendations

Based on the findings of the present study, the following recommendations are proposed:

1. Constructivism-based TLM should be regularly incorporated into Sanskrit teaching at the secondary school level.
2. Sanskrit teachers should be provided with regular training in the development and effective use of TLM.
3. Learner-centred, activity-based, and experiential teaching-learning practices should be encouraged.
4. Supplementary learning materials and self-learning resources should be developed for Sanskrit learners.
5. The use of digital TLM and interactive educational resources should be increased.
6. Sanskrit teachers should be encouraged to design locally relevant and learner-friendly teaching materials.
7. Opportunities for collaborative learning, problem-solving, reflection, and self-learning should be systematically integrated into Sanskrit classrooms.

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Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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