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HINDI MEDIATION IN DIGITAL ENGLISH LEARNING: EVIDENCE FROM RURAL LEARNERS IN AMBEDKAR NAGAR, UTTAR PRADESH

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ABSTRACT

This paper examines the role of Hindi L1 mediation in digital English language learning platforms used by rural learners in Ambedkar Nagar, Uttar Pradesh. Drawing on qualitative content analysis of three platforms — LearnVern, Duolingo, and Cake — and on a descriptive survey administered to forty-eight Hindi-speaking respondents from this rural community, the study investigates how first-language support is incorporated into digital instruction and what difference it makes to learners in a low-English-exposure context. The near-unanimous finding that 97.9 percent of respondents agreed that Hindi explanation makes English learning easier provides strong learner-level confirmation of Cummins' Interdependence Hypothesis (1979). The paper argues that L1 mediation in digital platforms is not a pedagogical shortcut but an essential scaffold, and that platforms vary significantly in how they provide it, at what intensity, and for whom. Implications for platform design, pedagogy, and digital language education policy in rural India are discussed.

Keywords: Hindi mediation, L1 support, digital English learning, MALL, rural India, Ambedkar Nagar, Cummins, mobile-assisted language learning

1. INTRODUCTION

Anyone who has tried to learn a language without a teacher knows that the hardest part is not finding content — it is understanding it. This is especially true for learners in rural India, where English is the target language, Hindi is the first and dominant language, and the gap between the two is wide. The structural differences between Hindi and English are not trivial: the word order is different, the sound system contains contrasts that Hindi does not mark, and grammatical categories like articles and prepositions that English treats as fundamental are either absent or function very differently in Hindi. A learner sitting with a smartphone in a village in Ambedkar Nagar, Uttar Pradesh, navigating an English learning app that assumes they already know what a verb tense sounds like is in a genuinely difficult position — unless the platform offers some explanation in a language they already understand.

This paper is about that explanation — specifically, about Hindi L1 mediation in digital English learning platforms and what it means for rural learners. The question of whether to use the learner's first language in second language instruction has generated considerable scholarly debate, but in the context of mobile and web-based platforms in rural India, this debate has rarely been examined with close attention to the actual learner community. Most research on digital language learning has been conducted in urban, institutional, or Western settings. The rural Hindi-speaking learner — learning without a teacher, on a smartphone, often with intermittent internet — has received far less research attention than the sheer scale of their numbers justifies.

This paper draws on a larger doctoral study that examined three digital English learning platforms — LearnVern (a web portal), Duolingo and Cake (mobile applications) — through

a linguistic and pedagogical lens. The study was grounded in the specific context of rural Ambedkar Nagar, and included a descriptive survey of forty-eight respondents from that community. The present paper focuses on one central thread from that larger work: the role of Hindi mediation across all three platforms, its different forms and intensities, and what the survey evidence reveals about how much it matters to the learners themselves.

2. THEORETICAL FRAMEWORK

The theoretical starting point for this paper is Jim Cummins' Interdependence Hypothesis, first advanced in 1979. Cummins proposed that a learner's first language and second language are not separate, competing systems — they are fundamentally interdependent. Concepts, literacy skills, and cognitive strategies developed in L1 transfer across to L2 and provide the scaffolding on which L2 knowledge is built. Crucially, Cummins argued that this transfer works most effectively when L1 is actively used as a support in the L2 learning process, particularly for learners at lower proficiency levels. This is not a concession to difficulty — it is a recognition of how language acquisition actually works.

The implications for pedagogy have been extensively documented: teachers who draw on students' first language to explain L2 structures, provide bilingual glossaries, or allow L1 use in task planning consistently report more confident and more rapidly developing learners than those working in English-only immersion environments without sufficient prior exposure. What has received comparatively less attention is how the same principle plays out in digital learning environments — where there is no teacher to make real-time decisions about when and how to use L1, and where the platform's design choices carry the entire instructional burden.

Stephen Krashen's Input Hypothesis (1985) is also relevant here, though in a more complicated way. Krashen's claim that acquisition occurs through exposure to comprehensible input — material slightly beyond the learner's current level — has been widely influential, but it says relatively little about what makes input comprehensible in the first place. For a Hindi-speaking rural learner encountering English grammar for the first time, English-only instruction may fall below the comprehensibility threshold entirely. This is where Cummins' framework extends Krashen's: L1 support is one of the primary mechanisms through which input becomes comprehensible in low-English-exposure contexts. The present paper treats these two frameworks as complementary rather than competing.

