Acta Scientific Ophthalmology (ISSN: 2582-3191)

Volume 8 Issue 3 March 2025

Research Article

Impact of Language on Learning and Performing Clinical Skills Among Vision Technicians: A Comparison of English and Vernacular-Based Rubrics

Sitharamanjaneyulu Madhukuri[1,2], Ram Kumar[2], Ruby Kala Prakasam[1,2]*, Anjali Tripathi[1,2], Snigdha Snigdha[1,2] and Avinash Pathengay[2]

[1]Brien Holden Institute of Optometry and Vision Sciences, L V Prasad Eye Institute, Hyderabad, India

[2]Standard Chartered – LVPEI Academy for Eye Care Education, L V Prasad Eye Institute, Hyderabad, India

***Corresponding Author:** Ruby Kala Prakasam, Educationist, Academic Research, Standard Chartered – LVPEI Academy for Eye Care Education, L V Prasad Eye Institute, Gullapalli Pratibha Rao Campus, Kismathpur, Hyderabad, Telangana, India.

Received: February 02, 2025

Published: March 04, 2025

Abstract

Background: Students from diverse language backgrounds often face challenges when professional health courses are taught in English, which is a widely accepted academic language in India. Language barriers can hinder effective communication, comprehension, and learning, while vernacular languages may enhance the learning experience. The study aims to investigate vision technician students' perceptions of language barriers and the impact of vernacular language-based rubrics on learning and performing clinical skills.

Method: A survey-based quantitative study was conducted in August 2023 with first-year VT students at L V Prasad Eye Institute, Hyderabad. Regular teaching and assessment methods were employed, using an English rubric for skill set 1 (distance visual acuity testing) and a Telugu-translated rubric for skill set 2 (objective refraction). After five months of practice through simulations and clinical rotations, a facilitated survey assessed students' confidence in spoken language, language preferences for rubric-based learning and evaluation, difficulty in understanding rubrics, and perceptions of their usefulness.

Result: A total of 39 students (88.6% response rate) completed the survey. Confidence in spoken Telugu was higher than in English, with 68% rating their Telugu confidence as excellent. Language preferences during classroom activities, practice sessions, and reading materials significantly differed between Telugu and English medium students, with Telugu medium students favoring both languages or Telugu and English medium students preferring English first, then both ($p < 0.05$). Difficulty in understanding the content of rubrics in Telugu also varied significantly ($p < 0.05$), with Telugu medium students finding it easy and English medium students finding it moderately difficult; however, most students felt bilingual rubrics would enhance clinical performance and help them score higher.

Conclusion: Integrating vernacular rubrics alongside English to teach technical skills can boost students' confidence, improve comprehension, and enhance clinical skills, leading to higher competency levels. A bilingual instructional model has the potential to improve learning outcomes in competency-based education, particularly for students from linguistically diverse backgrounds.

Keywords: Bilingual Rubrics; Clinical Skills; Vision Technician; Competency-Based Assessment Rubrics; Vernacular Language

Abbreviations

VT: Vision Technician; LVPEI: L V Prasad Eye Institute.

Introduction

The World Health Organization emphasizes the critical responsibility of improving the training of primary care health workers to expand access to quality healthcare. In line with this, medical education continually strives to strengthen the teacher-student relationship by creating effective communication channels for delivering both subject knowledge and practical skills to trainees.

Many non-English-speaking countries, including India, use English for official purposes, yet regional languages remain the

primary medium of instruction in government-run primary and secondary schools. This choice of regional language is both cost-effective and preferred by rural communities, especially those from economically disadvantaged backgrounds. However, when students from diverse linguistic backgrounds enter professional or allied health courses, they are typically taught in English, which is the widely accepted academic language.

According to a statistic reported by Sandeep Bapna (Sandeep) in the *Times of India*, only a small percentage (6%) of the Indian population speaks English, and it ranks 44th among the most widely spoken first languages in the country. The author highlights how language can create barriers to effective communication between teachers and students and discusses the advantages of using vernacular languages to enhance student learning outcomes. Moreover, scientific studies have identified various forms of language barriers (Li et al.; Sabbour, Dewedar and Kandil; Carlson et al.; Abd Abou Sahda et al.) in medical education and outlined the benefits (Liao et al.; Alnahdi et al.; Abi Raad et al.; Alsuliman et al.) of incorporating or simplifying vernacular languages alongside academic languages. These studies also suggest that when designing rubrics or assessment tools, it is important to consider the linguistic diversity of students. Interestingly, final-year medical students at the Arabian Gulf University believed that learning in English did not hinder their academic performance, and they supported the use of both Arabic and English as mediums of instruction (Tayem et al.).

