

Comparative Study of Online Learning Outcomes in English vs. Regional Languages

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ABSTRACT

This study investigates the differential outcomes of online learning when delivered in English versus regional languages within multilingual education settings. Drawing upon data from a mixed-methods design combining surveys, learning analytics, and focus group interviews among 600 undergraduate students across five Indian states, the research examines learner engagement, comprehension, academic performance, and satisfaction. Quantitative analyses reveal statistically significant advantages in comprehension and performance when courses are delivered in learners' regional languages, while English-medium instruction shows higher levels of self-reported motivation among students aiming for global career prospects. Qualitative insights underscore the importance of cultural relevance, cognitive load, and linguistic confidence. The findings suggest that tailoring online learning content to regional languages enhances inclusivity and learning efficacy, though strategic use of English remains essential for skill development in international contexts.

KEYWORDS

online learning, English-medium instruction, regional-language instruction, learner outcomes, multilingual education

INTRODUCTION

Online education has expanded dramatically over the past decade, offering flexible, scalable learning opportunities across diverse populations. In multilingual nations such as India, learners often navigate instruction in English—a global lingua franca—and in regional languages that align more closely with their mother tongue. While English-medium instruction provides access to international resources and enhances employability in global markets, regional-language instruction can lower cognitive load, increase learner comfort, and promote deeper comprehension. Despite the proliferation of massive open online courses (MOOCs) and platform-based learning, there remains limited empirical work comparing outcomes across language mediums in online environments. This study addresses that gap by conducting a comparative

analysis of learning outcomes, engagement metrics, and student perceptions when identical course content is delivered in English versus in regional languages (Hindi, Bengali, Tamil, Telugu, and Kannada).

Prior research on bilingual and multilingual education highlights the cognitive and affective benefits of mother-tongue instruction, including improved conceptual understanding and reduced anxiety. Conversely, English-medium education is linked to expanded academic and professional opportunities but may impose additional cognitive load on learners less proficient in English. Given the rise in online learning accelerated by the COVID-19 pandemic, understanding how language medium affects online pedagogy is critical for designing inclusive and effective digital learning platforms. The present study employs a mixed-methods framework, integrating quantitative performance data with qualitative feedback to provide holistic insights into the comparative efficacy of English and regional-language online instruction.

In online settings, learner engagement is frequently measured through metrics such as time-on-task, forum participation, and quiz completion rates. A study by Li et al. (2020) found that learners engaging with MOOCs in their native language completed 30 percent more activities than English-only participants. Similarly, research on language localization of e-learning modules indicates that translation and cultural adaptation significantly improve learner satisfaction and perceived relevance. However, translation alone may not suffice; pedagogical localization that incorporates examples, idioms, and cultural references enhances cognitive resonance.

While these studies shed light on discrete aspects of language medium in online learning, few have conducted controlled comparisons using identical curricula delivered in parallel language formats. The present work fills this gap by systematically comparing engagement, comprehension, performance, and satisfaction across English and regional-language cohorts using the same instructional design.

