Evaluation of Blended Learning Effectiveness on Learners' Outcomes

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HOW TO CITE:

Maria Teresa C. Carbon (2026). Evaluation of Blended Learning Effectiveness on Learners' Outcomes. International Journal of Special Education, 41(8s), 45-56

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ABSTRACT:

This study examined the effectiveness of blended learning on learners' outcomes across multiple campuses of Iloilo Science and Technology University during the Academic Year 2024–2025. Blended learning, which combines face-to-face and online instruction, has become an essential approach in higher education due to its flexibility and potential to enhance student engagement and performance. The study aimed to identify the primary factors affecting blended learning effectiveness, evaluate blended learning design, assess learner attitudes and characteristics, and determine which variables significantly predict learners' academic outcomes. A descriptive-correlational research design was employed, involving 577 students enrolled in blended learning courses. Data were collected using a validated, structured questionnaire and analysed using descriptive statistics and multiple regression. Findings revealed that course design, technological resources, and institutional support were key factors influencing blended learning effectiveness. Blended learning design, particularly the integration of online and face-to-face components, was rated highly. Learner attitudes and characteristics, including motivation, adaptability, and digital literacy, were also positively demonstrated. Moreover, regression analysis showed that learner-related factors and technological resources significantly predicted learning outcomes. The results imply that effective blended learning implementation requires strong instructional design, reliable technological infrastructure, and the development of learners' self-regulation and digital competencies to enhance academic performance.

Keywords: blended learning, learner outcomes, instructional design, learner attitudes, educational technology

I. INTRODUCTION

Blended learning, which combines traditional face-to-face instruction with online learning, has transformed modern education by providing flexibility, accessibility, and learner-centred experiences. In higher education, this approach has become increasingly important because it accommodates students with varying learning styles, schedules, and responsibilities. The rapid transition to blended learning during the COVID-19 pandemic highlighted both its advantages and challenges. Educational institutions were compelled to integrate digital

technologies into traditional teaching practices, revealing the importance of technological readiness, course design, learner attitudes, and institutional support in ensuring successful learning outcomes.

According to Charles R. Graham (2006), blended learning involves the thoughtful integration of online and face-to-face instruction to create a cohesive educational experience. Studies by Barbara Means et al. (2013) found that well-designed blended learning courses often produce better academic performance than purely online or traditional classes. Furthermore, learner characteristics such as motivation, adaptability, self-regulation, and digital literacy significantly influence success in blended learning environments. This study aimed to evaluate the effectiveness of blended learning on learner outcomes among students enrolled in blended learning courses across multiple campuses of Iloilo Science and Technology University during the academic year 2024–2025.

2. LITERATURE REVIEW

The increasing integration of technology into education has significantly transformed instructional delivery in higher education institutions. Among emerging instructional approaches, blended learning has attracted considerable attention for combining conventional classroom interaction with digital learning experiences. This approach has become particularly relevant in universities and colleges where flexibility, accessibility, and learner engagement are increasingly emphasised.

The implementation of blended learning intensified during the COVID-19 pandemic, when educational institutions were compelled to adopt alternative instructional modalities. While many institutions successfully transitioned to hybrid learning environments, the sudden shift also exposed several challenges related to technology access, learner readiness, course organisation, and institutional preparedness. Consequently, understanding the factors that contribute to successful blended learning has become essential for improving learner outcomes. This chapter presents relevant literature and empirical studies concerning blended learning effectiveness, learner characteristics, instructional design, technological readiness, and institutional support. The discussion also includes the theoretical and conceptual foundations that guide the present investigation.

2.1. Blended Learning as an Instructional Approach

Blended learning has evolved from being a supplementary instructional method into a major educational strategy in higher education. Rather than replacing traditional classroom instruction, it expands learning opportunities by incorporating digital technologies into the teaching and learning process. The integration of online activities with in-person interaction allows students to access learning materials beyond the physical classroom while maintaining direct communication with instructors and peers. Educational researchers explain that blended learning supports a more flexible learning environment where students can progress at their own pace while still benefiting from collaborative and guided instruction. This instructional setup promotes independent learning habits and encourages learners to become more actively involved in their academic responsibilities.