The two-year Vision Technician (VT) course at L V Prasad Eye Institute (LVPEI) trains young people from diverse language backgrounds (Telugu, Hindi) in rural India as support staff in primary eye care. Although the curriculum is primarily in English, which challenges trainees and faculty, LVPEI addresses this by involving instructors proficient in English and the local languages. Faculty encourage students to ask questions and, when needed, clarify concepts in the vernacular to support better understanding in both classroom and clinical settings.

The VT training program is a skill-driven curriculum focused on building competencies in ten essential clinical skills: 1) Eliciting ocular history, 2) Far distance visual acuity, 3) Near distance visual acuity, 4) Objective refraction, 5) Manual lensometry, 6) Subjective refraction, 7) Slit lamp examination techniques, and 8) Applanation tonometry, 9) Visual field analysis, 10) Fundus imaging. In the first five months of pre-clinical training, students work to master these skills. Training and assessment are guided by analytic rubrics, which students receive after each session, with instructions on how to use the rubric to build knowledge and refine clinical techniques.

To support understanding, instructors explain task steps and evaluation criteria primarily in English, with optional clarifications in vernacular languages. However, students struggled to fully utilize the rubric in English, leading us to believe that a translated version could enhance comprehension and skill development. Consequently, we translated rubrics for two skills (Distance visual acuity testing and Objective refraction) to examine trainees' perceptions of language barriers and the impact of vernacular language-based rubrics in learning and performing clinical skills.

Methods

A survey-based quantitative study was conducted at the Brien Holden Institute of Optometry and Vision Sciences, LVPEI, and Hyderabad, India. The study received approval from the institutional review board and adhered to the tenets of Helsinki.

The study included first-year students who enrolled in the VT program between the year 2023 and 2025. Apart from translating the English rubric into the local language, all other instructional and assessment steps followed standard procedures and were not altered for the study's purposes. The two clinical skill topics selected for the study were distance visual acuity testing and objective refraction. Classroom teaching focused on delivering practice-oriented knowledge, while practice sessions included both simulation-based training in the laboratory and clinical rotations in the outpatient department, held four days per week. The selected topics were taught sequentially, with skill set 1 (distance visual acuity testing) covered first, followed by skill set 2 (objective refraction). Students received a hard copy of the rubric in English for skill set 1 and a translated Telugu version for skill set 2, provided at the end of each classroom teaching session on the respective skill. For skill set 2, the Standard English version of the rubric was translated into Telugu using 'typing and translation' Software (Google, California, United States) by the course instructor, whose native language is Telugu. Students were given three to four months to practice the taught skills and were instructed to refer to the rubric during practice. Clinical evaluation of the selected skills was conducted at the end of the first semester (5^{th} month of year 1). The study implementation process has been summarized in table 1.

Following the skill evaluation, an online survey was administered. The 24-item survey included demographic questions, Likert scale items, and rating scale-based questions designed to assess students' confidence in spoken language, language preference for rubric-based learning and evaluation, perceptions of the rubric's

Participants	Topics included in the study	Training method			Phase 3: Survey
		Phase 1: Classroom teaching		Phase 2: Simulation based Training	
		Subject	Rubric		
Year-1 VT students; 1st semester	Distance Visual Acuity Testing	Practice-oriented knowledge and theory	Regular English version of rubric	Training in the laboratory and clinical rotations in the outpatient department	23-item facilitated online survey (supplementary)
	Objective refraction		Translated Telugu version of the rubric		

Table 1: Shows three phases of the study implementation.

usefulness for learning and evaluation, difficulty in understanding the rubric, and attitudes toward the rubric. Questions were organized under relevant subtopics. To avoid the language bias at the level of survey administration, the survey questions were formulated in both English and vernacular language (in Telugu). The online survey included the consent statement and was facilitated by a neutral mediator who was not directly involved in teaching or evaluation of the student cohort participated in the study. The mediator explained the study objectives and encouraged for a voluntary participation.

Statistical Analysis:

Descriptive statistics were used to report frequencies and percentages, and graphical representations were used to illustrate survey responses. Statistical analyses were conducted using IBM SPSS Statistics 21.0. A Chi-square test was applied to ordinal data to assess associations between participant responses and grouping variables such as gender and medium of instruction during school education. Statistical significance was set at $p < 0.05$.

