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REVITALIZING SANSKRIT COMMUNICATION AND VOCABULARY THROUGH CROSSWORDS IN A DIGITAL PLATFORM: A CASE STUDY OF PADARAÑJINĪ

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ABSTRACT

This study explores the pedagogical potential of Padarañjinī, a digital platform that uses crossword puzzles to support vocabulary acquisition and communication skills in Sanskrit. Grounded in principles of classical Sanskrit pedagogy and contextual learning, the platform reimagines traditional methods through a gamified, interactive interface. Using a qualitative case study design, data was collected through learner observations and feedback during 50 crossword-solving sessions. Thematic analysis revealed that learners showed improved vocabulary recall, increased motivation, and early signs of active language use. Despite some challenges related to input methods and clue complexity, participants (learners) reported high engagement and a sense of playful and meaningful learning. The findings suggest that digital crosswords can serve as effective tools for Sanskrit education, bridging classical pedagogy with modern e-learning strategies. The study offers implications for educators, platform designers, and researchers interested in the intersection of gamification, classical languages, and digital pedagogy.

KEYWORDS: Sanskrit pedagogy, crossword-based learning, gamification, vocabulary acquisition, digital humanities, Padarañjinī, classical language education, Sanskrit eLearning, interactive learning, language revitalization.

1. INTRODUCTION

Sanskrit is regarded as the classical language of Indian Knowledge Systems and its significance is immense (Bassetti & Reinboldt, 2023) due to its variety of literature created over thousands of years. Despite its presence and evolution over millennia, Sanskrit texts are largely used with their translation in English or native languages to derive meaning out of the texts. This is because Sanskrit in its spoken form is yet to be fully revived. Conversation is dependent on vocabulary and ability to communicate. With the evolution of digital technology and artificial intelligence, it is important to provide avenues to revitalize conversational Sanskrit.

1.1 Digital Learning and Crosswords

Mobile-assisted language learning (MALL) applications like Duolingo (Shortt et al., 2023) enable quick learning of conversational language. However Sanskrit learning is yet to be part of easy-to-use MALL apps. The role of digital platforms in learning is of paramount importance as they offer a wide array of engaging learning options (Shortt et al., 2023; Zakaria, 2024). The use of gamified tools, such as crossword puzzles, provides opportunities for engaging, self-paced, stress-free and cognitively stimulating (Klimova & Pikhart, 2023) vocabulary practice. Crosswords also encourage pattern recognition, recall, and contextual learning, making them an effective medium for both vocabulary and communication (Bergström, 2024; Torres et al., 2022).

1.2 About Padarañjinī

Padarañjinī is a Sanskrit crossword hosted by Samskrita Bharati on a gamified eLearning platform (https://zat.am/pr/) that supports vocabulary development and communication in Sanskrit. Designed to be both pedagogically sound and enjoyable, Padarañjinī aligns with modern learning methods while staying rooted in the goals of Samskrita Bharati, one of which is to revive Sanskrit as a spoken language and integrate it into daily life.

This paper presents a case study of Padarañjinī, with the aim of exploring how digital crossword-based learning can contribute to the revitalization of Sanskrit vocabulary and communication. It seeks to document learner experiences, identify patterns of engagement and motivation, and assess the potential of this method as a pedagogical tool in Sanskrit education.

1.3 Research Questions

The following research questions were formulated to explore the role of Padarañjinī for learning Sanskrit vocabulary and communication

- How does Padarañjinī affect learners' acquisition and recall of Sanskrit vocabulary and communication skills in Sanskrit?
- What are learners' perceptions of learning with Padarañjinī in terms of motivation, engagement, and ease of use?
- What challenges or limitations do learners encounter while using Padarañjinī?