Vygotsky's Zone of Proximal Development (1978) provides a third theoretical anchor. The ZPD describes the space between what a learner can do independently and what they can do with appropriate support. In a digital learning context, L1 mediation functions as one form of that support — it reduces the cognitive distance between what the learner already knows and what they are being asked to learn, making the gap navigable rather than prohibitive. A platform that withholds L1 support in the name of immersion is, in ZPD terms, potentially operating outside the rural beginner's developmental reach.

3. RESEARCH CONTEXT AND METHODOLOGY

The data reported in this paper come from a doctoral study conducted in rural Ambedkar Nagar district, Uttar Pradesh. Ambedkar Nagar is a predominantly rural district in eastern Uttar Pradesh, and the community studied — Hindi-speaking learners using digital platforms for English learning — represents a demographic that is growing rapidly but has received very limited scholarly attention in the applied linguistics literature.

The study combined two methodological approaches. The primary method was qualitative content analysis: a close, documented examination of all three platforms — LearnVern,

Duolingo, and Cake — conducted over approximately three years of sustained personal engagement by the researcher. This extended period of engagement allowed for systematic observation of each platform's approach to Hindi mediation — where it appears, how it is deployed, when it is withheld, and what its presence or absence means for a learner at the beginner level.

The secondary method was a descriptive survey administered in person to forty-eight respondents from rural Ambedkar Nagar. The instrument consisted of nine structured questions, prepared bilingually in Hindi and English to ensure that language proficiency did not create a barrier to participation. Respondents were Hindi-speaking learners who reported using at least one digital platform for English learning. Questions addressed platform usage patterns, perceived effectiveness, the value of Hindi explanation, skill improvement, pronunciation development, connectivity challenges, and access preferences.

A clarification on scope: this paper does not claim to establish statistically generalisable findings. Forty-eight respondents from one rural district cannot represent all Hindi-speaking digital learners in India. What the survey provides is contextually grounded, learner-level evidence from a community that rarely appears in the applied linguistics literature — and that evidence, as the following sections show, is both consistent and instructive.

4. HINDI MEDIATION ACROSS THE THREE PLATFORMS

4.1 LearnVern — Hindi as the Medium of Everything

LearnVern's Spoken English course takes the most thoroughgoing approach to Hindi mediation of the three platforms examined. Hindi is not a support tool on LearnVern — it is the medium of instruction itself. Every video lecture is delivered entirely in Hindi. The instructor introduces concepts in Hindi, explains them in Hindi, provides examples through Hindi, and only then shows the English equivalent. Grammar terminology is first explained as its Hindi equivalent — संज्ञा, कर्ता, काल — before the English term 'noun', 'subject', 'tense' is introduced. The approach is consistently deductive: the rule is stated in Hindi, made clear in Hindi, and then the learner is shown how it applies in English.

This is a deliberate and pedagogically considered choice. For a learner who has little or no prior English exposure, being asked to understand grammatical instruction in the very language they are trying to learn is a near-impossible task. LearnVern removes that obstacle entirely. The learner arrives at English through a door they already know how to open — their own language.

The phonetics module — covering vowels, diphthongs, consonants, silent letters, and sentence stress — maintains the same approach throughout. Phonological contrasts are explained by comparing Hindi and English sounds, noting explicitly which sounds exist in Hindi and which do not. The contrast between /v/ and /w/ — sounds that do not operate as distinct phonemes in Hindi — is addressed directly. The contrast between aspirated and unaspirated consonants is explained with reference to how these same sounds function in Hindi. This kind of contrastive phonological instruction, conducted through the learner's own language, reflects what Lado's contrastive analysis (1957) suggests is most useful for learners navigating phonological differences between L1 and L2.

The limitation this approach creates is a flip side of its strength: because everything is explained in Hindi, there is very little space in which the learner practices producing or receiving English independently. The platform is deeply receptive — learners watch, listen, and absorb — and the opportunities to produce language on their own are limited to end-of-

module quizzes. This matters because, as Long (1996) argued, acquisition requires not just comprehensible input but the opportunity to produce output and receive feedback on it.

