



Fostering 21st-Century Skills of Undergraduate English Students through Blended Learning: An Experimental Study.

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Abstract The current education system needs to adopt advanced approaches, methods, and techniques to enable undergraduate students to acquire and practice 21st-century skills effectively. A study has been conducted among undergraduate students to analyse their learning approaches, competencies, and skills, and to develop their 21st-century skills. It has been found that students were having difficulties communicating, critical thinking, problem-solving, and developing digital competence. These challenges have affected their ability to actively participate in academic activities and prepare for the demands of the modern workforce. A sequence of 21st-century skills and Blended Learning activities has been presented to the students using interactive e-Games, Web 2.0, Augmented Reality and Virtual Reality, Infographics, Brain Gym, Vlog, and Social Websites. These innovative learning tools and activities were designed to create an engaging and student-centred learning environment that promotes collaboration, creativity, communication, and critical thinking. Students were able to learn through Blended Learning and develop 21st-century skills effortlessly. The integration of technology-supported learning activities enhanced student participation, motivation, and engagement throughout the learning process. There were notable developments from pre-test to post-test among students, indicating significant improvement in their competencies and skill acquisition. Rubric analysis has been used as an assessment technique to assess the competence and performance of students. The findings suggest that Blended Learning is an effective approach for fostering 21st-century skills among undergraduate learners and supporting meaningful educational outcomes.

Keywords: Blended-Learning, 21st-Century skills, Pedagogical Education, Artificial Intelligence, Digital competence, Online Education

Introduction

Blended learning is not a new method in the teaching field, but it has gained significant attention and been reintroduced during the closures caused by the COVID-19 pandemic to ensure learning continuity and keep students engaged and motivated. Teaching in a face-to-face classroom environment, with the help of online materials and digital resources, enhances learners' engagement and participation in the learning process. This approach provides flexibility, accessibility, and opportunities for students to learn at their own pace while maintaining direct interaction with teachers and peers. Students can successfully acquire 21st-century skills through this method, as it combines traditional classroom instruction with technology-enhanced learning experiences. Blended learning is increasingly becoming a preferred viewpoint for students in higher education. It enables the use of the Internet and computer-based techniques to strengthen and enrich face-to-face interaction between teachers and learners (Morris, 2010). Furthermore, blended learning supports active learning, collaboration, and problem-solving by integrating various digital tools and instructional strategies. 21st-Century Skills refer to the knowledge, life skills, career skills, digital competence, and the 4Cs (Creativity, Critical Thinking, Collaboration, and Communication) that are critically important for student success in today's world, particularly as students transition to higher education, the workforce, and adult life (Jenna Buckle, 2020).

Thus, the study aims to enlarge learner autonomy in Blended Learning and develop 21st-century Skills through Blended learning methods for easy and effective language teaching and learning. In addition, adopt an



uninterrupted learning experience in English using the latest technology. And also, to include the Blended learning method and 21st-century Skills development as a subject of learning in the curriculum. Moreover, to build an extra flexible and inclusive education system for the future. English language teaching is an essential part of the school curriculum nowadays; it must cultivate knowledge and skills in line with technological and social developments (Tokoz-Goktepe, 2014).

The study further emphasises the importance of integrating technology-enhanced learning environments that encourage active participation, collaboration, creativity, critical thinking, communication, and problem-solving abilities among learners. Blended Learning provides opportunities for students to access learning materials anytime and anywhere, thereby supporting self-paced and personalised learning experiences. It also enables teachers to combine traditional classroom instruction with digital resources, creating a more engaging and interactive learning environment. The incorporation of 21st-century Skills within English language education can help learners become confident, independent, and lifelong learners who are capable of adapting to rapidly changing educational and professional contexts (Grabe, W., & Stoller, F. L., 2002). Furthermore, the implementation of Blended Learning can reduce barriers to learning, promote equal access to educational resources, and support continuous academic development. Therefore, this approach has the potential to transform English language teaching and learning by preparing students with the competencies required for success in a technologically advanced and globally connected world.