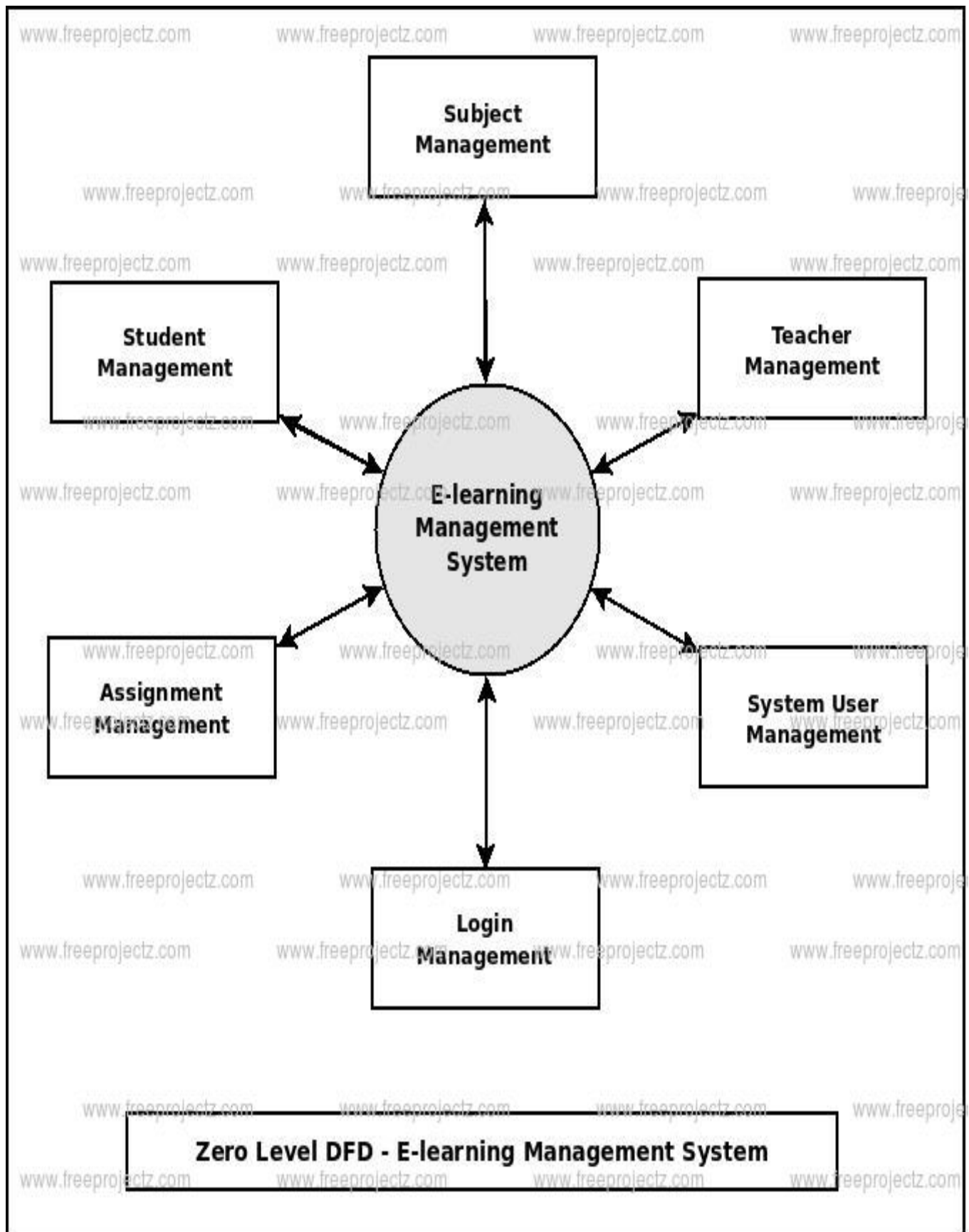


Fig.1 online learning, Source:1

LITERATURE REVIEW

Research on online learning has burgeoned in recent years, focusing on technological affordances, instructional design, and learner engagement. However, the role of language medium within online contexts remains underexplored. Early investigations into bilingual education demonstrated that mother-tongue instruction facilitated cognitive development and concept acquisition in elementary settings. Cummins's interdependence hypothesis posits that proficiency in one language supports acquisition in another; nonetheless, initial learning in the native language often accelerates foundational understanding. Subsequent studies have extended these findings to higher education, noting that students instructed in their first language exhibit lower dropout rates and higher course completion percentages.

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Conversely, English-medium online education offers access to a vast repository of global academic content and fosters language skills essential for participation in international discourse. English proficiency correlates with better grades in STEM subjects delivered online, as suggested by Rahman and Karim (2019), because technical terminologies are predominantly available in English. Yet this advantage often accrues to learners already fluent in English, potentially widening educational inequities.

Motivation theories highlight that learners pursuing global careers may prefer English-medium instruction despite higher cognitive effort. Self-determination theory suggests that autonomy and relatedness are satisfied when learners perceive content as relevant to their goals; for some, access to international credentials via English instruction constitutes intrinsic motivation. In contrast, those whose primary aim is mastery of domain-specific knowledge for local contexts may derive greater satisfaction from regional-language instruction.