4.2 Duolingo — Hindi as Structural Scaffold

Duolingo's relationship with Hindi is more selective and strategic than LearnVern's. The entire interface is in Hindi — menus, unit labels, achievement notifications, and instructional prompts all appear in the learner's first language. Each unit opens with a set of target words listed alongside their Hindi meanings, so learners always know what they are working with before any exercise begins. Individual exercises frequently present English sentences alongside their Hindi translations, and an on-demand translation feature allows learners to tap any Hindi word in an exercise prompt and receive its English equivalent instantly.

But Duolingo does not teach in Hindi the way LearnVern does. Grammar is not explained through Hindi-medium instruction — it is encountered through pattern and repetition. A learner figures out from repeated exposure that 'is' comes after 'he' or 'she' not from a Hindi explanation of subject-verb agreement, but from doing enough exercises that the pattern becomes familiar. This inductive approach suits the learner who already has some English foundations and is ready to develop them through practice. For the absolute beginner with very limited English exposure, there is a gap: the structure is there, the Hindi labels are there, but the explanatory bridge between them is not always provided.

The hearts system adds a further complication. In the free version, incorrect answers consume a limited daily supply of hearts, penalising the learner for errors. A learner who is still figuring out a structural pattern through trial and error — as inductive learning requires — is simultaneously burning through hearts with each mistake. The consequence is that the learner who most needs the freedom to guess and be wrong is the one most constrained by the penalty mechanism. This is a design choice that is difficult to defend on pedagogical grounds in the context of beginner rural learners.

4.3 Cake — Hindi as Subtitle Support

Of the three platforms, Cake uses Hindi most sparingly. The instructional environment is primarily English-medium: native speakers communicating in authentic video content, exercises conducted in English, and the AI Tutor operating in English. Hindi appears chiefly as subtitle support — displayed below video content alongside English subtitles — and as word-level translation in vocabulary exercises. It is available when needed, but it is not central to the pedagogical architecture.

This reflects Cake's orientation toward authentic communicative exposure rather than structured instructional scaffolding. The platform assumes that learners already have enough English to engage with native speaker content — to understand at least some of what they are hearing, and to use the Hindi subtitle as a fallback rather than a foundation. For a learner who has come through LearnVern and Duolingo and built basic competence, this assumption may be reasonable. For a rural beginner with very limited prior English, it is probably too demanding.

A specific and recurring issue in Cake is the handling of idiomatic language. The platform presents expressions — 'don't be salty', 'hang in there', 'I sleep like a log' — with immediate Hindi subtitles that are often literal machine translations. 'Don't be salty' appears as 'नमकीन मत बनो' (do not be salty, literally). 'Hang in there' appears as 'लटके रहो' (keep hanging, physically). 'I sleep like a log' is rendered as 'मैं लकड़ी की तरह सोता हूं' — meaningless in Hindi. The corrective explanation comes in a subsequent screen and is accurate — but the

first encounter with the idiom, which is the most cognitively significant moment, gives the learner a nonsensical equivalent. This illustrates the difference between providing Hindi support and providing accurate, pedagogically appropriate Hindi support.

5. SURVEY FINDINGS

The forty-eight respondents were asked nine questions about their experience with digital English learning platforms. The findings most directly relevant to Hindi mediation are presented and discussed here.

Table 1: Primary Platform Used (Q.1)

Platform	Respondents	Percentage
Duolingo	35	72.9%
Cake	8	16.7%
LearnVern	5	10.4%

Duolingo is by far the most used platform among respondents, which reflects both its global reach and the effectiveness of its Hindi-medium interface in making the platform accessible to rural learners. The dominance of Duolingo over LearnVern among this community, despite LearnVern's fuller Hindi-medium design, likely reflects Duolingo's stronger mobile presence — most respondents access content through smartphones.

Table 2: 'The Platform Helps Me Understand English Better' (Q.4)

Response	Respondents	Percentage
Strongly Agree	4	8.3%
Agree	41	85.4%
Neutral	2	4.2%
Disagree	1	2.1%

93.7 percent of respondents agreed or strongly agreed that digital platforms help them understand English better — a broadly positive finding that confirms the platforms are being experienced as useful by this community. But this finding says nothing about how they are useful, which is where the next table becomes significant.