Results

Of a total class strength of 44, 39 students responded to the survey (response rate, 88.6%), and of these 3 students were excluded from the data analysis due to incomplete submissions. The mean age of the student group was 19.9±4.3. among them, 51% (n,18) were male students and 49% (n,17) were female students. Over 83% of students had their qualification filed as intermediate (n, 29) and the remaining were the students (n, 6) who completed undergraduate studies before joining the vision technician course. 80% of the students reported Telugu as their mother tongue followed by 17% having Kannada and 3% having Marathi as their mother tongue. Further 75% of the student's medium of instruction in the school was similar to their mother tongue, while the remaining 25% of the student's medium at school was English, which is not similar to their mother tongue.

Instructional format during school education

In the chi-square results for instructional format during school education, there was a significant difference ($p = 0.034$) between genders in receiving the format of the instruction. The majority of students received instruction in a mix of vernacular and English, rather than exclusively in their chosen medium of language. For instance, a student in an English medium school (whose mother tongue is Telugu) might receive instruction in both English and Telugu or entirely in English. When compared between genders, a higher number of males (M, 16; F, 11) received a mix of vernacular language-based instruction during their school education compared to females.

Confidence level in spoken English

More than 50% of students (68%) rated their confidence levels in spoken Telugu as close to excellent or excellent (9 or 10 on a scale of 1-10), while only 13% of students scored 9 or 10 for their confidence level with spoken English (Figure 1). For spoken English, most of the students' (72%) scores were between 5 and 8. Moreover, 10% of the students reported the lowest level of (1 on a scale of 1-10) confidence in spoken English. However, students' confidence levels in spoken English and Telugu were not statistically different between genders and different mediums of instruction at school (table 2).

Language preference for rubric-based learning and evaluation

Figure 2 shows that students preferred the 'rubric language' and 'instruction on rubric components' to be communicated in both (53%, 56%) languages, followed by English alone (26%, 31%) and then Telugu alone (21%, 14%) respectively. Over 40% of the participants preferred their reading materials to be provided in English (40%) followed by in both languages (34%) and Telugu (26%). For language preference during practice sessions and classroom teaching activities, over 50% of the students preferred a combination of languages followed by Telugu (29%,36%) and English (21%,14%)

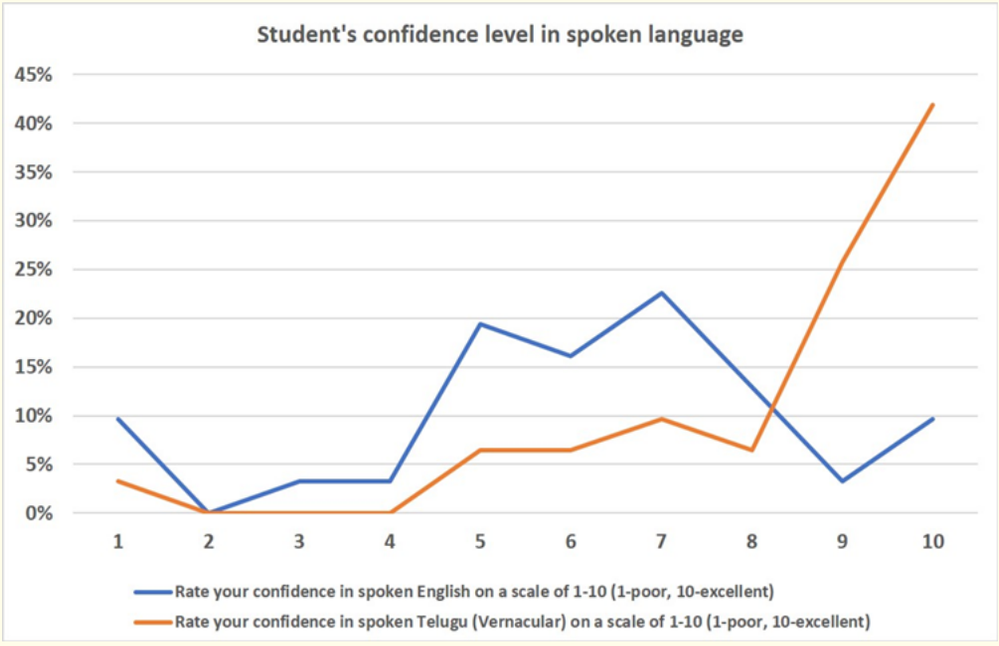

Figure 1: Shows students' confidence levels in spoken language.

