

SUB-ID-769926.docx

By Rishabh Deo

The 5E Instructional Model in Sanskrit Language Pedagogy: A Systematic Literature Review

**Achala & **Dr. Priyanka Srivastava*

Introduction

The design of language instruction has been notably behaviorist historically, whether dealing with a learner's mother tongue, a second language (L2), or a third language (L3). Classrooms have historically depended on rote memorization, repetitious syntax drills and top-down knowledge transmission. But the epistemic turn to constructivism is really a change in the way educators approach language development. No longer are learners perceived as passive receivers, rather, as active meaning-makers who develop linguistic competence through social engagement and experience discovery (Venkadeswaran & Ramanathan, 2024). The discipline concerned with the theory, methods, and practices of teaching languages. It explores how instructional design influences cognitive language acquisition and student engagement. The rapid growth of digital technologies in education has changed how students access, build, and share knowledge (Voogt et al., 2011). As classrooms become more interactive and technology-driven, teachers need effective teaching models that support active and meaningful learning. One of the most well-known and successful models for guiding inquiry-based learning is the 5E Instructional Model, which includes five stages: Engage, Explore, Explain, Elaborate, and Evaluate (Bybee et al., 2006). Developed by the Biological Sciences Curriculum Study (BSCS), this model focuses on student-centered learning that encourages curiosity, deep understanding, and the ability to apply knowledge to real-life situations (Bybee, 2014). The 5E educational approach is an example of this constructivist change. The framework was developed by the Biological Sciences Curriculum Study (BSCS) in the late 1980s for science education. It takes students through five different iterative phases: Engage, Explore, Explain, Elaborate and Evaluate (Pedaste et al., 2015). The model's roots are in STEM, but it has recently been massively transplanted transdisciplinary into language pedagogy. The 5E model aligns with natural cognitive channels of language learning (Educational and Humanities, 2026). Viewing language as a dynamic system to be examined rather than a static collection of rules to be

**Research Scholar, Faculty of Education, K Banaras Hindu University, Varanasi, Uttar Pradesh, India.*

E-mail- achalaedu@bhu.ac.in, Contact No.- 8004802758

***Assistant Professor, Faculty of Education, K, Banaras, Hindu University, Varanasi, Uttar Pradesh, India.*

E-mail- priyanka26@bhu.ac.in, Contact No.- 7052179402

remembered, But as this educational model has gained popularity around the world, there has been a sharp difference. The vast majority of research studies its effectiveness in high resource environments – such as English as a Foreign Language (EFL) – while almost completely disregarding classical, morphologically rich languages which are in dire need of pedagogical renewal. The systematic teaching and learning of the Sanskrit language, encompassing its syntax, morphology, vocabulary, and literature.

Research Question

To address the current landscape of active learning in language pedagogy, this systematic literature review is driven primarily by one central research questions:

How is the 5E instructional model being leveraged to enhance academic achievement in language pedagogy globally, and what are the current empirical gaps in teaching classical languages like Sanskrit through these constructivist teaching models?

Research Objectives

Derived directly from the ERQs, this paper operates on the following targeted objectives:

1. To systematically synthesize the theoretical and empirical evidence linking the 5E instructional model to improved academic outcomes and student engagement across mother tongue, L2, and L3 classrooms.
2. To map the functional role of technological integrations across the **Engage, Explore, Explain, Elaborate and Evaluate phases** of **the** constructivist inquiry cycle.
3. To critically evaluate the condition of contemporary pedagogical research in Sanskrit education and advocate for the application of the 5E model to bridge the gap between ancient linguistic traditions and modern classroom realities.

Research Methodology

To ensure a rigorous, unbiased synthesis of the literature, **this paper adopts a Systematic Literature Review methodology**. A **Systematic Literature Review** differs from

a traditional narrative review by utilizing explicit, reproducible criteria to identify, select, and critically appraise relevant research (Brignardello-Petersen et al., 2024).

- **Technique of Review:** The framework for this review is grounded in the qualitative and mixed-methods synthesis strategies outlined by Creswell and Guetterman (2019) for educational research.
- **Search and Selection Strategy:** A comprehensive search was executed across peer-reviewed databases (e.g., Scopus, ERIC, Google Scholar). Search strings intentionally cross-referenced terms like 'inquiry-based learning,' '5E instructional model,' 'language pedagogy,' 'academic achievement,' and 'Sanskrit education'.
- **Data Extraction:** The analysis prioritized studies published over the last decade that offered empirical data on academic outcomes, engagement metrics, or the integration of technology within constructivist learning environments.

