Exploring Diverse Teaching Models for Enhancing Nursing Students' English Language Proficiency: A Blended Learning Perspective

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Abstract

The present study examines the efficacy of blended learning models in enhancing nursing students' proficiency in the English language. It is challenging to come across comparative studies that assess the effectiveness of blended learning models in advancing the English language skills of nurses. However, the experimental study includes five groups, and each group has gone through five different instructional models of teaching. The first experimental group received instruction through the rotation model; the second experimental group received instruction through the flex model; the third experimental group received instruction through the self-blend model; the fourth experimental group received instruction through the enriched-virtual model; and the fifth group which served as control group received instruction through the communicative language teaching approach. A total of one hundred and fifty participants were selected through random sampling from Aligarh Muslim University, India. The data were gathered using pre- and post-tests administered before and after the intervention of these models using the standardized general English test (TOFEL). The repeated measure ANOVA revealed that each group manifested significant advancement in nurses' English language skills. Nevertheless, the rotation model demonstrated superior performance in enhancing nurses' English language skills in comparison to the other groups. The findings of the study hold pedagogical significance for those who are responsible for designing curricula, developing training programs for future nurses, producing materials, and all other persons who are involved in nursing education.

Keywords: blended learning models, developing training programs, second language proficiency, nursing students

1. Introduction

The accelerated developments in communication, digital media, and information technology over the past several years have increased both the availability and practicality of technology-powered learning. As a result, these advancements have led to an increase in the utilization of technology-driven resources in classrooms to enhance students' language acquisition (Alharbi, 2022; Jowsey et al., 2020). One of the most popular and emerging methods being employed in language classrooms throughout the world today is blended learning which involves a form of education that combines instruction online with in-person instruction. Blended learning merges traditional and online education, using models like rotation, flex, self-blend, and enriched virtual (Staker and Horn, 2012), incorporating digital tools and internet-based content delivery (Bonk & Graham, 2012; Graham, 2006; Garrison & Kanuka, 2004; Lothridge et al., 2013)). This contrasts with pure e-learning, which teaches using just electronic means. It incorporates a range of the learning styles of language learners. Instead of merely juxtaposing these learning modes, this educational paradigm seeks to enrich the learning process by seamlessly integrating in-person and virtual components. Graham (2006) defined blended learning as a system where regular classroom teaching is mixed with learning through computers and the Internet. In addition, Garrison and Kanuka (2004) defined blended learning as a combination of in-class and online learning ensuring both elements work well together. Hrastinski (2019) reached the determination that a consensus exists regarding the essential components of blended learning, namely the incorporation of both physical and online instruction and online learning. Boelens et al. (2015) asserted that this strategy optimized learning outcomes by effectively merging virtual and in-person training.

While blended learning is not a novel concept, its applicability and relevance continue evolving, presenting new opportunities and challenges. That is why multiple studies have emphasized how a lack of proficiency in the English language is crucial for nurses seeking employment in hospitals and healthcare institutions. Inadequate language skills can lead to misunderstandings and communication breakdowns (Derwing & Munro, 2009; Hymes, 1972), potentially jeopardizing patient safety (Crawford & Candlin, 2013). Therefore, it is imperative to ensure that nurses possess the requisite English communication skills for patients' well-being and professional development. It is worth noting that a fundamental grasp of English is insufficient; nurses must also be proficient in the specific linguistic requirements of clinical and social contexts within the nursing profession (McNamara, 1997; Edgecombe et al., 2013). An effective English language

curriculum for nurses should encompass language skills tailored to healthcare contexts and the communication skills necessary for healthcare professionals (Bosher & Smalkoski, 2002). This endeavor may require reevaluating long-standing cultural norms (O'Neill, 2011). English as a second language needs cultural competence, including the ability to communicate with patients and doctors, and an understanding of socio-cultural communication nuances such as jokes, humor, and euphemisms (Kawi & Xu, 2009).

1.1 Statement of the Problem

The pedagogy of teaching English in diverse regions of the world encounters specific challenges and intricacies. A recurring issue in the instruction of English often resides in the oversight of a fundamental aspect within the pedagogical framework. This particular facet pertains to carefully selecting specific methodologies and procedures that deliver a meaningful and valuable learning experience. Such an experience, when thoughtfully curated, can wield a substantial impact on the learning and development of competency in English as a second language.

1.2 Purpose of the Study

This study investigates how blended learning affects nursing students' English language skills. Second-language English-learning nursing students from Hindi, Tamil, and Malayalam are investigated. In nursing education, where instructional methods must be efficient to produce competent nurses, it is essential to figure out whether blended learning models offer an improved method of enhancing nurses' English skills. This research could inform and customize nurse training programs, producing exceptionally capable future nurses.