Table 3: 'Hindi Explanation Makes Learning Easier' (Q.5) — Key Finding

Response	Respondents	Percentage
Strongly Agree	5	10.4%
Agree	42	87.5%

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Response	Respondents	Percentage
Neutral	0	0%
Disagree	1	2.1%

This is the central finding of the paper. Forty-seven out of forty-eight respondents — 97.9 percent — agreed that Hindi explanation makes English learning easier. Not a single respondent was neutral. Only one disagreed. In a survey of forty-eight people, this level of agreement on any question is unusual; on a question about instructional design, it is remarkable. These learners are not expressing a preference — they are reporting something closer to a necessity. Hindi explanation is not what they would like. It is what makes the difference between understanding and not understanding.

Table 4: Skill That Improved the Most (Q.6)

Skill	Respondents	Percentage
Speaking	18	37.5%
Vocabulary	15	31.3%
Grammar	11	22.9%
Listening	3	6.3%
Confidence	1	2.1%

Speaking is reported as the skill that improved most (37.5%). This is a somewhat paradoxical result given that none of the three platforms' free versions provides robust speaking practice. The perceived improvement most likely reflects growing confidence and communicative readiness rather than verified oral production gains. What it confirms is that speaking is the primary aspiration of this learner community — they are using these platforms because they want to speak English, and any platform design that ignores this goal is missing the point.

Table 5: Preference for Free or Paid Platforms (Q.9)

Preference	Respondents	Percentage
Free access	39	81.3%
Paid subscription	9	18.8%

81.3 percent of respondents prefer free access. In this economic context, this is less a preference than a reality — disposable income for app subscriptions is limited or absent for most rural families. This finding has direct implications for Cake, whose most pedagogically valuable features sit behind a paywall. A platform that locks its Hindi-inclusive, speaking-

focused, and interactively rich features behind a subscription is, for 81.3 percent of this community, not genuinely accessible.

The open-ended responses in Question 10 added a qualitative dimension. Recurring themes were: more Hindi explanation, more speaking practice, and better offline access. One respondent specifically asked for 'grammar explanation alongside each sentence' — a request that LearnVern's design addresses but Duolingo's largely does not. Another asked for 'AI conversation tools to reduce the fear of speaking' — pointing directly to the speaking deficit that all three platforms share. These are not abstract pedagogical requests; they are descriptions of a learning experience that is partially working and clearly missing something.

6. DISCUSSION

The 97.9 percent agreement that Hindi explanation makes learning easier is not just a data point — it is a window into the cognitive experience of learning a language under conditions that the applied linguistics literature has not examined closely enough. These are learners with no English-speaking teacher, no English-medium home environment, no opportunity to practise with native speakers, and limited access to English print media. They are using a smartphone, a few hours a week, to build competence in a language that operates in a completely different phonological, syntactic, and lexical register from their own. In that context, a Hindi explanation is not a crutch. It is a bridge.

This finding provides strong empirical support for Cummins' Interdependence Hypothesis. The theory predicts that L1 support reduces cognitive load and facilitates rather than impedes L2 acquisition. The survey data reproduces the same conclusion from the ground up: forty-seven learners, independently and in person, said the same thing — when English is explained to me in Hindi, I understand it better. That is Cummins' hypothesis confirmed by the people whose learning it describes.

The data also complicates simple advocacy of immersive English-only instruction for this demographic. Krashen's Input Hypothesis suggests that comprehensible input drives acquisition — but comprehensibility is relational, not fixed. Input is comprehensible when the learner can make enough sense of it to extract meaning. For rural Hindi-speaking beginners, English-only instruction frequently falls below the comprehensibility threshold altogether. L1 mediation is one of the primary mechanisms that raises it. LearnVern, which provides the most thorough Hindi mediation of the three platforms, is also the platform that most closely matches the needs of the absolute beginner in this community — not because it is without faults, but because it meets the learner where they actually are.

That said, the three platforms together illustrate something important that goes beyond a binary choice between 'use L1' and 'avoid L1'. Hindi mediation exists on a spectrum of intensity and function. LearnVern uses it as the medium — the whole instructional architecture is built on it. Duolingo uses it as scaffold — present throughout the interface but secondary to the English content being taught. Cake uses it as subtitle — available as a fallback but not foregrounded. None of these approaches is inherently wrong. They correspond to different proficiency levels and different pedagogical orientations, and the most appropriate level of L1 mediation should not be fixed — it should decrease as the learner's proficiency grows.