2. Literature Review

Literature review comprised of a wide variety of ancient and modern interdisciplinary sources with search on keywords like Crosswords, Sanskrit eLearning, Spoken Sanskrit, Language games. etc. resulting in the following thematic categories: -

- Classical Sanskrit pedagogy
- Crosswords in learning languages and subjects
- Digital tools and platforms for Sanskrit eLearning
- Gamification in learning languages and professional education

2.1 Classical Sanskrit Pedagogy

Sanskrit was indeed a widespread medium of instruction in pre-colonial India (Kochhar, 2011; Srimathi & Krishnamoorthy, 2020), serving as the language of learning for spiritual, philosophical, and scientific knowledge across various educational settings (Nahata, 2021). Sanskrit learning pedagogy was based on interactive, and contextual learning approaches (Altekar, 1944) e.g., sutra-style aphorisms, dialogues in narratives and plays, poetic verses, and storytelling, enable learners to learn complex concepts without relying on translations.

For example, in Leelāvati (Meena & Ghai Kaushik, 2024), mathematics is taught through poetically structured word problems and context-oriented storytelling where stories e.g., from Mahabharata are used in defining a problem, resulting in learner engagement in contemplation (śravaṇa, manana, nididhyāsa). The Charaka Saṁhitā, a foundational Ayurvedic text, has Sanskrit-to-Sanskrit exposition and structured repetition (Bhattrai & Pandey, 2024; Waghmare et al., 2021), promoting memorization and internalization (pāṭha, smṛti). Astronomical knowledge in Āryabhaṭīya is presented in compact sūtra form (Clark, 1930), requiring both memorization and layered commentary-based reflection (sūtra–bhāṣya and manana). The Mānasāra, central to Vāstuśāstra (Mane et al., 2024), is rooted in śāstra-

based application. Logic and epistemology are taught in the Nyāya Sūtras using structured questions and answers (praśna–uttara), training learners in debate and critical evaluation (Pageni, 2024). Nāṭyaśāstra (Das, 2015) blends theory and performance, aligning with śravaṇa and nididhyāsa to teach performing arts, dramaturgy, and music.

A few other techniques include Udāharaṇa-prayoga emphasizes learning through illustrative examples (Baghel, 2023) and applied reasoning (Kanta & Yadao, n.d.), commonly used in logic and grammar. Anvaya-vyatireka is a method of affirmative and negative reasoning to sharpen conceptual clarity (Bapat, 1988). Vakya-vicāra is contextual sentence analysis that enables learners to grasp layered meanings through syntax and semantics (Dravid, 2001). In poetics and dramaturgy (Tripathi, 2004), kāvya-rasa-anubhava relates to experiential understanding of emotions and aesthetics. Dialogical traditions such as samvāda foster philosophical inquiry through respectful discussion or debate. Vr̥tti-anuvr̥tti is a method of paraphrasing with progressive elaboration that aids in reinforcing complex ideas (Sharon, 2019). Pañcatantra and Hitopadeśa use nīti-kathā, that is instruction through moral storytelling and sutle learning of language with ethics and practical wisdom (Sharma & Balhara, 2025).

Many original works are now available in digital libraries such as archive.org. Ayurveda texts like the Charaka Saṁhitā and Suśruta Saṁhitā are now available on platforms like the AYUSH Research Portal, integrating classical Sanskrit source texts with modern medical indexing. Projects like INFLIBNET's Bharatiya Granth Collection and Digital Corpus of Sanskrit are preserving works on Nyāya (logic), Alaṅkāraśāstra (poetics), and Śābdabodha (semantic theory) with tools that support digital search, tagging, and analysis.

2.2 Crosswords in learning languages and subjects

Arthur Wynne, a British journalist who emigrated to the United States, is credited with creating the first modern crossword puzzle. On December 21, 1913, the Sunday New York World published Wynne's "word-cross" puzzle, which was diamond-shaped and later renamed "cross-word" before finally becoming "crossword" (Tausig, 2013). Due to its widespread craze, Simon and Schuster, New York Times included them in their books or periodicals resulting in further popularity. During World War II, crosswords served as entertainment and mental exercise for soldiers.