2. Literature Review

Blended learning models have changed teaching and learning strategies worldwide. Higher education institutions are revising their strategies by adopting blended learning models that help accomplish their pedagogical goals. The last few years have witnessed the publication of multiple studies dealing with how technology-enabled learning is enhancing the English language proficiency of learners. For example, Smith and Hill (2019) examined 97 higher education blended learning papers published in 15 journals between 2012 and mid-2017 to reflect advances in the field. The assessment primarily concentrated on the dates and places that the papers were published, as well as their topic, origin, and extent. It also examined its research concerns, the methodological approach, and the significance of blended education. It was found that blended learning's definition was general, its application was global, and the study it conducted was technical, small-scale, and individual-focused, establishing its value. The study suggests future studies should focus on sector-wide awareness regarding blended learning required. Castro (2019) discussed the most exciting blended educational innovations in higher education, technological advancements (such as datafication), and other blended learning tools and situations. For this literature study, a total of 45 articles from peer-reviewed journals were selected and evaluated. The findings showed digital learning tools shared capacities. Digital technologies with human-to-machine communication might automate blended learning. Video capsules and AI teaching might improve education. Future studies are suggested to expand their research samples and regions to confirm these findings. Sonesson et al. (2018) examined the potential for blended learning and the educational difficulties and opportunities for improvement identified by senior physicians and nurses. A training program called DSTC (Definitive Surgical Trauma Care) was used to teach healthcare professionals how to handle difficult situations. Top physicians and nurses were trained in September 2015. In March 2017, 18 months following the training, interviews, surveys, and research were done. The study found that integrated learning assistance, reflection, home hospital training and teaching, and multidisciplinary team training were insufficient. Bergmans et al. (2023) investigated to determine if blended learning, which mixes conventional four-step instruction with pre-course online components, is equally effective and involves less time to complete. A randomized, multi-center research compared a 4-step face-to-face pelvic binder training method to a blended one. The study expected the blended strategy would improve skill performance after teaching and two days. A t-test comparing performance ratings found no statistically significant difference between the blended method and the alternative strategy, with a margin of 0.5 standard deviations. The blended technique had a notable advantage in terms of mean retention ratings. The study suggests that future studies should focus on how blended education might be applied to teach further life support skills in schools.

Smyth et al. (2012) discussed the experiences of learners in a blended learning midwifery and nursing postgraduate program. Focus groups were conducted with students in the first year of implementing blended learning. The study demonstrated two primary themes: (1) the benefits of blended learning and (2) its challenges. Students evaluated the blended learning experience positively. One surprising discovery was that students spent almost all of their online time studying, meaning that it interfered significantly with their daily lives. The study holds immense implications for those contemplating blended learning for program delivery. Jokinen and Mikkonen (2013) investigated instructors' experiences in planning and implementing blended learning in adult nursing programs. For the qualitative investigation, three four-to-six-person focus groups were used. Data was used using qualitative content analysis. It was found that blended learning offers greater chances for learning and teaching. However, it suggested that blended learning must address issues that occur while combining face-to-face instruction and application with technology-mediated learning. The study holds significance for students and teachers as it deals with both opportunities and challenges of blended instruction. Futch et al. (2016) analyzed how instructors use both face-to-face and online characteristics in blended learning courses to improve classroom performance in a highly contextualized learning environment. Three community college professors recognized for delivering blended learning courses were interviewed using a case study. The analysis revealed descriptive themes and subthemes related to student accomplishment. In addition to "organization "communication," and "support," "comfort" affected learning results. The findings imply that effective blended course design will be inspired by this knowledge. Gjestvang et al. (2021) explored the educational experiences of adult students in their first year of a blended learning master's program. A

qualitative, exploratory, and descriptive study comprised two focus group interviews with Master's students pursuing blended learning. Graneheim and Lundman's methods guided qualitative analysis of material. The results showed a single primary theme: a desire for competence in a diversified everyday life, and four crucial categories: professional competence, challenge to manage multiple communications, exhausting juggling, and ambiguous student role. The study holds immense implications for those dwelling in urban and rural regions who work and have children and other family responsibilities.