Thematic Synthesis of the Literature

Theme 1: Language Acquisition as a Constructivist Mechanism

The most consistent trend that emerges from the literature is the simple efficacy of active inquiry to increase academic performance. Constructivist techniques profoundly undermine the teacher-centered paradigms. Teachers are no longer the lecturers at the front of the room, but facilitators of the students' negotiation of meaning (Venkadeswaran & Ramanathan, 2024). Meta-analyses show time after time that inquiry-based frameworks lead to a statistically significant increase in academic achievement when students are provided with proper cognitive scaffolding over traditional direct instruction (Freeman et al., 2014; Lazonder & Harmsen, 2016). The Explore and Explain phases of the 5E paradigm, when applied to language training, effectively require intelligible input and output. Students are challenged to actively wrestle with syntax and semantics in real time, the very cognitive friction needed to transfer a language from short-term memory to deep, long-term retention (Educational and Humanities, 2026).

Theme 2: Emotional Scaffolding and Engagement Metrics

You can't separate cognitive performance in language learning from affective involvement. One comprehensive evaluation that spanned two decades of data found student engagement as perhaps the single most essential predictor of language acquisition performance (Hiver et al., 2021, Dangcolis, 2025). Interestingly, the literature suggests that the 5E model inherently curates this engagement by dispersing cognitive load and promoting collaboration. Expanding on this, Zhao and Li (2021) theorize the importance of a "loving pedagogy" – a high-support emotional climate where students can take linguistic risks without fear of punishing marking. Here, the Engage phase of the 5E model is particularly important, as it reduces the emotive filter and encourages inherent curiosity prior to any formal rules of grammar being taught.

Theme3: Technology Supporting the Inquiry Cycle

Digital affordances are pushing a big change in the way the 5E model is presented in physical spaces, and we're seeing that happen." Technology-enhanced language learning (TELL) environments have become the main settings for current research (Shadiev & Yang, 2020). Mobile-Assisted Language Learning (MALL), for example, has been shown to be a powerful tool to enhance vocabulary learning at the Explore and Elaborate stages, offering low-stakes, repeated practice outside the classroom walls (Dağdeler, 2023). Moreover, Artificial Intelligence (AI) is addressing one of the historically most resource-consuming bottlenecks of the 5E model: the Evaluate phase. AI-based chatbots and intelligent tutoring systems may now provide hyper-personalized, immediate feedback on syntax and pronunciation, successfully scaling the constructivist paradigm for large, mixed-ability classrooms (Alshumaimeri & Alshememry, 2024; Crompton et al., 2024).

Theme 4: The Empirical Gap in Classical Language Pedagogy

The literature reviewed in this paper yields a conclusive conclusion: constructivist frameworks designed through the 5E instructional model—enhanced by emotional engagement and digital tools—significantly accelerate language learning outcomes. But a

look at the landscape of this research reveals a gaping, systemic blind spot. The vast bulk of pedagogical innovation is dominated solely by high resource modern languages, especially English and Mandarin. There is thus a great lack of empirical research which has used the 5E instructional approach for teaching ancient and classical languages. Sanskrit is possibly the most flagrant instance of this negligence. The pedagogy of Sanskrit, however crucial to the bed-rock of Indian Knowledge Systems (IKS) comprising historical, scientific and philosophical literature, is mainly imprisoned in antiquity. In India and around the world, in classrooms, language is still largely taught by rote translation and grammatical memorization, completely skipping the cognitive benefits of active learning. Recent educational reforms, most notably India's National Education Policy (NEP) 2020, have specifically advocated for the mainstreaming and linguistic rejuvenation of Sanskrit, steering it away from a ritualistic remnant to a living, multidisciplinary topic (Oza, 2025). But there is essentially no actual study on how to do this pedagogically, despite this high-level governmental effort. Filling this void is a vital academic imperative. Future research should carefully investigate the association between the 5E instructional paradigm and academic accomplishment in the Sanskrit classroom, proving that ancient syntax can be mastered via modern inquiry.

Thematic Focus	Authors (Year)	Core Pedagogical Contribution
Constructivism & Inquiry	Pedaste et al. (2015)	Mapped the specific phases of inquiry-based learning that biologically validate frameworks like 5E.
Constructivism & Inquiry	Lazonder & Harmsen (2016)	Demonstrated the statistical efficacy of guided IBL on academic outcomes through meta-analysis.
Constructivism & Inquiry	Venkadeswaran & Ramanathan (2024)	Examined constructivism specifically as a

		psychological driver for English language competence.
Engagement & Emotion	Hiver et al. (2021)	Synthesized two decades of data proving behavioral and cognitive engagement is central to language success.
Engagement & Emotion	Zhao & Li (2021)	Explored the psychological safety ("loving pedagogy") required for students to thrive in active EFL classrooms.
Digital Affordances	Shadiev & Yang (2020)	Outlined how TELL environments facilitate the active, decentralized participation demanded by modern frameworks.
Digital Affordances	Crompton et al. (2024)	Analyzed AI's dual role as an engagement facilitator and a tool for hyper-personalized, immediate evaluation.
Policy & Classical Pedagogy	Saha (2026)	Analyzed the integration of Sanskrit under India's NEP 2020, highlighting the need for linguistic revitalization.
Policy & Classical Pedagogy	Sinha (2025)	Explored the importance of the Sanskrit language in the modern education system and its

		psychological impact.
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Table 1. Tabulated Review of Core Literature