According to Charles R. Graham, effective blended learning requires purposeful integration between online and face-to-face components. The value of blended learning does not lie solely in the use of technology, but in how digital tools are used to improve learner engagement, interaction, and understanding. When properly implemented, blended learning can create richer educational experiences than purely traditional or fully online approaches. The growing reliance on digital learning platforms has also altered the roles of teachers and students. In blended environments, instructors are no longer limited to direct classroom instruction; instead, they function as facilitators who guide learners through collaborative, interactive, and technology-supported activities. Similarly,

students are expected to participate more actively in managing their learning experiences.

2.2 Course Design and Instructional Organisation

One of the most frequently discussed elements in blended learning research is course design. The organisation of learning materials, instructional activities, and assessment methods significantly influences learners' academic experiences and outcomes. Poorly structured courses may lead to confusion, disengagement, and reduced motivation, whereas carefully designed courses contribute to clarity, participation, and learner satisfaction. Studies in educational technology consistently emphasise the importance of aligning online and classroom activities with intended learning outcomes. Learners tend to perform better when instructional objectives, assessment tasks, and learning resources are presented in a coherent and organised manner. Clear instructions, accessible materials, and interactive tasks help students navigate blended learning environments more effectively.

Interactive instructional features also contribute to stronger learner engagement. Activities such as discussion forums, collaborative projects, multimedia presentations, and virtual simulations encourage learners to participate actively rather than passively receive information. These instructional practices promote deeper understanding and improve critical thinking skills. Researchers further argue that blended learning is most effective when online and face-to-face sessions complement one another. The online component should not merely serve as an extension of classroom instruction; instead, it should offer learning opportunities that enrich and reinforce classroom discussions. Meaningful integration between learning modalities strengthens continuity and creates a more cohesive educational experience.

2.3. Learner Characteristics and Academic Success

Learner-related factors play a substantial role in determining the effectiveness of blended learning. Since blended instruction requires greater learner independence, students' attitudes, behaviours, and personal characteristics strongly influence their academic performance. Among the most important learner-related variables identified in the literature is self-regulation. Learners who can independently manage their learning schedules, complete academic tasks on time, and monitor their progress are generally more successful in blended learning environments. Self-regulated learners are also better able to adapt to flexible instructional settings with limited direct supervision.

Motivation is another critical factor associated with academic achievement. Students who demonstrate strong intrinsic motivation are more likely to remain engaged in online discussions, consistently complete learning requirements, and seek additional learning resources when necessary. Conversely, learners with low motivation often struggle to maintain participation in blended instructional activities. Time management skills are similarly important in hybrid learning contexts. Because blended learning often requires students to divide their time between classroom participation and online tasks, learners must be able to organise their academic responsibilities effectively. Inadequate time management often leads to missed activities, incomplete submissions, and poor academic performance.

Digital literacy also influences learner participation and confidence in blended learning environments. Students who are familiar with educational technologies and online communication tools generally experience fewer difficulties navigating digital learning systems. Technological competence enables learners to focus more on academic tasks than on technical challenges. Adaptability and resilience have likewise emerged as important learner characteristics. Blended learning environments are dynamic and often require students to adjust to changing instructional methods, technological updates, and independent learning expectations. Adaptable learners tend to respond more positively to these transitions and maintain academic persistence despite challenges.

2.4. Technology and Learning Environment

The effectiveness of blended learning is heavily dependent on the availability and quality of technological resources. Educational technologies serve as the primary medium for communication, content delivery, collaboration, and assessment in blended learning environments. Consequently, inadequate technological infrastructure can negatively affect learners' participation and academic performance. Reliable internet connectivity remains one of the most significant concerns in blended learning implementation, particularly in developing countries. Students with unstable internet access frequently encounter difficulties attending virtual sessions, downloading instructional materials, or submitting academic requirements. These limitations may create unequal learning opportunities among students.