Role of Blended learning in developing 21st Century Skills

One of the key advantages of blended learning is its ability to foster self-directed learning and critical thinking skills in students (Amosa Isiaka Gambari, 2017). By incorporating online modules and resources into the curriculum, students are encouraged to take ownership of their learning and engage in independent research and problem-solving activities (Kintu, M.J. 2017). This helps to develop their ability to analyse information, think creatively, and make informed decisions, all of which are essential skills in the 21st-century workforce (William Xavier Toro, 2019). Blended learning also promotes collaboration and communication skills among students. Through online discussion forums, group projects, and virtual team activities, students learn how to work effectively in teams, collaborate with peers, and communicate their ideas clearly and persuasively. These are valuable skills that are in high demand in today's interconnected and globalised world, where effective communication and teamwork are essential for success (Lee Yen Chaw, 2013).

Furthermore, blended learning provides students with greater flexibility in terms of time, pace, and learning style. Learners can access educational materials at their convenience, revisit complex topics, and progress according to their individual needs and abilities. This personalized approach to learning enables students to become more responsible and independent in managing their academic tasks. In addition, the integration of digital technologies within blended learning environments encourages learners to develop digital literacy skills, which are increasingly important in modern educational and professional settings. The combination of face-to-face instruction and online learning opportunities also creates a more engaging and interactive learning experience, helping students remain motivated and actively involved in the learning process (Ulicheva, A. et al. 2018). As a result, blended learning not only enhances academic achievement but also equips students with lifelong learning skills that prepare them to adapt to changing educational and workplace demands. By promoting autonomy, collaboration, critical thinking, communication, and technological competence, blended learning serves as an effective approach for developing well-rounded and future-ready learners.

Another crucial aspect of blended learning is its emphasis on digital literacy and technology skills. In today's digital age, proficiency in using technology and online resources is a must-have skill for students to succeed in their academic and professional pursuits (Paul Erik Rosenbaum, 2012). By incorporating online learning platforms, multimedia tools, and interactive simulations into their learning experience, students can develop their



digital literacy skills and become adept at using technology to enhance their learning and productivity (Philip Rotich, 2013). These digital tools provide learners with opportunities to engage with educational content in innovative and interactive ways, making learning more meaningful and effective. Students are encouraged to explore a variety of digital resources, evaluate information critically, and use technology responsibly while completing academic tasks. As they interact with online discussions, virtual classrooms, and collaborative learning platforms, they gain valuable experience in communication, information management, and problem-solving within digital environments. Such experiences prepare them for future educational and workplace settings where technological competence is increasingly important.

Blended learning also promotes adaptability and flexibility in students. With the ability to access course materials and resources online, students can learn at their own pace and customise their learning experiences to suit their needs and preferences. This flexibility allows students to take control of their learning process and adapt to different learning environments, leading to greater resilience and adaptability in the face of challenges and changes (Maria Josephine, 2015). Furthermore, students can revisit lessons, review recorded materials, and engage with supplementary resources whenever necessary, enabling them to strengthen their understanding of complex concepts. The combination of face-to-face instruction and online learning opportunities supports diverse learning styles and encourages greater independence. As students become more responsible for managing their learning schedules and academic progress, they develop self-regulation and time-management skills. These qualities not only contribute to academic success but also prepare learners to thrive in rapidly changing educational, social, and professional contexts where continuous learning and adaptation are essential.

In addition, blended learning also fosters creativity and innovation in students. By incorporating multimedia tools, interactive simulations, and project-based learning activities into the curriculum, students are encouraged to think outside the box, take risks, and explore new ideas and concepts (Hixson, 2012). This helps to develop their creativity and problem-solving skills, which are essential for success in the 21st-century workplace where innovation and creativity are highly valued (Kristin Firmery Petrunin, 2019). Through exposure to a variety of digital resources and collaborative learning opportunities, students are able to engage with content in more meaningful and dynamic ways. They can experiment with different approaches to solving problems, work collaboratively with peers, and receive immediate feedback that supports continuous improvement. Such experiences encourage independent thinking and help learners become more confident in expressing original ideas and perspectives.