Suda et al. (2014) examined graduate chemists' experience and learning outcomes in their first blended medication information and literature review class. In contrast to in-person lectures and occasional recitations, an anonymous online questionnaire, course grades, and feedback were used. It was found that students enjoyed and watched the online lessons on time. They found a blended approach just as effective as physical classes which led to improving their marks. The study has implications for improving course assessments, engaging learning sessions, and achieving higher overall grades. Margolis et al. (2017) investigated to identify educational methods that students should follow when utilizing blended learning. Three focus groups were organized in the pharmacy school's first three years. Recording and writing of focus group discussions were carried out for analysis. The result revealed that around eleven teaching best methods including consistent team teaching, timely posting, answerability, organized active learning, instructor feedback, student feedback, brief reviews, and user-friendly technology to name a few. The study holds immense implications as the course instructors can utilize these practices to enhance their teaching and instructional styles. Future studies may be carried out to determine whether these methods enhance student performance. The analysis of the aforementioned studies underscores the inescapable necessity for nurses to engage in English language education. The central concern pertains to the astute choice of an educational model that harmonizes seamlessly with the nursing curriculum, facilitating the proficient impartation of English language skills to the succeeding generation of nursing practitioners.

2.1 Blended Learning and Its Models

1. The Rotation Model: The Rotation Model is an educational approach that involves the systematic rotation of students through unique learning modes, encompassing the integration of online learning. In this model, online learning is combined with whole-class lectures, projects for groups, and one-on-one coaching. The comprehensive educational strategy considers the benefits of online learning and the engagement and interaction that can be derived from traditional classroom settings.

2. The Flex Model: The primary element of this model is the digital dissemination of educational resources, which enables students to progress rapidly. This approach involves face-to-face assistance from educators and other professionals in academia who provide tailored aid such as personalized guidance and small-group instruction. The Flex Model emphasizes individualized learning, tailoring the educational process to each student's specific requirements.

3. The Self-Blend Model: In the present framework, learners are allowed to enhance their conventional face-to-face lectures by enlisting in virtual modules. This technique empowers students to customize their scholastic expedition by opting for online courses corresponding to their personal preferences, educational requirements, or explicit objectives. The Self-Blend Model enhances the accustomed educational encounter by providing supplementary online resources that are personally chosen.

4. The Enriched-Virtual Model: Per this conceptual framework, students allocate their time to engaging in remote digital education and attending a tangible educational institution. This model amalgamates the benefits of remote learning with the advantages of in-person interaction, thereby combining the adaptability and convenience of online education with the social merits of in-person interaction. By striking a balance between personal encounters and the accessibility of online materials, this approach cultivates a comprehensive educational setting.

The models Staker and Horn (2012) outlined offer distinct viewpoints on integrating digital and conventional teaching approaches, mirroring the changing nature of learning modalities in higher education. When taken as a whole, they highlight how blended learning may be used to create flexible, customized, and successful learning environments.