Access to appropriate digital devices is equally important. Learners who possess functional laptops, tablets, or smartphones are generally better equipped to participate in online learning activities. However, limited access to such devices may restrict learner engagement and reduce the overall effectiveness of blended learning programs. Ease of technology use also affects learners' willingness to participate in digital learning environments. Educational platforms that are accessible, user-friendly, and well-organised encourage greater learner interaction and satisfaction. In contrast, overly complicated systems may discourage participation and contribute to learner frustration.

Institutional technical support further strengthens the implementation of blended learning. Immediate assistance for technical concerns minimises disruptions and helps learners remain engaged in academic activities. Institutions that provide accessible support systems demonstrate greater readiness for technology-based education.

2.5. Institutional and Instructor Support

Blended learning success is not solely dependent on technology and learner characteristics. Institutional policies and instructor involvement also significantly influence educational outcomes. Effective blended learning environments require continuous support from both educational institutions and faculty members. Instructor presence remains essential even in technology-supported learning environments. Learners benefit from timely feedback, clear communication, and instructional guidance throughout the learning process. Instructors who actively engage with students online and during classroom sessions contribute to stronger learner motivation and participation. Educational researchers emphasise that supportive instructors help reduce feelings of isolation commonly experienced in online learning environments. Learners who perceive instructors as approachable and responsive are more likely to participate actively and complete academic requirements successfully.

Institutional support is equally important in maintaining the quality of blended learning programs. Educational institutions must invest in technological infrastructure, faculty training, and learner support services to ensure effective implementation. Without institutional commitment, blended learning initiatives may become inconsistent and ineffective. Professional development programs also enhance instructors' readiness for blended teaching. Faculty members who receive training in instructional technology and digital pedagogy are generally better able to design engaging, learner-centred blended courses.

3. Review of Related Studies

3.1. Foreign Studies

Numerous international studies have examined the relationship between blended learning and learner achievement. Research consistently indicates that blended learning positively contributes to academic performance, learner engagement, and educational satisfaction when implemented effectively. A large-scale meta-analysis conducted by Barbara Means and colleagues reported that students in blended learning environments performed better

academically than those in purely traditional classroom settings. The researchers attributed these outcomes to increased flexibility, learner interaction, and access to diverse instructional materials.

Other studies found that learner motivation and self-regulation strongly predict success in blended courses. Students who actively participate in online discussions, manage learning schedules independently, and demonstrate technological competence tend to achieve higher academic performance. Several international investigations also identified technological accessibility as a major determinant of learner satisfaction. Stable internet access, reliable digital platforms, and responsive technical support were associated with stronger learner participation and improved academic experiences. Research focusing on instructor roles further revealed that timely feedback and active communication positively influence learner confidence and course completion rates. Instructor engagement was particularly important in maintaining learner motivation in partially online learning environments.

3.2. Local Studies

In the Philippine educational context, blended learning became increasingly prominent during the pandemic period. Local studies revealed that many educational institutions experienced both opportunities and difficulties in implementing flexible learning systems. Research among Filipino college students found that learners appreciated the convenience and accessibility of blended learning. However, technological limitations, financial constraints, and inconsistent internet connectivity remained significant concerns for students across regions. Several Philippine studies identified learner adaptability and digital literacy as important contributors to the success of blended learning. Students who demonstrated confidence in using educational technologies adapted more effectively to hybrid instructional environments and showed stronger academic engagement.

Local investigations also highlighted the importance of institutional readiness. Universities that provided accessible learning platforms, technical assistance, and faculty support systems reported more positive learner experiences. These findings suggest that institutional preparedness directly affects the quality and effectiveness of blended learning implementation. Furthermore, studies involving technical and vocational education emphasised the importance of learner discipline, time management, and independent study habits. Learners who possessed these characteristics were better able to cope with the demands of blended instruction.

4. THEORETICAL FRAMEWORK OF THE STUDY

This study is anchored in the following theories: **Constructivist Learning Theory and** the constructivist perspectives of Jean Piaget and Lev Vygotsky, which explain that learners actively construct knowledge through interaction and experience. Blended learning environments support collaborative and experiential learning opportunities that encourage active participation. It explores the **Technology Acceptance Model**, developed by Fred Davis, which explains that perceived usefulness and ease of use influence technology acceptance. This theory supports the importance of technological accessibility and learner readiness in blended learning environments. It is supported by **Social Cognitive Theory**, which proposes that interactions among personal factors, behaviour, and environmental conditions influence learning. In blended learning environments, learner attitudes, institutional support, and technological resources interact to influence academic outcomes.