Blended learning also helps to bridge the gap between theory and practice. By combining traditional classroom instruction with online resources and real-world applications, students can see the relevance and applicability of what they are learning to their everyday lives and future careers. This enhances their motivation and engagement in the learning process, leading to deeper understanding and retention of knowledge and skills (Garrison, D. R., & Kanuka, H., 2004). Furthermore, the integration of practical activities, case studies, and technology-based assignments enables learners to apply theoretical concepts to authentic situations. This application-oriented approach helps students develop critical thinking, decision-making, and analytical skills that are necessary for academic and professional success. Blended learning environments also provide opportunities for personalised learning, allowing students to progress at their own pace while accessing a wide range of learning materials. As a result, learners become more actively involved in constructing knowledge, improving their overall learning outcomes and preparing themselves to meet the challenges of an increasingly technology-driven and knowledge-based society.

Another key benefit of blended learning is its ability to provide personalised and differentiated instruction to meet the diverse needs and learning styles of students. By incorporating online assessments, adaptive learning platforms, and individualised learning plans, teachers can tailor instruction to address the specific strengths, weaknesses, and interests of each student, ensuring that all students can achieve academic success and develop



essential 21st-century skills (Christopher Scott Boe, 2013). In addition, blended learning enables students to progress at their own pace, allowing them to spend more time on challenging concepts while advancing more quickly through areas they have already mastered. This flexibility helps create a supportive and inclusive learning environment where learners feel motivated and engaged. Teachers can also use data generated through digital tools to monitor student progress, identify learning gaps, and provide timely feedback and intervention (Cumming, A., et al. 2018). Furthermore, blended learning encourages greater student autonomy, responsibility, and collaboration, helping learners become active participants in their educational journey and better preparing them for future academic and professional challenges.

Furthermore, blended learning also promotes lifelong learning and continuous improvement in students. Exposing students to various online learning resources, professional development opportunities, and self-assessment tools encourages them to take ownership of their knowledge and pursue continuous growth and development throughout their academic and professional careers (Priyanka Datta, 2014). This instils in students a growth mindset and a passion for learning that will serve them well in the ever-changing and competitive 21st-century workforce. In addition, blended learning enables learners to access educational content at their own pace, allowing them to revisit concepts, strengthen understanding, and develop greater confidence in their abilities. The integration of digital technologies with traditional classroom instruction supports independent learning habits and encourages students to become active participants in the learning process. Through continuous engagement with diverse learning materials and interactive platforms, students enhance their adaptability, problem-solving skills, and self-motivation. These qualities are essential for navigating modern educational and workplace environments, where ongoing learning and the ability to acquire new knowledge are increasingly important for long-term success and professional advancement.

Entry Behaviour

At the start of the study, a pre-assessment was conducted to evaluate the students' baseline knowledge, skills, and attitudes toward English language learning and 21st-century competencies. The purpose of the pre-assessment was to identify the learners' existing proficiency levels and determine the challenges they faced in acquiring English language skills. Understanding the knowledge and skill sets of learners in the English language enabled the researcher to design and develop a blended learning classroom environment in a novel and innovative manner. The blended learning environment was carefully structured to engage learners actively and create meaningful learning experiences that would enhance both language proficiency and essential 21st-century skills. The study was conducted among 100 first-year undergraduate students pursuing English language courses at various colleges in the Madurai district of Tamil Nadu. The participants represented diverse educational, social, and linguistic backgrounds, providing a comprehensive understanding of the learning needs and challenges faced by undergraduate learners.

The research was executed through a systematic process involving pre-tests, post-tests, and analytical rubric assessments. These assessment methods were employed to evaluate learners' performance, monitor their progress, and measure the effectiveness of the blended learning approach. The findings from the pre-test revealed that nearly 60% of the students struggled to communicate effectively in the English language. Many learners demonstrated difficulties in expressing their thoughts and ideas clearly, both in formal and informal communication contexts. Furthermore, the students faced several challenges, such as a lack of confidence, stage fright, fear of making mistakes, incorrect pronunciation, limited vocabulary, and lack of fluency while speaking. These issues significantly affected their ability to participate actively in classroom discussions, presentations, and collaborative learning activities.

In addition to communication difficulties, some learners experienced specific learning difficulties such as dyslexia, which further hindered their language learning progress. The study also indicated that a considerable



number of students lacked critical academic and interpersonal skills required at the undergraduate level. Skills such as critical thinking, creativity, collaboration, communication, problem-solving, digital literacy, adaptability, and self-directed learning were found to be underdeveloped among many participants. These findings highlighted the necessity of implementing innovative pedagogical strategies that could address both language learning needs and the development of essential competencies required for academic and professional success in the twenty-first century.