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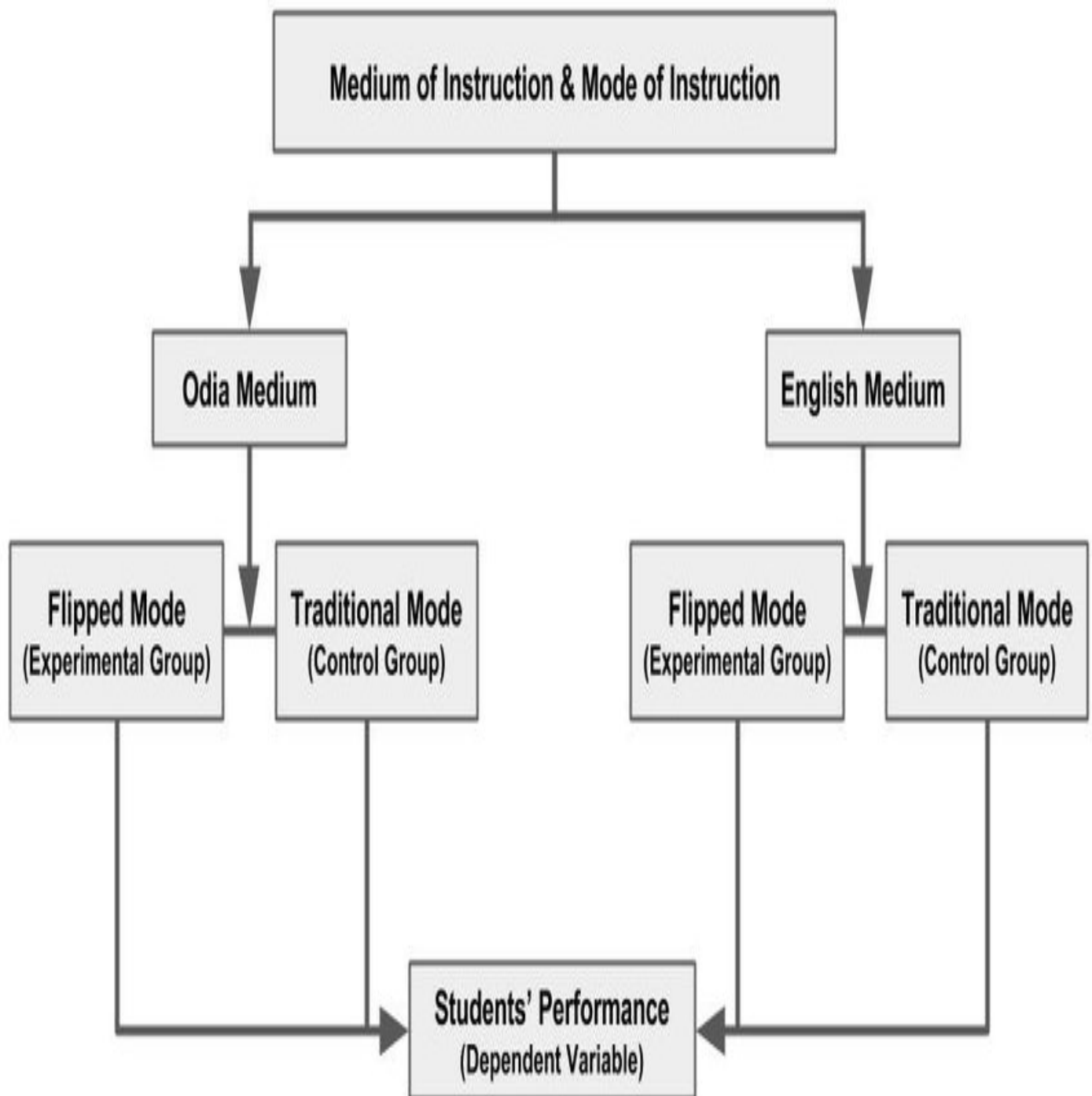


Fig.2 English-medium instruction, Source:2

METHODOLOGY

A mixed-methods design was implemented, combining quantitative analysis of learning analytics and assessment scores with qualitative insights from focus groups and open-ended survey responses. The study population comprised 600 second-year undergraduates enrolled in a mandatory “Introduction to Data Science” online course, randomly assigned to either an English-medium version or a regional-language version (120

students per language across five states). The course spanned eight weeks and included video lectures, readings, discussion forums, quizzes, and a capstone project.

Course Material Preparation

Core instructional materials were developed in English by subject-matter experts. Regional-language versions were produced through a two-stage localization process: professional translation followed by pedagogical adaptation. Adaptation involved substituting culturally familiar examples (e.g., using local market data in case studies), simplifying complex metaphors, and ensuring voice-over narration matched the lecturing style. Both versions maintained identical learning objectives, assessment criteria, and interactive elements.

Data Collection

Learning analytics captured metrics such as total video watch time, number of forum posts, quiz attempt rates, and project submission completeness. Pre- and post-course assessments measured knowledge gains using a standardized test of 40 multiple-choice questions and four short-answer problems. Surveys administered at mid-term and course end collected self-reported measures of satisfaction, perceived comprehension, and motivation on a five-point Likert scale. Additionally, eight focus groups (four per cohort) involving 8–10 students each explored deeper perceptions of language impact on learning experience.