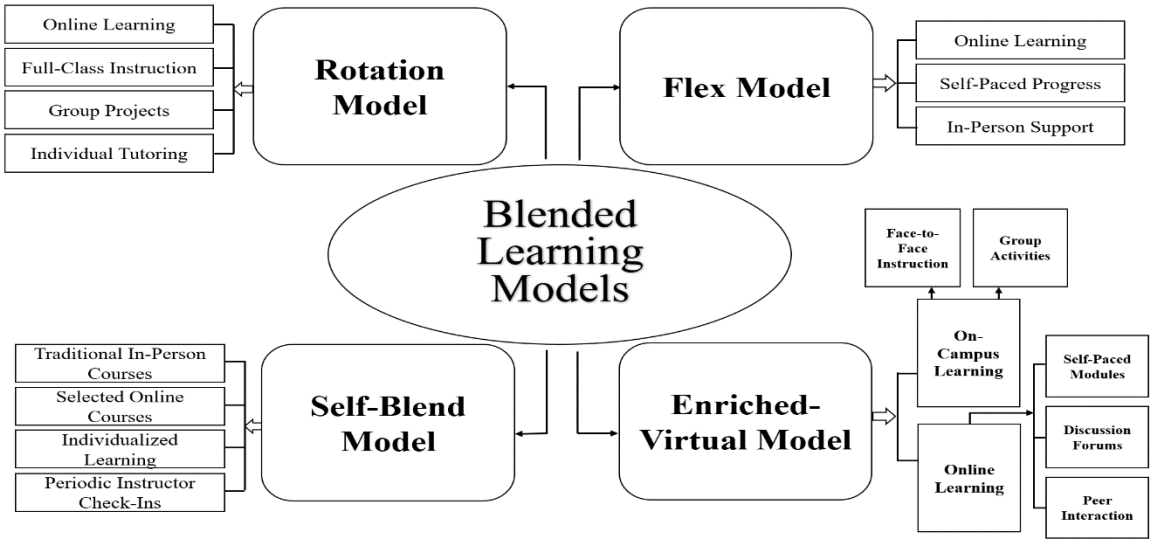

Figure 1. Types of Blended Learning Models

Blended learning is an innovative, flexible teaching methodology combining traditional in-person training and virtual learning elements. By combining the benefits of both online and classroom instruction, this pedagogical approach gives students a wide range of learning opportunities. Teachers successfully use technology in blended learning environments to give assignments and tests while encouraging in-person class interaction. This strategy promotes individualized learning by enabling students to access learning resources and interact with course content at their speed. Moreover, face-to-face assistance and group projects supplement the virtual element, enhancing learning. The educational landscape in K–12 and higher education settings is being improved by blended learning, which has emerged as a flexible and adaptable teaching technique that meets the requirements and styles of students.

2.2 Research Question

1. Which of the four English language teaching models—rotation, flex, self-blend, and enriched virtual—improves nursing students' English language proficiency in an equivalent amount of time?

3. Methodology

3.1 Participants

This study involved 150 nursing students from Aligarh Muslim University, India. These participants were methodically assigned to five groups, each comprising 30 students, with an equal distribution of 15 female and 15 male nursing students in each group. The participants varied in age from 19 to 23 years. Notably, their primary language was Hindi; none had prior exposure to living in English-speaking countries. It is worth highlighting that all participants had successfully passed a rigorous university entrance test, ensuring a level of uniformity within the study's population. Participants actively participated in all training sessions for ten weeks, involving four weekly sessions. Ethical considerations were diligently observed, as the study secured the requisite ethical approval for participant involvement, and all individuals willingly provided informed consent to partake in the program.

3.2 The Procedure of the Study

The present research study adhered to the procedure outlined in Moradimokhles and Hwang's (2022) study, with specific modifications made to suit the study's objectives. However, at the start of the study program, respondents were administered a pretest aimed at evaluating their overall English language proficiency. This pretest had a dual purpose: firstly, it ensured that the five groups started with a similar level of English proficiency, creating a consistent baseline for all participants. Secondly, it aimed to assess the foundational English language proficiency level as the program commenced. To conduct this assessment, the standardized Longman's TOEFL English proficiency test was used, encompassing different separate modules that examined participants' general English proficiency, including listening comprehension (30 items), reading comprehension (30 items), and grammar and written expression (40 items).

After the pretest examined students' general English skills, the five groups started receiving training instruction. All sessions were conducted in a smart classroom, with students from the five groups convening in this shared space. All participants actively engaged in each training session during ten weeks of four weekly sessions. Each session had a duration of 60 minutes for all groups. Notably, the training program was meticulously managed and delivered by the same instructor, who, in this instance, was the author of this study. This approach was chosen to maintain consistent instruction across all five groups.

The first experimental group, i.e., the rotation model group (RM group), received instruction on three English language skills from the instructor with the rotation model. Under the rotation model, students switched between several types of instruction. The instructor has

divided the instructional sessions into three sections: group projects, in-person classes, and Internet training. Online training gives students a complete learning experience by combining interactive language learning resources with in-person instruction. The teacher-led instruction offers lucid elucidations of intricate concepts, while language fluency is enhanced through peer engagements and exchanges in collaborative group endeavors. By meticulously devising an approach that considers each learner's specific needs, this intervention synergistically integrates peer participation, instructor guidance, and online materials to augment proficiency in the English language effectively.

The second experimental group, the Flex model group (FM Group), was provided with instruction in three different aspects of the English language using the Flex model approach. This method granted the students entry to a digital platform encompassing an extensive variety of English language resources, including interactive lessons and multimedia materials. One of the significant aspects of this strategy was that it let the students proceed through the material at their own pace, which stimulated self-directed learning. Moreover, the learners were allowed to attend in-person sessions with teachers scheduled in advance. These sessions were planned to offer guidance, address any queries the students may have had, and provide support whenever needed.

The third experimental group, the Self-Blend Model group (SBM Group), was provided with instruction in three key components of the English language using the self-blend model. This approach enabled students to augment their traditional English language courses using carefully chosen online resources. By doing that, they succeeded in picking online courses and materials aligned with their specific learning needs and interests, thereby customizing their English language education. Additionally, regular check-ins were scheduled with experienced language instructors to assess progress, provide guidance, and address any questions or concerns. This intervention is intended to aid in a customized educational encounter, enabling students to enhance their competence in the English language while also reaping the rewards of in-person guidance within the Self-Blend Model framework.