Crosswords gained popularity in Indian regional language (Doctor, 2014) newspapers like Marathi, Hindi, Kannada, Bangla since late 1940s with some huge following e.g., Shabdaranjan Spardha published across Marathi newspapers established by Jayantrao

Salgaonkar in 1958. A.N Prahlada Rao composed more than thirty-five thousand crosswords in Kannada. With the advent of digitization, some entrepreneurs saw the opportunity to create a digital online platform e.g., Amuse Labs allows crosswords to be created in more than 35 world languages with artificial intelligence features.

Crossword puzzles have served as an effective edutainment tool, particularly in language learning (Bergström, 2024), where they enhance vocabulary retention (Torres et al., 2022), spelling accuracy, semantic association, and cognitive recall. Their format encourages learners to engage in pattern recognition, contextual deduction, and active problem-solving, making them suitable for diverse learning environments resulting in memory retention, delayed onset of memory decline (Pillai et al., 2011), knowledge retention (Torres et al., 2022; ZAMANI et al., 2021) and improvement in examination scores.

Digital implementations of crossword-based learning (Bosakova-Ardenska & Andreev, 2024), due to ease of access and gamification have also shown promising results like vocabulary retention (Rifai et al., 2023; Torres et al., 2022) and engagement (Zakaria, 2024). Natural Language Processing (NLP) and Large Language Model (LLM) based and crossword generation systems (Zeinalipour et al., 2024) are considered as scalable tools for automated (Zugarini et al., 2024) and adaptive learning of languages and professional education (Kaynak et al., 2023; Marpaung, 2023) as these systems align the crossword complexity to learner proficiency.

2.3 Digital tools and platforms for Sanskrit eLearning

Leading academic institutions, non-profit organizations, entrepreneurs and individuals have come forward to disseminating the knowledge of Sanskrit through digital tools (Pons & Leach, 2015), repositories and platforms (Patel, 2018) with components such as e-dictionaries, grammar tools (Chandra et al., 2017), transliteration systems, guided coursework, podcasts, songs, storytelling and videos. Institutions like IIT Kanpur has projects like Āyurjñānam that consists of knowledge graph created through manual annotation of Bhāvaprakāśa Nighaṇṭu. They also have Śabdabandhālēkhaḥ to visualize dependency graph of a sentence. Their Gita Supersite is popular for original text, transliteration, translation, audio and commentaries of Bhagavad Gītā, Upanishads, and Brahma Sūtras etc.

The NPTEL platform, led by IITs and IISc, offers structured courses such as Introduction to Basic Spoken Sanskrit and Sanskrit for Beginners. The Central Institute of Indian Languages (CIIL) hosts huge information about speech, history, literature and many other dimensions about Sanskrit. Central Sanskrit University has contributed significantly by digitizing

glossaries, textbooks, short films, books, manuscripts, journals and instructional content in Sanskrit. Community-driven platforms like sanskritdocuments.org and spokensanskrit.de offer searchable archives, bilingual dictionaries, and Sanskrit-to-Sanskrit learning resources. With digital flashcards, memory apps, and blended learning systems in classrooms, Sanskrit eLearning goes beyond archiving into active pedagogical redesign including scenarios where Sanskrit is a foreign language (Librenjak et al., 2016).

2.4 Gamification in learning languages and professional education

Gamification applies elements of a game in contexts which are not considered game related (Deterding et al., 2011). With language learning apps like Duolingo, gamification (Bafoeva, 2023) has emerged as a highly effective strategy in Digital Game-Based Vocabulary Learning (DGBVL) environments (Kazu & Kuvvetli, 2023; Vnucko & Klimova, 2023; Zugarini et al., 2024) resulting in vocabulary acquisition, learner engagement, motivation and encouraging communication (Chowdhury et al., 2024; Zakaria, 2024). Due to the surprise element and uncertainty in the sensory clues, the interactive gamified learning (Hsu et al., 2023; Huber et al., 2024) is known to improve short-term acquisition of vocabulary (Zakaria, 2024) and increased motivation of learners (Pearson, 2020), positive environment for learning (Vnucko & Klimova, 2023) development of cognition (Klimova & Pikhart, 2023; Pillai et al., 2011), attention and working memory. Together these indicate that gamified tools can enhance broader executive functioning alongside learning language and knowledge retention. Learners building their own games based on nonfiction (Arnold et al., 2024; Chowdhury et al., 2024) highlight the importance of generativity, agency, tinkering, and intrinsic motivation in learning.