This is what Vygotsky's ZPD framework suggests: scaffolding should be calibrated to the learner's current level and withdrawn progressively as competence develops. The problem is that none of the three platforms does this dynamically. LearnVern provides maximum L1 mediation regardless of where in the course the learner is. Duolingo provides the same level

of Hindi interface support at unit one as at unit twenty. Cake provides the same sparse Hindi subtitle support whether the learner is a beginner or an intermediate. A platform that adapts its L1 support in response to demonstrated proficiency — providing more in the early stages, less as the learner develops independence — would align with the ZPD principle and represent a genuine advance over current designs. This remains an open design challenge.

The idiomatic translation problem in Cake raises a more specific concern. When L1 translation is generated by a machine without adequate contextual processing, it can actively mislead rather than support — producing Hindi equivalents that are grammatically literal but semantically nonsensical. This is not an argument against Hindi translation in digital platforms; it is an argument for linguist-reviewed, contextually accurate Hindi translation. The difference between LearnVern's instructor-produced Hindi explanations and Cake's machine-generated Hindi subtitles reflects two very different understandings of what L1 mediation is actually for.

7. IMPLICATIONS

For Platform Developers

The most direct implication is that Hindi mediation should be treated as a core design feature for any platform targeting rural Hindi-speaking learners — not an optional add-on or a localisation courtesy, but a structural component of instructional design. The finding that 97.9 percent of rural learners in Ambedkar Nagar value Hindi explanation should give developers serious pause before reducing, limiting, or paywalling L1 support features.

Developers should also invest in linguist-reviewed Hindi translations, particularly for idiomatic and non-literal language. The Cake examples demonstrate how quickly a machine-generated Hindi equivalent becomes a source of confusion rather than clarity. Additionally, there is a real design opportunity in building adaptive L1 support — a feature that progressively reduces the frequency and depth of Hindi explanation as proficiency develops, pushing the learner toward greater English independence. This would align platform design with Vygotsky's scaffolding principle and turn L1 mediation from a static feature into a dynamic pedagogical tool.

For Educators and Facilitators in Rural Contexts

For teachers and digital literacy facilitators working with rural communities, the findings suggest that platform guidance should take L1 mediation into account when recommending tools at different stages. LearnVern's thorough Hindi-medium instruction makes it the most appropriate starting point for the absolute beginner. Duolingo's Hindi-scaffold model suits the learner who has a basic foundation and needs to develop it through practice. Cake's lighter support model is appropriate for the lower-intermediate learner ready for authentic communicative exposure. These are not interchangeable alternatives — they represent stages, and matching the learner to the right stage matters.

For Policy Makers

At a policy level, this paper adds to the case for treating Hindi-medium or Hindi-scaffolded instruction as a minimum standard for digital English learning platforms endorsed or subsidised for rural Hindi-speaking communities. The Skill India initiative's partnership with LearnVern offers a useful precedent. The challenge is to apply the same access and language-support principles more broadly across the expanding digital learning landscape.

8. CONCLUSION

The learners who participated in this survey did not come to it with a theory about L1 mediation. They came with their smartphones, their aspirations, and their direct experience of what helps and what does not. Forty-seven of forty-eight of them said the same thing: when English is explained to me in Hindi, I understand it better. That is not a surprising finding in any theoretical sense — it makes complete sense, and any teacher who has worked with beginners in a bilingual context would recognise it immediately. What is remarkable is how consistently this evidence is ignored in the design of platforms that are being used, right now, by millions of rural learners across India.

This paper has argued that Hindi mediation is not a pedagogical shortcut. It is a scaffold — a way of connecting what the learner already knows to what they are trying to learn. Cummins' Interdependence Hypothesis gives us the theoretical framework for understanding why it works. The survey data from Ambedkar Nagar gives us the learner-level evidence that it does work. And the comparative analysis of three platforms gives us a picture of the different ways it can be provided — as medium, as scaffold, or as subtitle — and the limitations of each approach.

The rural Hindi-speaking learner in Ambedkar Nagar is already walking a road that the digital language learning industry has not designed specifically for them. They are picking up tools built for different contexts and making them work as best they can. The very least the research community can do is pay careful attention to their experience — and the most practically useful thing platform developers can do is listen to the 97.9 percent.

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