The Enriched-Virtual Model group (EVM Group), which constituted the fourth experimental group, was instructed by the instructor in three English language skills using the enriched virtual model. This pedagogical approach seamlessly integrated on-campus and online learning components, thereby facilitating a comprehensive and holistic learning experience. Students dedicated part of their time to attending in-person classes, receiving interactive face-to-face instruction, and participating in group activities. Concurrently, they had access to online resources and modules for self-paced learning, allowing them to reinforce their English language skills. Online discussion forums and peer interaction platforms were made available to encourage collaboration. This intervention was meticulously designed to offer students the benefits of in-person classroom interactions while harnessing the flexibility of digital resources, effectively enhancing their English language proficiency within the Enriched-Virtual Model.

The fifth and control group acquired English through the usual curriculum utilizing Communicative Language Teaching (CLT), which emphasizes interaction as the main method and aim of language learning (Brown, 1994). CLT involves learners engaging in meaningful communication with their peers and the instructor, as exemplified by activities like practicing question forms to gather personal information about classmates (Richards & Rodgers, 2014; Kumaravadivelu, 1993). This approach is commonly employed in ESL settings across various academic contexts (Savignon, 1991).

After the training program, all students completed a post-test evaluating their general English skills. It is essential to note that both the pretest and post-test employed standardized Longman English language proficiency assessments. Notably, distinct Longman English language proficiency tests were utilized for the pretest and post-test, preventing students from recalling previous test content. Additionally, both the pretest and post-test were intentionally set at the same difficulty level following established testing standards. These assessments were administered within the classroom, ensuring a consistent testing environment for all participants.

Formative tests examined participants' progress and identified difficulties during the training period. The goal of formative assessment is to continuously track the growth of learners, giving teachers feedback to improve their teaching and helping students learn more. Formative exams let students identify their strengths as well as their weaknesses, set goals for progress, and allow teachers to quickly address any issues.

Both the pre-test and post-test consisted of multiple-choice questions and the answers were assessed objectively using answer sheets. The scores for both the pretest and post-test ranged from 0 to 100.

4. Results of the Study

The results of the study indicated the varying influence of mixed learning approaches on the English language skills of nursing students. By implementing an experimental setup involving five separate groups, each exposed to a particular teaching technique, significant enhancements in linguistic abilities were noted across all participant sets. Particularly, the Rotation Model emerged as the most successful, surpassing the Flex, Self-Blend, and Enriched-Virtual models, and a control group utilizing Communicative Language Teaching. These results provide valuable insights into effective educational methods for language acquisition, with the Rotation Model showing remarkable efficacy in nursing instruction. The data displayed below makes things clear.

Table 1. General English Proficiency Ratings in Pretest, Post-test, and Test Score Differences

Types of Blended Learning Models	Values	Pretest	Post-test	Gain
RM Group	Mean	30.67	41.57	10.90
(Experimental Group)	SD	1.36	1.26	-0.10
FM Group	Mean	31.80	35.80	4.00
(Experimental Group)	SD	0.91	1.66	0.75
SBM Group	Mean	32.60	38.53	5.93
(Experimental Group)	SD	0.84	1.55	0.71
EVM Group	Mean	31.17	38.10	6.93
(Experimental Group)	SD	1.30	1.25	-0.05
CLT Group	Mean	31.63	34.67	3.03
(Control Group)	SD	1.35	1.75	0.40

For unrelated samples, a one-way Analysis of Variance (ANOVA) was carried out to evaluate the initial English language proficiency across the three participant groups. The statistical evaluation proved that the group effect was insignificant, $F(4, 145)^2 = 0.569$, $p = .941$, as outlined in Table 1. The results indicated no significant differences in English language competency among the groups at the program's inception. At the beginning of the program, the three groups were presumed to have similar English language skills. Additionally, after matching individuals across the groups according to their pretest results, a one-way ANOVA was performed to evaluate the effect of the intervention on English language proficiency. This study tested if the three groups' post-test scores differed statistically. The one-way ANOVA results found a significant difference between the groups, $F(4, 145)^2 = 1.139$, $p = .014$. Based on the post-test results, this result shows that the groups had different degrees of English language proficiency after the intervention.