2.5 Gaps in Existing Research

When it comes to classical Sanskrit pedagogy, new Sanskrit learners may not find it comfortable to read the subjects in Sanskrit on their own without assistance. Digitization helps bring the texts closer to the readers and such efforts are commendable. However, they still do not address the engagement of novice learners in learning Sanskrit vocabulary and conversation through micro interventions like crosswords.

We analyzed some online tools which offer creation of crosswords in Sanskrit. Websites like crosswordspin.com, puzzlemaker.discoveryeducation.com, crosswordlabs.com though not exclusively, could be used with Devanagari script with little to moderate interaction ability. A website for Sanskrit, samskrutam.com displays a static version, whereas PuzzleMe™ from

Amuse Labs enables interactive creation of crosswords which can be embedded in your website. An interactive way of playing Sanskrit crosswords in an easy-to-use digital platform was missing.

While most of the online and digital tools for learning Sanskrit emphasize textual fidelity, multimodal learning and grammatical rigor, the potential to integrate playful, learner-driven activities such as crosswords, quizzes, and digital storytelling into Sanskrit learning platforms remains largely untapped or underrepresented. As digitization of Sanskrit texts and Sanskrit learning is still evolving, there are limited avenues to gamified learning on digital platforms.

3. The Present Study

This study addresses these gaps by exploring Padarañjinī , that leverages digital crosswords and supports Sanskrit learning in a community-based model, combining traditional language goals with modern gamified strategies.

3.1 Overview of Padarañjinī

Samskrita Bharati is a non-profit organization committed to reviving Sanskrit as a spoken language and integrating it into daily life. It focuses on engaging learners through vocabulary acquisition and conversation competence in a learner centric way. Largely run by its volunteers, it leads various initiatives including classes, teacher training programs, publications, and language camps across India and the world. One of its flagship projects is Sambhāṣaṇa Sandēśaḥ, a monthly Sanskrit magazine that has been in publication since 1994. Over the years, the magazine has reached significant milestones, amassing more than 120,000 subscribers across over 20 countries. Sambhāṣaṇa Sandēśaḥ features diverse content such as stories, poems, news, essays, grammar tips, interviews, and engaging activities like puzzles and crosswords in Sanskrit.

Padarañjinī is the name of the Sanskrit crossword feature in Sambhāṣaṇa Sandēśaḥ. Since its inaugural edition, more than 360 crosswords have been published to date. In 2022, a group of Samskrita Bharati volunteers from the USA and Canada came together to digitize these crosswords for broader accessibility. One team undertook the rigorous effort of digitizing the published crosswords, while another team evaluated technology platforms for hosting them. After considering options like Crossword Hobbyist, PuzzleFast, Educaplay, Puzzel.org, and AmuseLabs, they partnered with AmuseLabs, selecting their PuzzleMe™ platform. After a digitization effort spanning over 18 months, the team launched a live weekly online “Prahelikā” class, where learners collaboratively solve the crosswords. So far, around 50

sessions have been conducted, adding fun, interaction, and community spirit to Sanskrit learning.