Response variable	Grouping variable#	Chi-square test statistic	Degrees of freedom	P-value
What instructional format was used during your school education?	Gender	4.497	1	0.034*
	Medium of instruction	0.003	1	0.958
Do you prefer English or Telugu (Vernacular) as the language of instruction during classroom teaching activities?	Gender	0.728	2	0.695
	Medium of instruction	10.218	2	0.006*
Do you prefer English or Telugu (Vernacular) as the language of instruction during practice sessions?	Gender	1.427	2	0.49
	Medium of instruction	9.343	2	0.009*
Do you prefer reading materials (textbooks) in English or Telugu (Vernacular) language?	Gender	2.619	2	0.27
	Medium of instruction	15.556	2	0.0001*
What is the reason behind your preference for one language over the other?	Gender	0.674	2	0.714
	Medium of instruction	0.191	2	0.909
Do you translate English terms in your textbooks into the Telugu (Vernacular) language for better understanding?	Gender	0.243	2	0.885
	Medium of instruction	2.809	2	0.245
Rate your confidence in spoken English on a scale of 1-10 (1-poor, 10-excellent)	Gender	9.082	8	0.335
	Medium of instruction	14.255	8	0.075
Rate your confidence in spoken Telugu (Vernacular) on a scale of 1-10 (1-poor, 10-excellent)	Gender	10.41	6	0.108
	Medium of instruction	9.914	6	0.128
Were the details of the rubric and the evaluation process clearly explained by the course instructor?	Gender	2.003	1	0.157
	Medium of instruction	0.706	1	0.401
Do you think using the rubric to perform a particular task would help you score high?	Gender	0.172	1	0.679
	Medium of instruction	0.697	1	0.404

Do you prefer instruction on the rubric components (steps involved in performing the clinical skillset and the grading criteria) to be in English or Telugu (vernacular) language?	Gender	2.574	2	0.276
	Medium of instruction	4.388	2	0.111
Do you refer to the rubric during your training/ practice sessions?	Gender	3.126	2	0.209
	Medium of instruction	0.012	2	0.994
Do you prefer the rubric to be in English or Telugu (Vernacular) language?	Gender	0.748	2	0.688
	Medium of instruction	4.03	2	0.133
Do you think Telugu-based rubric (Vernacular) would improve your performance in clinical tasks?	Gender	0.305	2	0.859
	Medium of instruction	3.605	2	0.165
Do you think English-based rubric would improve your performance in clinical tasks?	Gender	1.04	2	0.595
	Medium of instruction	1.425	2	0.49
Rate the level of difficulty in understanding the content of the rubric in English	Gender	0.125	2	0.939
	Medium of instruction	3.506	2	0.173
Rate the level of difficulty in understanding the content of the rubric in Telugu	Gender	1.46	1	0.227
	Medium of instruction	5.625	1	0.018*

Table 2: Associations between response variables and the grouping variables.

respectively. Additionally, 66% of students reported translating English terms into Telugu for better understanding, and 79% believed that their language preference (English over Telugu or vice versa) significantly improved their comprehension and retention of learning. Additionally, 66% of students reported translating English terms into Telugu for better understanding, and 79% believed that their language preference (English over Telugu or vice versa) significantly improved their comprehension and retention of learning.

The preference for language during classroom activities, practice sessions, and reading materials significantly differed between Telugu medium and English medium students. During classroom activities, Telugu medium students preferred both languages followed by Telugu, whereas English medium students equally preferred either English or both, and not Telugu (Pearson Chi-square p=0.006). During practice sessions, Telugu medium students preferred both languages followed by only Telugu, while English medium students preferred English over other language options (p=0.009). For reading materials, Telugu medium students preferred both languages followed by Telugu and then English, whereas English medium students preferred only English (p=0.0001). However, student's language preferences were not statistically different between genders (table 2).

Difficulty level in understanding the rubric

The results on students' difficulty level in understanding the rubric (Figure 3) indicate that 56% of students felt the content was very easy to understand when in Telugu, and 45% felt it was very easy in English. Over 44% and 48% of students rated moderate difficulty in understanding the rubric content in Telugu and English, respectively, with over 6% finding it very difficult to understand in English.