Furthermore, a statistical analysis of the correlation between the 150 participants' pretest and post-test scores was done, and the results showed a substantial connection ($r = .360$, $p < .001$). Given this significant connection, the main effects of the groups and tests and the interactions between these variables were ascertained using a repeated measure two-way analysis of variance (RM-ANOVA). The two-way RM-ANOVA indicated a statistically significant main effect of group, $F(1, 40) = 109.181$, $p = .001$, $\eta^2p = .961$. Comparing the Rotation Model (RM) group to the Self-Blend Model (SBM), Enriched Virtual Model (EVM), Flex Model (FM), and Communicative Language Teaching (CLT) groups, this analysis showed that the RM group had a higher mean score, indicating more remarkable improvement in general English language skills (Figure 1). Furthermore, the main effect of the test was also found statistically significant, $F(1, 40) = 109.181$, $p = .001$, $\eta^2p = .961$. As compared to the pretest (taken before treatment), this analysis points to a higher mean score in the post-test (taken following the treatment) (Figure 2).

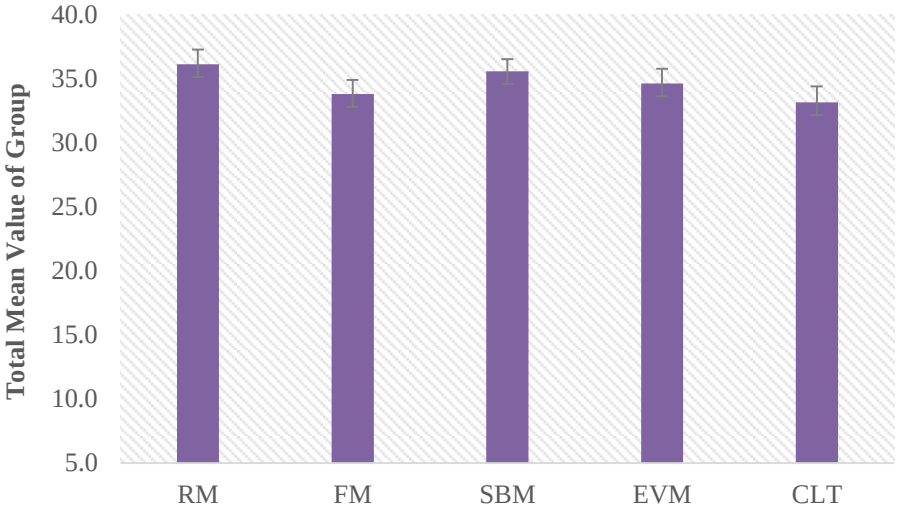

Figure 1. Comparative Mean Scores of English Proficiency across Blended Learning Models

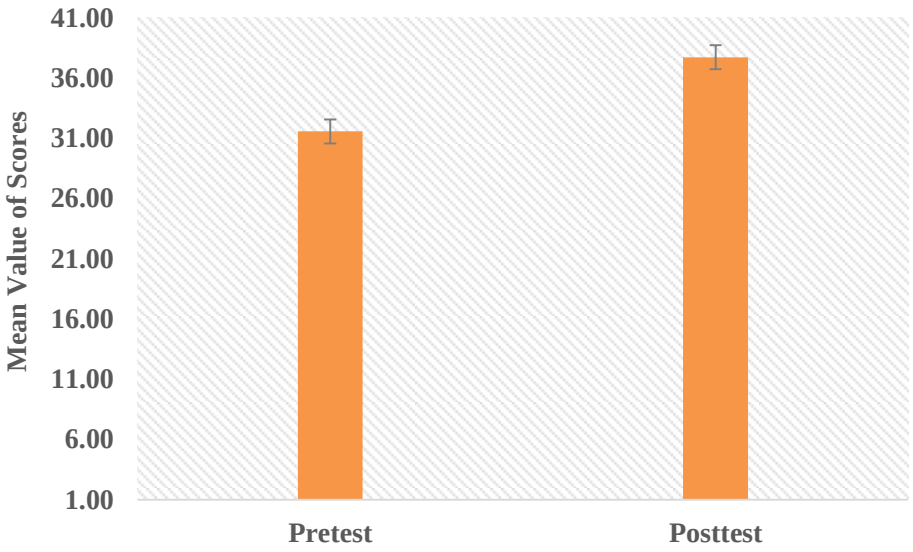

Figure 2. Average English Language Scores Before and After the Intervention

The results, $F(1, 40) = 109.181$, $p = .001$, $\eta^2p = .961$, further demonstrated a significant two-way interaction between the two test types (pretest, post-test) and the five groups (Rotation Model [RM], Self-Blend Model [SBM], Enriched Virtual Model [EVM], Flex Model [FM], Communicative Language Teaching [CLT]). This interaction highlights a significant rise in the post-test mean scores relative to the pretest for all groups (RM, SBM, EVM, FM, and CLT). The findings of this study, which are depicted in Figure 3, emphasize the gains made in the post-intervention phase and the various degrees of progress in English language proficiency within each group.