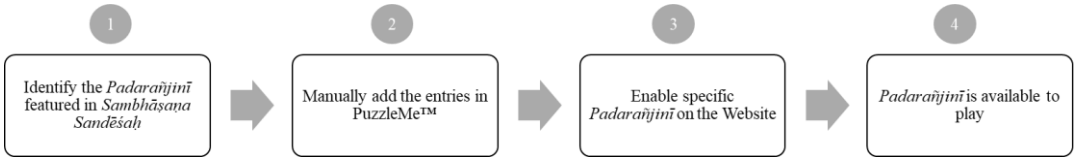

Figure 1: Initial process of digitization of Padarañjinī using PuzzleMe™

3.2 Playing Padarañjinī in Prahelikā class

Padarañjinī digital crossword interface hosted on https://zat.am/pr/ presents a Devanagari crossword grid, with active clues organized into "Across" and "Down" columns on the right. Learners interact with the puzzle by typing answers using a Devanagari keyboard or selecting reveal/check options from the assist menu. Additional features include a timer, multiplayer mode, and hint functions that support collaborative and self-paced learning. This interface combines Sanskrit sentences and conversation in the form of clues and vocabulary development through its responses, with modern gamified individual and group engagement, making language learning both engaging and contextually oriented.

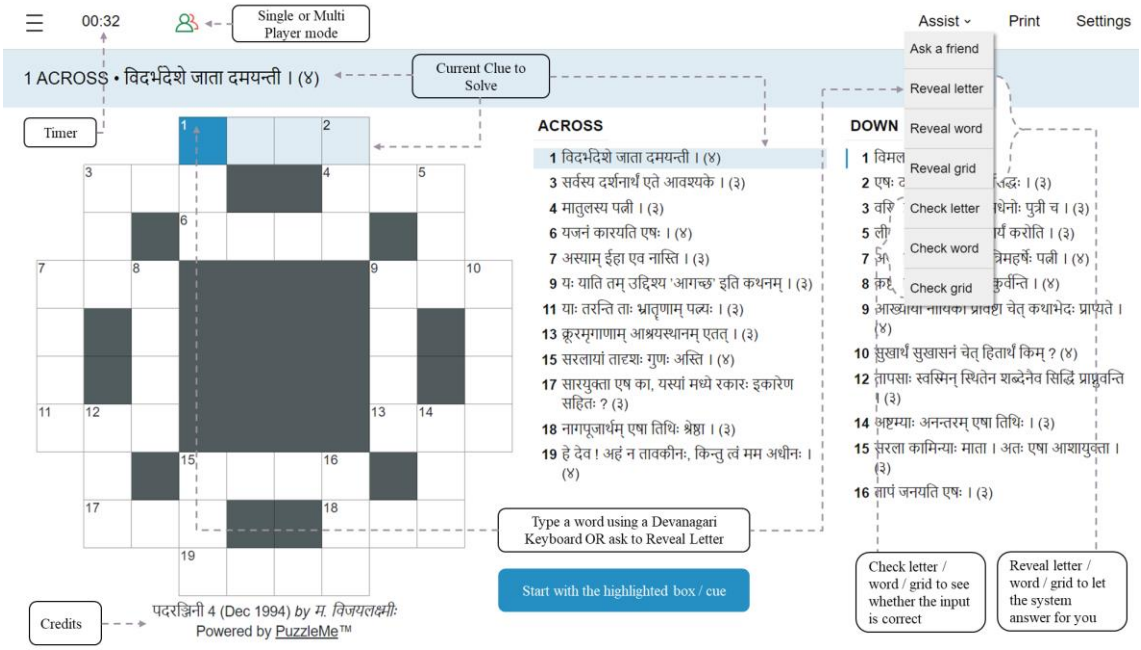

Figure 2: Annotated screenshot of the player interface and clue layout with menu and options.

Every Thursday evening, participants gather via a web-based video conferencing platform to collaboratively play Padarañjinī, hosted at https://zat.am/pr/. A shared screen allows all

members to view the crossword interface simultaneously, with live interaction facilitated through video and audio.

A rotating leadership system is followed, with a pre-assigned roster indicating the group leader for each session. The leader navigates the interface and facilitates turn-taking, clue reading, and discussion. One clue is taken up at a time, and multiple participants engage by proposing letters they believe should come next.