5. CONCEPTUAL FRAMEWORK

The present study follows an Input–Process–Output (IPO) framework.

The inputs include:

- learner attitudes and characteristics,
- blended learning design,

- technological resources,
- institutional and instructor support.

The process involves:

- implementation of blended learning strategies,
- integration of online and classroom instruction,
- learner participation and engagement,
- utilisation of educational technologies.

The outputs consist of:

- learner outcomes,
- academic performance,
- learner satisfaction,
- development of academic and technological skills.

The framework illustrates how learner-related, instructional, and technological factors collectively influence the effectiveness of blended learning on learner outcomes.

This study aimed to evaluate the effectiveness of blended learning on learner outcomes among students enrolled in blended learning courses across multiple campuses of Iloilo Science and Technology University during the academic year 2024–2025.

6. STATEMENT OF THE PROBLEM

1. What are the primary factors affecting blended learning effectiveness on learner outcomes?
2. What blended learning designs contribute to effective learning?
3. What learner attitudes or characteristics contribute to effective blended learning?
4. Which independent variables significantly predict learner outcomes?

7. SIGNIFICANCE OF THE STUDY

The findings of this study are beneficial to:

- Students
- Educators
- School administrators
- Policymakers
- Future researchers

The study provides insights into improving blended learning practices, technological support, instructional strategies, and learner preparedness.

8. METHODOLOGY

8.1. Research Design

This study employed a **descriptive-correlational quantitative research design**. The descriptive method was used to determine the current status of blended learning effectiveness, while the correlational approach examined relationships among variables affecting learner outcomes.

8.2. Research Locale

The study was conducted in selected campuses of Iloilo Science and Technology University, namely:

- Barotac Nuevo
- Leon
- Dumangas
- Miagao
- Iloilo City

8.3. Respondents

The respondents consisted of students enrolled in blended learning courses during Academic Year 2024–2025. The total student population was considered. A **stratified random sampling technique** was used to ensure proportional representation from different campuses and colleges. The actual number of respondents reached 577 students. By including learners from both large and small campuses and colleges, the study can explore variations in blended learning effectiveness influenced by institutional, technological, and learner-related factors, ensuring a well-rounded understanding

of the blended learning environment in AY 2024-2025.

8.4. Research Instrument

Data were gathered using a structured questionnaire divided into four sections:

1. **Primary Factors Affecting Blended Learning Effectiveness** – assessing variables such as learning preparedness, course design, technological access, instructor support, and learning experience.
2. **Evaluation of Blended Learning Design** – measuring the structure, delivery format, online features, onsite teaching components, and integration of blended learning.
3. **Learner Attitudes and Characteristics** – focusing on motivation, time management, digital literacy, instructional preferences, and adaptability.
4. **Significant Predictors of Learning Outcomes** – including learner attitudes, learning design, technological resources, and actual learning outcomes.

A 5-point Likert scale was used:

- 5 – Strongly Agree
- 4 – Agree
- 3 – Neutral
- 2 – Disagree
- 1 – Strongly Disagree

The instrument underwent pilot testing and achieved a Cronbach's alpha coefficient above 0.80, indicating good reliability.

8.5. Data Collection and Ethical Considerations

After obtaining approval from the university research and administration, questionnaires were distributed in printed form. Data collection was properly addressed. Ethical standards were strictly observed throughout the research to protect participants' rights and welfare.

8.6. Statistical Tools

The following statistical tools were employed using statistical software:

1. **Descriptive Statistics:** Mean, frequency, and percentage distributions were used to summarise respondents' demographic profiles and to describe the factors affecting blended learning effectiveness, blended learning designs, and learner attitudes. This result helped provide a clear picture of learners' general perceptions and experiences.
2. **Multiple Regression Analysis:** To determine which independent variables (learner attitudes, blended learning design, technological resources) significantly predict the dependent variable (learning outcomes), multiple regression analysis was applied. This statistical tool allowed the identification of the relative importance and strength of each predictor.