The ratings on the level of difficulty in understanding the content in Telugu were statistically significant between Telugu medium and English medium students (Pearson Chi-square p=0.018). Telugu medium students found it very easy to understand the rubric in Telugu, while English medium students found it moderately difficult. However, students' difficulty levels were not statistically different between genders (table 2).

The usefulness of rubrics for learning and evaluation

The results on students' perception regarding the usefulness of rubrics for learning and evaluation (Figure 4) demonstrate, that over 74% and 75% of the students felt English-based rubrics and Telugu-based rubrics would improve their performance in clinical tasks to a greater extent, and 86% of the students felt that using rubrics to perform a particular task would help them score high. However, the Chi-square test statistic of these variables showed no statistically significant differences between gender and mediums of instruction respectively (table 2).

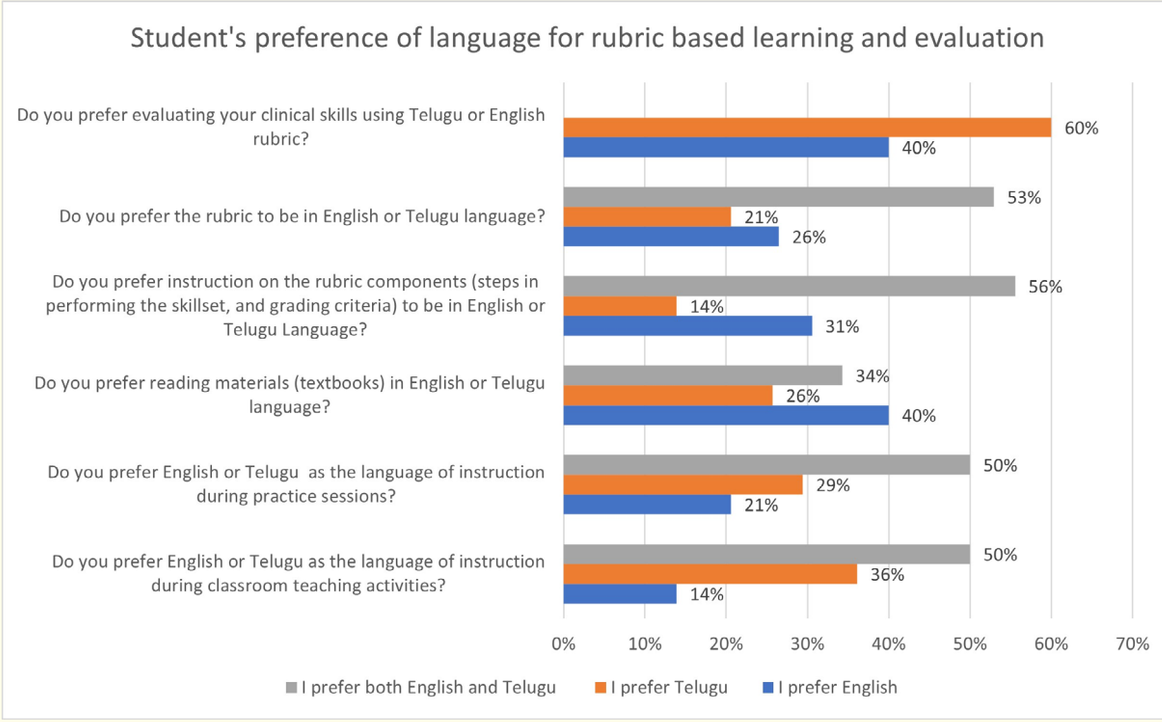

Figure 2: Student's preference of language for rubric based learning and evaluation.