This process is highly interactive, involving real-time dialogue, differing interpretations, and consensus-building. Participants collectively decide on a letter to try, and the cycle continues letter by letter until the complete word is formed. In cases where the group is uncertain or out of guesses, the platform's 'Reveal Letter' feature is used as a support mechanism. This dynamic structure creates a collaborative, game-like environment that encourages participation, reasoning, and vocabulary recall.

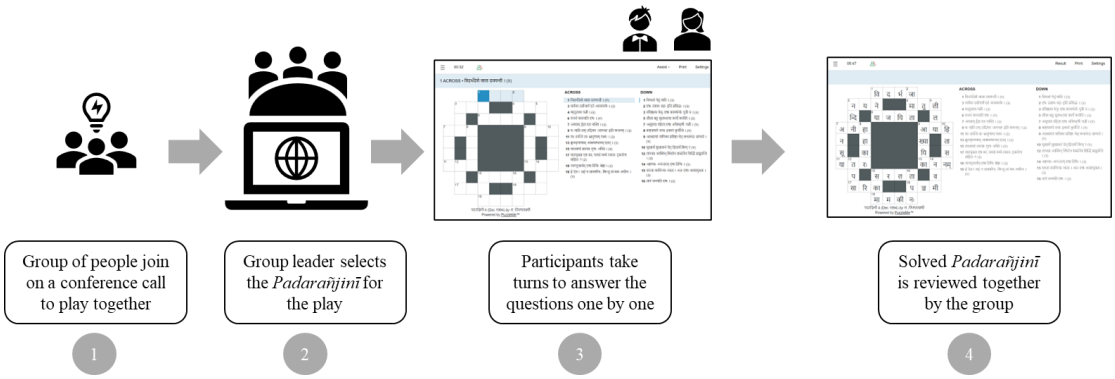

Figure 3: How participants engage in solving the crossword.

3.3 Objectives of the Study

In line with the research questions, the following objectives were formulated to explore the pedagogical potential of Padarañjinī

1. Explore how Padarañjinī affects vocabulary recall and retention among learners.
2. Assess whether Padarañjinī supports active engagement with Sanskrit communication, including reading, understanding, and constructing language.
3. Document learner perceptions regarding Padarañjinī 's usability, motivation, and engagement.
4. Identify the challenges learners encounter while using Padarañjinī

These four research objectives will be referred to in abbreviated form as Retention, Communication, Engagement, and Challenges - corresponding respectively to Objectives 1 through 4 - in the analysis and subsequent sections.

3.4 Methodology

This study is based on a qualitative case study design, focusing on observations and feedback collected from Sanskrit learners playing Padarañjinī as a group. The participants included 48 learners from varying proficiency levels. The data is based on observations from 50 sessions between January 2023 to December 2024.

The following three methods were used for data collection. Session-level observations: Each of the 50 crossword-solving sessions was observed in detail, with a focus on learner behavior, engagement patterns and error tendencies during clue interpretation and group discussions. Learner feedback: Both structured (objective) and open-ended (subjective) feedback were gathered once at the end of 50^{th} session capturing learners' experiences, motivational shifts, perceived educational impact, and challenges encountered while using Padarañjinī. Informal group interactions: Spontaneous verbal exchanges such as real-time questioning, peer prompting, and collaborative discussion were noted during and after sessions to understand the grasp of vocabulary and conversation.

The twelve classical Sanskrit pedagogical principles were mapped with the first three objectives viz. Retention, Communication and Engagement using Objective – Pedagogical Principle Matrix. This matrix was developed through iterative analysis of session notes, observed behaviors, and qualitative response in feedback, and then cross-validated with theoretical definitions of each pedagogical principle. A numeric scale ranging from 0 to 3 was used to represent the strength of alignment between each pedagogical principle and the corresponding research objective, where 3 indicated strong alignment (direct support observed or embedded), 2 denoted moderate alignment, 1 reflected weak or indirect alignment, and 0 represented no applicable alignment. Numeric survey responses from 48 learners were summarized as means and standard deviations for objective 3.