Furthermore, the research facilitated the creation and implementation of diverse English language teaching and learning methods, including mobile-assisted learning, computer-assisted learning, Information and Communication Technology (ICT)-based language teaching, gamification, infographic-based instruction, and the theory of multiple intelligences. These approaches were integrated into the blended learning framework to provide learners with varied opportunities for engagement, interaction, and skill development. The blended learning model combined traditional face-to-face instruction with digital and technology-enhanced learning experiences, thereby creating a flexible and learner-centred educational environment.

In addition, the study utilised a wide range of methodological tools and technological resources to enrich the learning process. These included mobile applications, online video conferencing platforms such as Zoom and Google Meet, interactive e-games, Web 2.0 tools, augmented reality (AR), virtual reality (VR), infographics, Brain Gym activities, vlogs, and social networking platforms such as WhatsApp, Facebook, Instagram, Twitter, and other online communication tools. Emerging technologies such as ChatGPT, chatbots, Google Bard, and various Artificial Intelligence tools were also incorporated into the learning process. These digital resources provided learners with immediate feedback, interactive learning opportunities, authentic language exposure, and personalised learning experiences. The integration of AI-based tools particularly supported students in improving grammar, vocabulary, pronunciation, writing, speaking, and overall language proficiency while simultaneously enhancing their digital literacy skills.

The learners participated in a variety of engaging classroom activities designed to strengthen their English language competence and develop 21st-century skills. Students were involved in peer learning activities, pair work, group discussions, and individual tasks that encouraged active participation and collaborative learning. The activities included reading and discussing news articles, self-introduction exercises, paralinguistic communication activities, pronunciation practice sessions, emotive speaking exercises, rhetorical speech presentations, role-play performances, debates, interactions with AI tools, mini-drama productions, story-chain activities, shadow speaking exercises, translation tasks, TED Talk presentations, creative writing and speaking exercises, chat-and-find activities, and numerous other language-focused tasks. These activities were carefully selected to provide learners with authentic opportunities to practice language skills in meaningful and real-life contexts.

Various instructional materials were employed to support the learning process and make classroom experiences more interactive and engaging. Worksheets, newspaper cuttings, flashcards, pictures, models, and audio-visual clips were extensively used as teaching aids. These materials helped learners understand concepts more effectively and encouraged active participation in classroom activities. The use of multimedia resources enhanced students' interest and motivation while promoting better comprehension and retention of language concepts.

Throughout the study, students were consistently motivated and encouraged to complete assigned tasks and participate actively in learning activities. The tasks were designed and practised in such a way that motivation, enjoyment, and entertainment played a significant role in the learning process. By incorporating elements of fun, creativity, and collaboration, the learning environment became more engaging and less stressful for students. This approach helped reduce anxiety and fear associated with language learning while fostering confidence and willingness to communicate in English. Both teacher-led and learner-led classroom environments were organised under flexible and rule-free learning conditions. This approach empowered learners to take greater responsibility

for their own learning while allowing teachers to serve as facilitators and guides. The learner-centred nature of the blended learning environment promoted autonomy, independent thinking, and active engagement. Students were encouraged to explore ideas, experiment with language, collaborate with peers, and utilise digital resources to enhance their learning experiences.

The findings of the study revealed that the blended learning mode of instruction significantly improved the 21st-century skills of students. Participants demonstrated greater adaptability, creativity, collaboration, communication, and flexibility in using the English language across various contexts. They became more confident in expressing their ideas, interacting with others, and utilising technology for learning purposes. The integration of innovative teaching methods, digital tools, and interactive learning activities contributed substantially to the development of both language proficiency and essential life skills. Therefore, the study confirms that 21st-century skills play a vital role in the learning process and that blended learning serves as an effective approach for fostering these competencies while enhancing English language learning among undergraduate students.

Exit Behaviour

The study was directed through a variety of learner-centred activities such as brainstorming and problem-solving tasks, creative speaking and writing exercises, picture description, mind mapping, role-play, group discussions, oral presentations, and activities based on real-life situations. These instructional strategies were carefully selected to promote active participation and meaningful engagement among learners. Such activities encouraged students to think critically, communicate effectively, collaborate with peers, and express their ideas creatively. The learning environment was designed to move beyond traditional teacher-centred instruction by providing students with opportunities to apply language skills in practical and authentic contexts. Through continuous interaction and participation, learners were able to enhance both their linguistic competence and their higher-order thinking skills.