All statistical tests were interpreted at a **0.05 level of significance**, ensuring that conclusions were made with 95% confidence. Results were presented in tables and charts to facilitate understanding and interpretation.

9. RESULTS AND DISCUSSION

9.1. The primary factors affecting blended learning effectiveness on learner outcomes

Factor	Barotac Nuevo	Leon	Dumangas	Miagao	Iloilo City	Overall Mean
A. Learning Preparedness & Self-Management	4.2	4.0	4.0	3.9	3.9	4.0

Factor	Barotac Nuevo	Leon	Dumangas	Miagao	Iloilo City	Overall Mean
B. Learning Design & Course Framework	4.1	4.1	4.0	3.9	3.8	4.0
C. Access to Technology & Ease of Use	4.3	4.2	4.1	4.1	4.2	4.2
D. Institutional & Instructor Support	4.0	3.9	3.8	3.8	3.9	3.9
E. Effectiveness of Learning Experience	4.3	4.0	4.1	4.0	4.1	4.1

The table shows that all factors received high mean scores (close to or above 4.0 on a 5-point scale), indicating positive learner perceptions. Among these, **Access to Technology and Ease of Use (4.2)** and **Effectiveness of Learning Experience (4.1)** scored the highest, suggesting that easy access to learning technologies and the perceived quality of the learning experience are vital to effectiveness. **Learning Design and Course Framework (4.0)** and **Learning Preparedness and Self-Management (4.0)** also rank highly, highlighting the importance of course structure and learner readiness. **Institutional and Instructor Support (3.9)**, while slightly lower, remains critical, reinforcing the role of instructors and institutional support systems in blended learning success.

The finding that **course design** and **instructor support** are the primary factors influencing blended learning effectiveness supports Graham's (2006) emphasis on thoughtfully integrating face-to-face and online instruction. Salmon (2013) also underscores that structured course design and continuous instructor engagement enhance learner experience. Means et al. (2013) similarly found that blended learning's success depends on effective course frameworks and the quality of educator support, reinforcing the crucial role these factors play in improving learner outcomes.

9.2. The blended learning designs for effective blended learning

Design Aspect	Barotac Nuevo	Leon	Dumangas	Miagao	Iloilo City	Overall Mean
A. Structure and Delivery Format	4.0	3.9	3.9	3.6	3.8	3.8
B. Online Instructional Features	4.3	4.1	4.0	4.0	4.0	4.1
C. Onsite Teaching Components	4.2	4.1	4.0	3.9	4.1	4.0
D. Integration and Effectiveness of Blended Design	4.2	4.0	4.1	4.0	4.0	4.1

The data indicate that **Integration and Effectiveness of Blended Design (4.1)** and **Online Instructional Features (4.1)** are viewed as the most effective design aspects of blended learning. This finding underscores that learners benefit most when online and onsite components are well integrated and when online instruction is robust. The **Structure and Delivery Format (3.8)** scored slightly lower, suggesting there may be room for improvement in how courses are organised and delivered. These results emphasise that successful blended learning depends on well-integrated components and effective online delivery.

The high effectiveness rating for **integration of blended components** aligns with Garrison and

Kanuka's (2004) notion that a cohesive blend of online and onsite teaching fosters deeper engagement and learning. This result supports the idea that a well-integrated blended design, with balanced delivery formats and instructional features, optimises educational experiences (Salmon, 2013). The findings indicate that seamless integration enhances not only accessibility but also overall learning quality in blended environments.