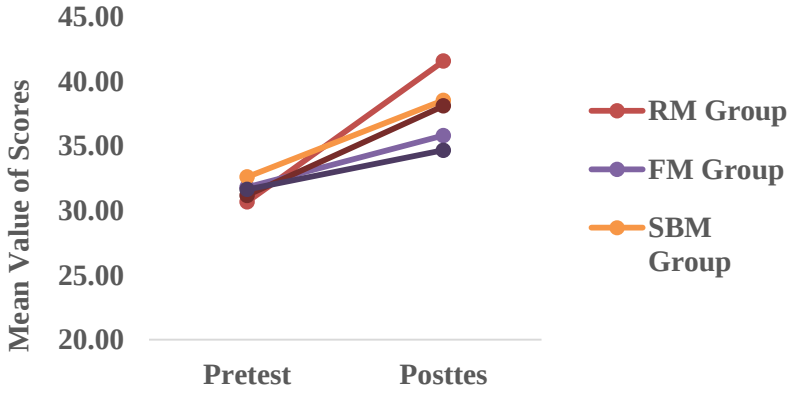

Figure 3. Pre-test and Post-test English Language Score Comparison across Different Instructional Models

4.1 Comparative Analysis of Blended Learning Models

The RM group's performance stood out in comparing the efficiency of four blended learning approaches (see Table 1). On the post-test, it received the highest mean score of 41.57. It recorded a remarkable mean gain of 10.90, representing the most pronounced progress and demonstrating the model's effectiveness for this group. In stark contrast, despite an auspicious start reflected in its pretest mean, the FM group concluded with a post-test mean of only 35.80, accompanied by a gain of 4.00, which is comparatively modest. This indicates that the blended learning model applied to the FM group was less effective at fostering substantial post-intervention academic growth. The SBM group's results were moderately better, with a post-test mean of 38.53 and a gain of 5.93, outstripping the FM and CLT Groups but falling short of the high bar set by the RM and EVM groups. The EVM group exhibited notable progress; its post-test mean was a respectable 38.10, and the gain was a significant 6.93, pointing to the efficacy of its learning model, albeit not to the extent of the RM Group's. The CLT group's outcomes were less encouraging. It had the lowest post-test mean of 34.67 and the smallest gain of 3.03, signaling the least improvement following the intervention. This comprehensive analysis not only underscores the relative success of each group but also particularly accentuates the RM group's exceptional performance, inferring that the blended learning model it engaged with was most conducive to enhancing English language skills outcomes.

Among the groups subjected to different blended learning models, the RM group achieved the highest gain, with a mean increase of 10.90 points from the pretest to the post-test. This substantial gain reflects the most significant learning improvement within the groups and

indicates the effectiveness of the learning strategies employed for the RM group. The remaining groups—FM, SBM, EVM, and CLT—registered lower gains of 4.00, 5.93, 6.93, and 3.03, respectively, with the RM Group's gain exceeding the closest competitor, the EVM group, by nearly 4 points, underscoring a clear advantage in learning outcomes for the RM group (see the table. 1).

5. Discussion and Analysis

The outcomes of the systematic comparative analysis delineate a clear distinction in the efficacy of the blended learning models applied across different groups. The RM group emerged as the most successful cohort, demonstrating the most significant enhancement in improving English language skills, as evidenced by its exceptional post-test mean score of 41.57 and an impressive mean gain score of 10.90. This pronounced gain highlights the magnitude of its English language skills improvement and serves as a testament to the effectiveness of this group's specific blended learning approach. Such a significant leap in performance from pretest to post-test metrics underscores the RM group's strategic pedagogical alignment and ability to capitalize on the integrated learning model. The findings point towards the RM Group's blended learning strategy as not merely beneficial but optimally conducive to superior English language skills achievements compared to the other groups under investigation. This study's findings regarding the rotational model's efficacy in enhancing learners' academic performance align with several past studies on rotation model blended learning (Nurkamto et al., 2019; Belazi & Ganapathy, 2023; Fitri et al., 2023; Nugraha, 2020; Truitt, 2018; Yang & Newman, 2019; Ogude & Chukweggu, 2019; Mings, 2018; McCollum, 2019; Mamman et al., 2022; Usama, 2023). However, this finding is inconsistent with one study (Alkaabi et al.2023) which adversely affected course instructors' efficacy in teaching a language.

The Rotation Model's flexibility in adapting to different educational settings and its ability to integrate various learning resources and activities make it a more dynamic and practical approach than the Flex, Self-Blend, and Enriched Virtual models (Dakhi, 2020). While beneficial in certain contexts, these models may not offer the same level of interaction and engagement as the Rotation Model, which is crucial for language learning and skill development (Bizami et al., 2023; Larsari et al., 2023).