The synthesis literature leads to a decisive conclusion: constructivist frameworks organized through the 5E instructional model, augmented by emotional engagement and digital resources, dramatically accelerate language learning outcomes. But a glance at the lay of the land in this research reveals a clear, systematic blindspot. High-resourced contemporary languages, especially English and Mandarin, utterly dominate the great bulk of pedagogical innovation.

As a result, there is a severe scarcity of empirical studies of the use of the 5E instructional approach in teaching ancient and classical languages. Perhaps the most telling instance of this negligence is the case of Sanskrit. Sanskrit pedagogy, despite being basic, the base of Indian Knowledge Systems (IKS) including historical, scientific and philosophical literature, is mainly stuck in antiquity. The language nevertheless lives on in classrooms around the world and in India, mostly taught by rote translation and memorization of grammar, completely avoiding the cognitive benefits of active learning (Sinha, 2025).

Recent educational reforms, notably India's National Education Policy (NEP) 2020, have expressly called for the mainstreaming and linguistic rejuvenation of Sanskrit, turning it from a simple ritualistic relic into a living, multidisciplinary subject (Saha, 2026). But despite this high level policy drive there is essentially no empirical research into how to do this pedagogically. Sanskrit is a morphologically rich , highly inflected language requiring enormous cognitive scaffolding . It is very weak in contemporary teaching paradigms and improved digital processing technologies (Sadhukhan & Punyeshwarananda, 2024). This vacuum needs to be urgently filled, as an intellectual need. In the current education system, for the classical languages to survive and flourish, future research must carefully evaluate the association between the 5E teaching model and academic accomplishment in the Sanskrit classroom, to prove that old syntax can be

mastered through modern inquiry. A frequent obstacle to the preservation of ancient languages around the world is the lack of engagement. For these languages to survive in the present period, they need to be taught with approaches that are interesting, relevant and intellectually challenging for pupils. In the Indian national context, the necessity for this transition perhaps becomes more urgent. Following the National Education Policy (NEP) 2020, Sanskrit is not to be seen as a remnant of the past but as a living foundation of Indian Knowledge Systems (IKS). However, as this research indicates, there is a gap between this policy goal and its realization at the level of the classroom in practice.

The path forward will require a three-pronged strategy to:

- 1. Re-engineering of Pedagogy-** Teachers and curriculum designers should actively re-engineer the five phases of 5E model in the context of unique morpho-syntactic structure of Sanskrit from rote recollection to inquiry-based discovery.
- 2. Digital Integration-** The absence of modern NLP (Natural Language Processing) and digital resources further adds to the deficit in Sanskrit educational research. There is an immediate need to develop AI-assisted tools to aid the Explore and Evaluate portions of the 5E cycle for Sanskrit learners.
- 3. Empirical Rigour-** Future research needs to move beyond the theoretical discussion. Carry out longitudinal studies to quantify quantitatively the effect of inquiry-based education on academic achievement of students of Sanskrit.

Finally, the 5E instructional model is not just a teaching template, but a roadmap to the revival of Sanskrit. Perhaps via the combination of historic linguistic history with modern constructivist learning we may ensure that Sanskrit not only lives as an object of study but flourishes as a living and deeply understood language of the future.

Conclusion

Through this analysis ¹ it can be concluded that the 5E teaching model is potentially a remarkable model which can yield statistically significant results in real life classroom situations; It is theoretically solid and empirically confirmed framework for language acquisition. It effectively switches the classroom from passive absorption to

active inquiry, meeting the basic cognitive needs for deep linguistic retention. Modern digital affordances (e.g., AI-based tutoring, mobile-assisted vocabulary acquisition) support the paradigm and provide a scalable solution to the complicated nature of language training in the 21st century. But the present diffusion of pedagogical research is one-sided. We are seeing a great “educational inequality”: modern languages benefit from rigorous, inquiry-based pedagogical frameworks, whereas classical languages are left to rely on methods that are decades, if not centuries, old. This is not only a gap in scholarship, it is a crisis of culture and intelligence.

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