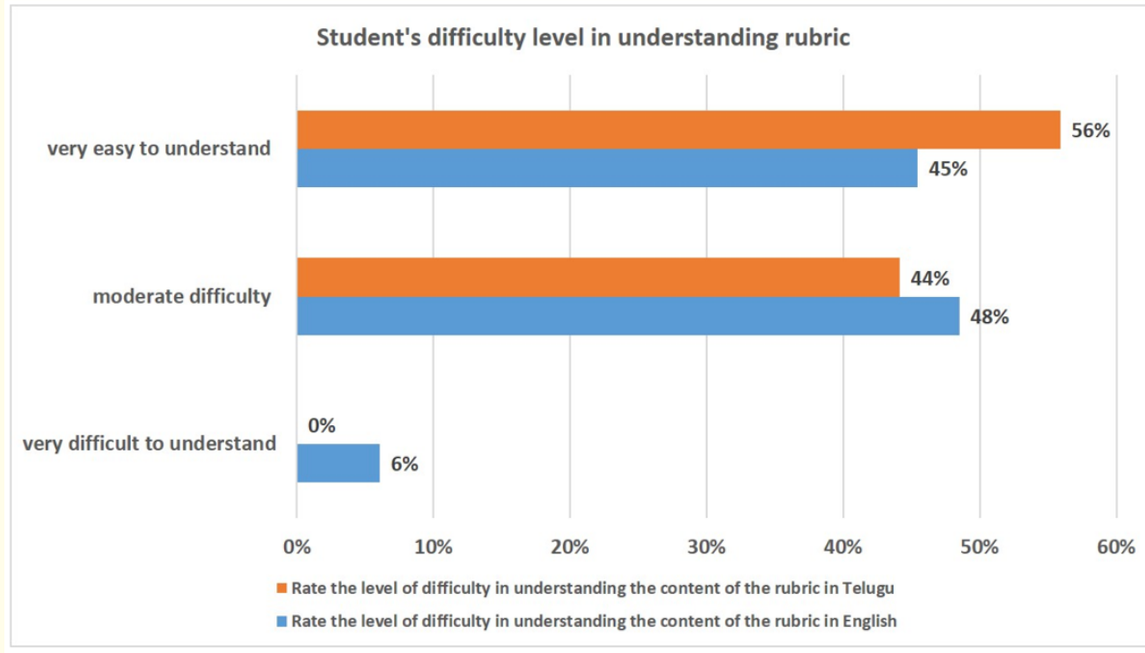

Figure 3: Student's difficulty level in understanding rubric.

Discussion

This study evaluated the impact of language barriers on understanding and following rubric-based evaluations for clinical techniques among Vision Technician students. While English plays a crucial role in medical education, students from rural parts of India predominantly study in their vernacular language or mother tongue, leading to greater confidence in speaking and understanding their native language compared to English(Sandeep; Li et al.). In short-duration paramedical courses, such as the two-year Vision Technician program discussed in this study, students with prior education in their vernacular language may face significant challenges in adapting to rubric-based learning in English, particularly during the initial phase of the course. In the present study, 75% of the students reported that the medium of instruction in their school was the same as their vernacular or mother tongue, while

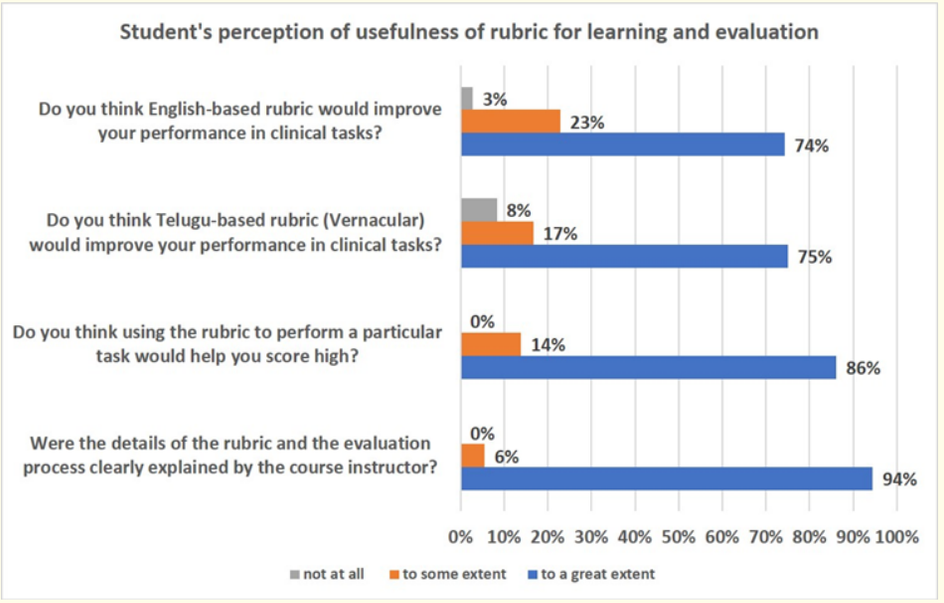

Figure 4: Student's perception of the usefulness of rubric for learning and evaluation.

a smaller percentage had English as their medium of instruction, differing from their mother tongue (Telugu/other). This finding highlights the demographic characteristics of the study cohort, which predominantly represents rural India, where vernacular languages are the primary medium of instruction, unlike in most private schools in urban areas that adopt English as the primary language(Abd Abou Sahda et al.).