4. DISCUSSION

This section presents the key findings of the study, organized according to the research objectives and interpreted through the lens of classical Sanskrit pedagogical principles, learner engagement data, and participant feedback.

4.1 Objective - Pedagogical Principle Matrix

This study examined how twelve classical Sanskrit pedagogical principles align with the first three research objectives of the Padarañjinī case study. Principles such as śravaṇa (listening), manana (reflection), nididhyāsa (contemplation), pāṭha (structured repetition), smṛti (memorization), vr̥tti-anuvṛtti (reinforcement with elaboration), praśna–uttara (question–answer), padavākya-praśna (word-to-sentence construction), samvāda (dialogic interaction), and kāvya-rasa-anubhava (aesthetic/emotional engagement) align directly with the core objectives of this study. Other principles, such as nīti-kathā (moral storytelling) and udāharaṇa-prayoga (example-based learning), show partial relevance depending on how stories or contextual examples (Chowdhury et al., 2024) are embedded within crossword clues. Principles like anvaya-vyatireka (analytical reasoning), vākya-vicāra (contextual syntactic analysis), and sūtra–bhāṣya (aphorism-commentary learning) are indirectly applicable if clues relate to references from texts using these principles.

Table 1: Objective - Pedagogical Principle Matrix.

Objective **Pedagogical Principle**	**1** **Retention**	**2** **Communication**	**3** **Engagement**
śravaṇa, manana, nididhyāsa	3	3	1
pāṭha, smṛti	3	1	1
sūtra–bhāṣya	1	1	-
praśna–uttara	-	3	3
udāharaṇa-prayoga	-	1	2
anvaya-vyatireka	-	-	1
vakya-vicāra	-	2	-
pada-vākya-praśna	1	3	1
kāvya-rasa-anubhava	-	-	3
samvāda	1	3	3
vr̥tti-anuvṛtti	3	1	-
nīti-kathā	-	1	2

During the sessions, multiple participants in repeated the clues before solving it. After solving, they used to evaluate the correct or incorrect answer with their knowledge of the topic. Controlled exposure helped them in remembering the words and clues for conversation and use in subsequent sessions. Vocabulary retention and recall (Objective 1) is most strongly supported by śravaṇa, manana, nididhyāsa, pāṭha, smṛti, and vr̥tti-anuvṛtti, which reflect the Padarañjinī 's focus on reinforcement, repetition, and contemplation.

Participants appreciated the interaction which resulted inadvertently during the process of applying a clue and revealing each word. This interaction was in the form of questions being

asked to each other during the sessions. Participants who are weak in communication in the beginning gradually started conversing confidently. The expression of surprise, resentment or question which arose during application of clues fostered communication and conversation. Communication (Objective 2) is well represented through praśna–uttara, pada-vākya-praśna, and samvāda, indicating that Padarañjinī facilitates structured response and dialogic conversation in language usage.

The conclusion of a crossword in every session was a celebration. Depending on the competence and experience of the participants with Sanskrit conversation during the session, and familiarity with using the online platform, the feedback ranged from their ability to interpret clues, converse, contradict or accept any other participants views. Engagement (Objective 3) aligns most with praśna–uttara, kāvya-rasa-anubhava, and samvāda, suggesting learners respond positively to clue-based challenge, emotional immersion, and collaborative solving. This finding echoes that gamification (Shortt et al., 2023) through uncertainty and peer interaction (Al-Hoorie & Albijadi, 2024) (Tang, 2023) enhances the willingness of learners to communicate, even in diverse and linguistically challenging environments.

4.2 Learner Engagement

For quantitative analysis, all structured survey questions, each measured on the scale of 1 to 5, were mapped to Objective 3: Engagement, as they measured various facets of user motivation, satisfaction, interaction quality, and perceived value - all key indicators of learner engagement.

Table 2: Metrics from objective feedback.