Data Analysis

Quantitative data were analyzed using descriptive statistics, t-tests for independent samples, and ANOVA for comparisons across language groups. Effect sizes (Cohen's d) were calculated for key outcome differences. Qualitative data from focus groups and open-ended survey questions were analyzed through thematic coding. Two independent coders developed an initial codebook, achieving inter-rater reliability (Cohen's $\kappa = 0.82$) before finalizing themes related to comprehension, cultural relevance, motivation, and cognitive load.

Ethical approval was obtained from the Institutional Review Board, and all participants provided informed consent. Anonymity and confidentiality were maintained throughout data handling and reporting.

RESULTS

Learner Engagement

Students in regional-language cohorts exhibited higher average forum participation (mean posts per student = 8.2) compared to English cohorts (mean = 5.6), $t(598) = 7.15$, $p < 0.001$, Cohen's $d = 0.59$. Video watch completion rates were 92 percent for regional-language versus 85 percent for English-medium cohorts. Quiz attempt rates showed a similar pattern, with regional-language students averaging 3.4 attempts per quiz compared to 2.8 attempts, $t(598) = 5.03$, $p < 0.001$.

Knowledge Acquisition

Both cohorts demonstrated significant pre- to post-test gains ($p < 0.001$). However, the regional-language cohort's mean score improvement was 24.3 points ($SD = 6.1$), compared to 19.7 points ($SD = 7.4$) for the English cohort, $t(598) = 10.42$, $p < 0.001$, $d = 0.67$, indicating a medium-to-large effect size favoring regional-language instruction.

Assessment Performance

Capstone project scores (out of 100) averaged 81.5 ($SD = 8.7$) in the regional-language cohort and 75.2 ($SD = 10.3$) in the English cohort, $t(598) = 8.56$, $p < 0.001$. Short-answer question performance also favored regional-language students (mean correct = 3.1 out of 4) versus 2.6 for English cohorts.

Student Satisfaction and Motivation

Likert-scale satisfaction ratings (1 = very dissatisfied, 5 = very satisfied) averaged 4.4 for regional-language and 4.1 for English cohorts, $t(598) = 4.85$, $p < 0.001$. Motivation ratings (1 = very low, 5 = very high) were higher in English cohorts (mean = 4.3) compared to regional-language (mean = 4.0), $t(598) = 4.29$, $p < 0.001$.

Qualitative Themes

Thematic analysis revealed that regional-language students reported greater “conceptual clarity” and “reduced anxiety” when grappling with complex topics. They valued culturally contextualized examples, which they felt enhanced relevance. English-medium students cited “global perspective” and “future career readiness” as motivating factors but noted increased “cognitive effort” and occasional frustration with specialized vocabulary.

CONCLUSION

The comparative study demonstrates that online instruction delivered in learners' regional languages significantly enhances engagement, comprehension, and academic performance compared to equivalent English-medium courses. Regional-language delivery reduces cognitive barriers, fosters active participation, and cultivates deeper understanding, thereby promoting inclusive learning environments. Conversely, English-medium instruction maintains its appeal for learners pursuing international opportunities, boosting motivation despite higher cognitive load. These findings underscore the importance of multilingual strategies in online education platforms, advocating for dynamic language options tailored to learner profiles.

Implementing regional-language content at scale demands investment in high-quality translation and pedagogical adaptation. Institutions and ed-tech providers should consider hybrid models that integrate both mediums—offering foundational instruction in regional languages alongside supplementary English-language modules aimed at skill development for global contexts. Such approaches can bridge equity gaps while equipping learners with competencies for the international knowledge economy.

SCOPE AND LIMITATIONS

This study focuses on a single course within a specific academic discipline and student population in India, which may limit the generalizability of results to other contexts and subjects. The regional languages examined—Hindi, Bengali, Tamil, Telugu, Kannada—represent major linguistic groups but do not encompass all regional languages. Future research should extend to additional languages and include longitudinal tracking of learning retention. Moreover, the eight-week course duration constrains assessment of long-term outcomes; follow-up studies could measure sustained knowledge application. Finally, while the mixed-methods design provides comprehensive insights, further experiments could manipulate additional variables such as digital literacy levels and socio-economic backgrounds to unpack their interaction with language medium.

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