In the progression of the study, advanced Artificial Intelligence (AI) tools were exclusively allotted for English language training and practice. These AI-based tools provided learners with personalised learning experiences, immediate feedback, interactive exercises, and opportunities for self-paced learning. The integration of AI technology enabled students to engage with language-learning activities more effectively and independently. Furthermore, the use of AI-assisted learning platforms enhanced motivation and sustained learner interest throughout the instructional process. The technology-supported environment also facilitated continuous practice and reinforcement of language skills, thereby contributing to the overall effectiveness of the blended learning approach.

For this research, an innovative testing and evaluation procedure known as the Analytical Rubric Assessment was employed. This assessment method enabled the researcher to evaluate learners' performance across multiple dimensions systematically and objectively. The rubric provided clear performance indicators and criteria for measuring the development of specific competencies associated with English language learning and 21st-century skills. By adopting this comprehensive evaluation framework, the study ensured greater reliability and accuracy in assessing student progress and achievement.

Following the instructional intervention, a series of assessments were administered to evaluate the students' learning outcomes and the development of their 21st-century skills. These exit assessments were specifically designed to measure growth and improvement in key areas such as critical thinking, communication, collaboration, creativity, and problem-solving abilities. The performance of students who participated in the blended learning programme was compared with that of the control group that received traditional instruction. This comparison provided valuable insights into the effectiveness of AI-supported blended learning in enhancing learners' competencies.

Although the results have already been discussed, it is essential to analyse the growth and achievements of the participants through their exit behaviour. Exit behaviour, reflected through post-test scores and performance

outcomes, serves as a significant indicator of learning achievement and skill development. The findings reveal a remarkable improvement among the participants, demonstrating substantial gains in the acquisition and enhancement of 21st-century skills. The post-test results clearly indicate that the blended learning approach, supported by AI technologies, contributed significantly to learners' academic growth, skill development, and overall educational achievement. Post-test Analytical Rubric score is given below.

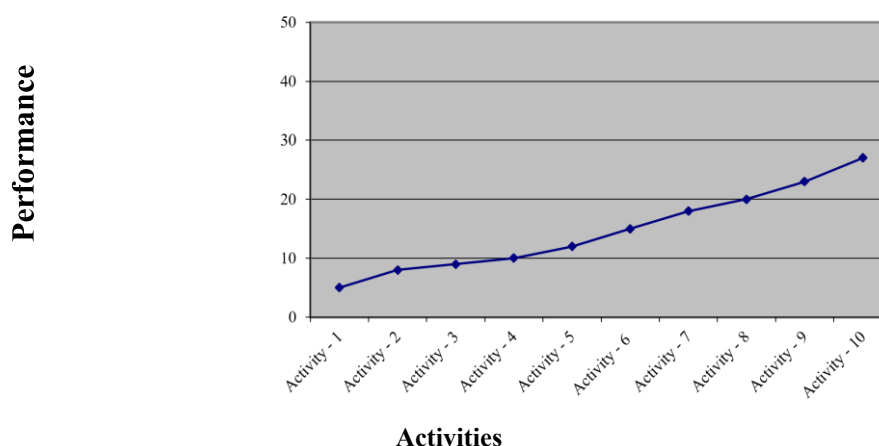
Analytic Rubric of Activity - 1

		Based on 21st Century Skills development, the Blended Learning Method					
Activity1	Content	Advanced (7-9)	Proficient (4-6)	Basic (2-3)	Minimal (0-1)	Score (10)	Remarks
Task – A	Draw a picture that symbolises you	The main thought was clearly expressed	Thought presented, but not always coherent	The thought was expressed with limited explanation	Used limited language to explain	5	Confidence improved
Task – B	Love Letter	Presented the language consistently with coherence	Used the language associated with the letter with a few errors	Language had mistaken that which impeded meaning	Committed mistakes and thoughts were not clearly expressed	6	Participation brought up
Task – C	Chat with AI	Did the conversation effectively	Faced some difficulty in conveying meaning	Involved in limited conversation	Made a limited conversation	5	Made to be brisk
Task – D	Debate	Attended with full confidence	Attended with fluent language	Attended with a positive spirit	Attended and responded adequately	6	Reasoning and problem-solving skills got improved
Task – E	Creative Speaking	Spoke with full confidence	Spoke in fluent language	Spoke with a positive spirit	Spoke and responded adequately	7	Creativity and developing