Metric	Mean	SD
Overall experience using Padarañjinī	4.64	0.67
Ease of navigation	4.09	0.83
Technical performance	4.36	0.67
Engagement and enjoyment with crosswords	4.27	0.65
Appropriateness of difficulty level	3.45	0.69

Above metrics indicate that Padarañjinī was perceived as an engaging and enjoyable learning tool by the learners (M = 4.64, SD = 0.67), reflecting high levels of learner satisfaction and a consistently positive reception. Similarly, the engagement and enjoyment of the crossword puzzles were rated highly (M = 4.27, SD = 0.65), reinforcing that the learners found the platform both stimulating and motivating. The ease of navigation received a moderately high score (M = 4.09, SD = 0.83), suggesting that while most users found the interface accessible,

a few may have encountered usability issues. Technical performance was rated positively (M = 4.36, SD = 0.67), indicating overall system reliability during usage.

The difficulty level of the puzzles received a more moderate rating (M = 3.45, SD = 0.69), pointing to variability in learners' perceptions - some found the tasks appropriately challenging, while others may have struggled or found them too simple. This stands as an area of improvement in construction of crosswords, mode of interaction during the sessions and taking a tiered approach to select crosswords based on difficulty levels. Learners' willingness to recommend Padarañjinī to others remained high (M = 4.50, SD = 0.64), supporting the overall positive learner experience. Overall, these findings echo that game-based learning in early language education (Tang, 2023) (Al-Hoorie & Albijadi, 2024) improves intrinsic motivation (Pearson, 2020) and vocabulary retention (Rifai et al., 2023) among learners and even surpasses conventional teaching methods (Vnucko & Klimova, 2023).

4.3 Challenges

Four key themes emerged from the responses to the open-ended questions. These challenges highlight opportunities for refinement in both platform design and instructional design, particularly to support learners with varying digital literacy and linguistic proficiency levels (Chowdhury et al., 2024). Similar usability concerns have been reported in other game-based learning platforms (Klimova & Pikhart, 2023), digital language learning such as cognitive load**,** usability, and tool interface barriers.

Table 3: Themes emerging from subjective feedback.

Theme	Top Keywords	Indicative Challenge
Clues	words, possible, simple, clues, little, available	Desire for clearer or simpler clues; vocabulary difficulty
Script	Devanagari, typing, observed, challenging, little, improve	Difficulty typing in Devanagari; interface limitations
Session Flow	mentioned, encounter, problem, tool, sessions	Mixed responses: participants often encountered problems with tool or session flow
Words	ambiguity, selections, tool, sessions, participants, input	Clarity issues with clue phrasing or selection interface

Technical challenges with Devanagari input might be reduced by incorporating audio or visual alternatives, aligning with śravaṇa and nididhyāsa. Ambiguities in clue phrasing suggest a need for clarity drawn from sūtra–bhāṣya and vakya-vicāra, which emphasize interpretive and contextual analysis.

5. CONCLUSION

This study demonstrates that Padarañjinī, through its gamified digital crossword format, effectively integrates classical Sanskrit pedagogical principles into a modern, digital learning environment. Learners showed improved vocabulary retention, increased engagement, and growing confidence in communication. The collaborative nature of the sessions fostered active participation and peer-supported learning. While challenges such as Devanagari input and clue complexity emerged, the overall learner experience was positive. These findings affirm the potential of culturally rooted, play-based platforms in revitalizing Sanskrit education and bridging traditional learning with contemporary digital pedagogy.

Future research can explore longitudinal impacts of crossword-based learning on language fluency, retention over time, and grammatical competence. Comparative study using shorter version of gamified puzzles with crosswords, impact of learning crosswords for various age groups, impact of Padarañjinī for children with speaking disorders are a few other avenues to explore. Educators could measure the recall and cognitive load by embedding crosswords in the learning journey for languages and other subjects for any age group. Platform designers are encouraged to prioritize intuitive interfaces, Devanagari input support, and complexity levels that accommodate learners of varied proficiency. Developers of Sanskrit eLearning tools may want to explore how their platforms align with time-tested pedagogical methods, thereby promoting the practice of learning Sanskrit through Sanskrit itself.

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