One of the important reasons the rotation model stands out is its ability to offer diverse learning activities. This model balances group projects, direct teaching, and individual study, unlike other models that could strongly favor digital or conventional techniques (Feldstein & Hill, 2016; Tucker, 2012; Horn & Staker, 2017). This diversity guarantees accommodations for pupils with varying learning styles and preferences. For example, multimedia tools can help kinesthetic learners, whereas more hands-on exercises can help visual learners (Mayer, 2014; Dale, 1969). This adaptability is less evident in models such as the Flex or Self-Blend, which might not provide a broad variety of learning tasks. The rotation model's active involvement and promotion of participation is another significant benefit. Students are less likely to get disengaged from the learning environment when they rotate around several learning stations, as shown by Hattie et al., (2016), Bergmann & Sams (2012), and Jensen (2005). However, because of their heavy reliance on online components, models such as the enriched virtual model may not offer the same amount of connection and engagement—both essential for language acquisition. Another important area in which the rotation model shines is personalization. It enables customized learning experiences that consider each learner's strengths and shortcomings (Horn & Staker, 2017; Tucker, 2012; Tomlinson & McTighe, 2006). Other models frequently do not offer this degree of personalization, and the one-size-fits-all strategy may not adequately meet each student's unique learning demands. Additionally, the rotation model makes receiving quick feedback and correction easier, which is essential for language learning. Closer communication between instructors and students under this paradigm guarantees that students receive timely feedback, enabling in-the-moment correction and growth (Hattie, 2008; Macalister & Nation, 2019). This is a significant benefit over the Flex approach, where providing such quick and tailored input would not be possible. Finally, the rotation model becomes more successful when technology is included (Horn & Staker, 2017). While other models, like the enriched virtual model, also utilize technology, the rotation model is more balanced and integrated, combining digital tools with traditional teaching methods. This makes learning more engaging and prepares students for a technologically advanced world. This all shows that the rotation model's effectiveness in improving English language skills surpasses other models due to its diverse and dynamic learning activities, active engagement, personalization, immediate feedback, and balanced technology integration. These factors collectively contribute to a more comprehensive and practical language learning experience.

6. Conclusion

This study meticulously examined the Rotation, Flex, Self-Blend, and Enriched Virtual blended learning models' efficiency and efficacy in enhancing nursing students' English language skills. The research findings revealed that the Rotation Model notably enhances nursing students' general English proficiency, displaying a more substantial impact compared to the Flex, Self-Blend, and Enriched Virtual models. Consequently, the study suggests prioritizing the Rotation Model, particularly in educational contexts with limited curricular time for teaching and practicing English. However, this recommendation does not imply the exclusion of other model models in developing English language competencies. The study acknowledges the contribution of these models in managing learning processes and aiding in language skill acquisition. However, it was observed that in specific educational environments, the other models occasionally encounter challenges in providing learners with adequate and precise feedback. Furthermore, these models have, at times, demonstrated limitations in accurately diagnosing specific educational challenges automatically. An additional finding of this study is the underutilization of the other models by some instructors, primarily attributed to a lack of comprehensive training in integrating technology within their academic endeavors. This emphasizes how educators must receive more training in technology use if they are to realize the full potential of blended learning models.

6.1 Implications and Future Research

The pedagogical implications of this study hold significant relevance for nursing students in medical universities, particularly within the

context of India, offering valuable insights for training future nursing professionals. This research provides important considerations for curriculum designers, program developers, and material producers involved in nursing education. These insights can inform the development of effective training programs, enhancing future nurses' educational experience and preparedness. Moreover, the study's outcomes are pertinent to all stakeholders in the domain of nursing education, offering guidance in the formulation of instructional strategies and educational materials that are aligned with the evolving needs of the nursing profession.

Future studies should examine how blended learning methods teach additional English language skills. Additionally, it would be beneficial to extend this line of inquiry to include diverse student populations, considering that the current study's participants were exclusively nursing students. Such expansion in research scope would provide a more comprehensive understanding of the applicability and efficacy of blended learning models across different educational contexts and learner demographics.

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Authors contributions

Dr. Abu Saleh Md Manjur Ahmed was responsible for study design. Dr. Md Sarfaraj was responsible for data collection/conducting experiments. Dr Mohammad Jamshed drafted the manuscript and Dr. Sameena Banu revised it. All authors read and approved the final manuscript. All authors contributed equally to the study.

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The writers declare they do not have any conflicts of interest.

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The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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No additional data are available.

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