Total score 29/50

Table 1. Rubric Rating of Activity 1

Consolidated Analytical Rubric of 21st Century Skill Development



Result Discussion

It has been observed that the pre-test standard score was 5, and that during post-test practice, the indicators improved from 5 to 29. This substantial increase in scores clearly demonstrates the positive impact of the Blended Learning classroom environment remedial course on the overall development of the learners. The improvement recorded between the pre-test and post-test stages indicates that students benefited significantly from the integration of traditional classroom instruction with technology-supported learning activities. Such a learning environment provided opportunities for continuous engagement, practice, and reinforcement of language skills, which contributed to better academic outcomes.

The findings suggest that learners developed greater confidence in using the language, particularly in communicative situations that required active participation and interaction. As students were exposed to a variety of learning tasks and digital resources, their cognitive skills, including critical thinking, problem-solving, analysis, and decision-making abilities, showed noticeable enhancement. Furthermore, regular exposure to digital tools and online learning platforms strengthened their digital competence, enabling them to navigate, access, and utilise educational resources more effectively.

Another important outcome of the study is the improvement in students' 21st-century skills. Skills such as collaboration, creativity, communication, adaptability, and independent learning were fostered through the blended learning approach. These competencies are essential for academic success as well as for meeting the demands of a rapidly changing global environment. The increase in performance scores reflects not only gains in language proficiency but also the development of broader learning competencies. Therefore, the results indicate that practising the Blended Learning classroom environment remedial course effectively enhanced students' confidence, cognitive abilities, digital literacy, and 21st-century skills, thereby enabling learners to acquire, comprehend, and produce language more efficiently in a variety of real-life and academic contexts.

Conclusion

Teaching English through blended learning offers a powerful and effective approach to developing 21st-century skills in students. By combining traditional classroom instruction with online learning activities, blended learning provides students with a comprehensive and personalised learning experience that promotes self-directed learning, critical thinking, collaboration, communication, digital literacy, adaptability, creativity, innovation, relevance, personalisation, and lifelong learning. The integration of face-to-face teaching with digital resources creates a dynamic learning environment in which students can actively participate in their own learning process. Through access to online materials, interactive exercises, multimedia content, and collaborative platforms, learners are

encouraged to explore concepts independently while receiving guidance and support from teachers. This balanced approach not only strengthens language proficiency but also enables students to acquire essential competencies required in contemporary educational and professional settings.

Blended learning enhances students' engagement with the English language by offering diverse opportunities for practice and interaction. Students can improve their reading, writing, listening, and speaking skills through a variety of digital tools and classroom-based activities. The flexibility of blended learning allows learners to progress at their own pace, revisit learning materials when necessary, and develop confidence in using English in different contexts. Furthermore, online discussions, group projects, and collaborative assignments encourage teamwork and communication, helping students to exchange ideas, solve problems collectively, and build meaningful learning relationships. These experiences contribute significantly to the development of social and interpersonal skills that are highly valued in the 21st century.

As the growth of the English language increases day by day, we continue to navigate the complexities of the modern world, where blended learning will play a progressively crucial role in preparing students for success in the 21st century and beyond. The increasing integration of technology into education highlights the importance of equipping learners with digital competencies alongside language skills. Blended learning supports this objective by familiarising students with technological tools and online environments that are commonly used in academic and professional contexts.

Thus, has been observed in exit behaviour that the students in the experimental group were taught by an expert teacher or guide in a Blended Learning Classroom mode, and hence the results improved tremendously, and they were able to use their 21st-century skills for better English learning. Their improved performance demonstrates the effectiveness of blended learning in fostering independent learning habits, enhancing motivation, and creating meaningful opportunities for the practical application of English language skills. The positive outcomes indicate that blended learning is a valuable educational approach for promoting both language development and the acquisition of essential 21st-century competencies.

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