Majority of the students of the current study are from rural India, whose medium in the school (Telugu) and mother tongue are same, reported higher confidence level in speaking Telugu language, and low in speaking English language. Low Confidence levels in English among these students may hinder them from asking their doubts, particularly in situations where the medium of instruction is purely English. Students' preferences and confidence in their mother tongue positively correlated with their understanding of the rubric content, aligning with previous studies that demonstrate positive attitudes toward vernacular languages (Abi Raad et al.; Al-Zubi, El-Sharif and Alzoubi; Khallof et al.). Notably, students favored a combination of English and their vernacular language for instruction during classroom teaching and practice sessions. Studies in medical education(Abd Abou Sahda et al.; Alsuliman et al.; Tayem et al.; ياسين, نوارم and ريجينالد) further support this approach, highlighting that each language has its strengths and limitations, and suggesting that a blended model incorporating both the mother tongue and a foreign language like English may be more effective, particularly in rural areas where vernacular languages predominate(Sabbour, Dewedar and Kandil). The preference of Telugu-medium students for a combination of both their mother tongue and English over exclusively Telugu or English can be attributed to several factors. First, students may recognize the advantages of learning the subject in English alongside their vernacular language, as this dual approach could benefit their clinical practice and support future career growth, particularly if they choose to pursue higher education. Second, technical terms are often introduced and explained in English, even when instruction is primarily delivered in the vernacular language(Carlson et al.; Liao et al.). In a multilingual country like India, proficiency in both the vernacular language and English serves as an essential communication tool, particularly during interactions with patients in clinical rotations, aligning with literature findings (Alnahdi et al.; Carlson et al.; Jiménez et al.) that emphasize the importance of bilingual competence in improving patient care and fostering professional success. In this study, VT students receive primary training at the main campus, a center of excellence in the urban city, before being placed in rural centers during their second year. This model equips them to manage patients from diverse language backgrounds at the main campus and non-English-speaking patients in rural settings. The findings, particularly the preference for bilingual instruction, support this training approach and the students' clinical exposure in the urban center.

Language can be a potential barrier to students' growth in terms of understanding, conceptualizing, and applying concepts appropriately in real-life situations. In the present study, students strongly support the hybrid model of teaching and training. We appreciate the need to translate the English version of the rubric into

their mother tongue while retaining the technical terms in English. Alternatively, students should be provided with both language versions of the rubric during learning and training periods to remove potential language barriers and enhance the learning experience of students with rural backgrounds whose medium of instruction during school is not English.

Limitations of the Study

This study focused on two clinical skills, Distance Visual Acuity Testing, and Objective Refraction, from the ten taught in the Vision Technician program, limiting the generalizability of findings to other clinical competencies. Additionally, the linguistic diversity among participants, with 80% speaking Telugu and 20% speaking Kannada or Marathi, may have influenced the understanding of Telugu bilingual rubrics, restricting their applicability to non-Telugu speakers. Future research should explore a broader range of clinical skills to determine the effectiveness of bilingual rubrics across various tasks. Case-controlled studies and competency assessments can offer stronger evidence, while longitudinal studies are essential to evaluate long-term retention and real-world application of skills developed using bilingual rubrics.

Conclusion

Language plays a pivotal role in the learning and performance of clinical skills, particularly for students from rural areas where vernacular languages dominate as the medium of instruction. English-based rubrics in medical education may present challenges for non-English-speaking students, whereas bilingual rubrics can enhance understanding, boost confidence, and improve clinical performance. A bilingual instructional model may bridge linguistic gaps by facilitating the learning of technical terms in English while ensuring comprehension through the mother tongue. This approach has the potential to foster engagement, improve learning outcomes, and enhance clinical competence, making it especially valuable in resource-limited and linguistically diverse settings.

Acknowledgments

The authors sincerely thank all the vision technician students for their voluntary participation in the survey. We extend our gratitude to Dr. Chen Zhi Xiong for his valuable feedback in improving the manuscript. We acknowledge Standard Chartered – LVPEI Academy for Eye Care Education for their support.

Disclosure Statement

No potential conflict of interest was reported by the author(s).

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