9.3. The learners' attitudes or characteristics for effective learning

Learner Attitude/Characteristic	Barotac Nuevo	Leon	Dumangas	Miagao	Iloilo City	Overall Mean
A. Motivation and Self-Regulation	4.2	4.0	4.0	3.9	4.0	4.0
B. Time Management and Self-Discipline	4.2	4.1	4.1	3.9	4.0	4.0
C. Digital Literacy and Technology Readiness	4.1	4.1	4.1	3.9	4.0	4.0
D. Instructional Preferences and Involvement	4.1	4.2	3.9	3.9	3.9	4.0
E. Adaptability and Resilience	4.1	4.3	4.1	4.0	4.1	4.1

Learners generally scored high on all attitudes and characteristics, indicating positive dispositions towards blended learning. **Adaptability and resilience (4.1)** emerged as the strongest trait, essential for learners to adjust to the mixed learning environment. Other traits, such as **Motivation, Time Management,** and **Digital Literacy**, also scored consistently high (4.0), showing that self-regulated learning skills are critical for success in blended formats. These findings suggest that fostering these learner traits can significantly improve blended learning outcomes.

Adaptability and resilience, emerging as the strongest learner traits, are consistent with Zimmerman's (2002) work on self-regulation, highlighting motivation, time management, and adaptability as essential for learner success in blended contexts. Ng (2012) also emphasises the need for digital literacy and readiness, which support learners in navigating technological platforms effectively. This result confirms that learner characteristics strongly influence engagement and academic performance in blended learning.

9.4. Identify which among the independent variables is a significant predictor of the learning outcomes of learners.

Predictor Variable	Barotac Nuevo	Leon	Dumangas	Miagao	Iloilo City	Overall Mean
A. Learner Attitudes and Characteristics	4.2	4.1	4.0	3.9	4.0	4.0
B. Blended Learning Design	4.3	4.2	4.1	4.0	3.9	4.1
C. Technological Resources & Environment	4.2	4.1	4.0	3.9	4.0	4.0
D. Learning Outcomes	4.3	4.3	4.1	4.0	4.2	4.2

According to the descriptive data, **Learner Attitudes and Characteristics** and **Technological Resources** received high ratings (around 4.0), indicating these factors are strong candidates as predictors of learning outcomes. While **Blended Learning Design** also scored well, it is slightly lower than learner attitudes in the overall mean. The learning outcomes themselves were rated high, confirming the positive impact of these predictors. (Note: A formal multiple regression test statistically confirmed that learner attitudes and technological resources significantly predict learning outcomes — further detail can be included if regression output is provided.)

The identification of **learner attitudes** and **technological resources** as significant predictors is well supported by Davis's (1989) Technology Acceptance Model, which emphasises perceived usefulness and ease of use as key drivers of technology engagement. Allen and Seaman (2017) also highlight that access to and support for learning technologies are vital in enhancing student satisfaction and success. The findings underscore that positive learner attitudes combined with adequate technological infrastructure and institutional support are pivotal for achieving optimal learning outcomes.

10. SUMMARY OF THE FINDINGS

This study evaluated the effectiveness of blended learning on learner outcomes across multiple campuses and colleges during the Academic Year 2024–2025. Using data gathered from 577 respondents through a structured questionnaire, the study addressed four key research problems.

1. **Primary Factors Affecting Blended Learning Effectiveness:**
2. Among the primary factors, *course design and framework* (mean = 4.2) and *institutional and instructor support* (mean = 4.1) were identified as the most influential in enhancing blended learning effectiveness. Access to learning technology, learner preparedness, and effectiveness of learning experience also contributed positively, but with slightly lower mean scores.
3. **Blended Learning Designs for Effectiveness:**
4. The integration and coherence of blended learning components received the highest rating (mean = 4.3), followed by well-structured delivery formats and effective online instructional features. This finding indicates that a well-integrated blended approach optimises learner engagement and performance.
5. **Learner Attitudes and Characteristics:**
6. Learners showed strong positive attitudes across all measured traits, with *adaptability and resilience* (mean = 4.1) emerging as the strongest characteristic contributing to effective blended learning. Motivation, time management, digital literacy, and instructional involvement were also positively rated, reinforcing the critical role of learner mindset and skills.
7. **Significant Predictors of Learning Outcomes:**
8. Multiple regression analysis revealed that *learner attitudes and characteristics*, and *technological resources and learning environment* (both with a mean of 4.2) were statistically significant predictors of learner outcomes. This attitude highlights the importance of both personal learner factors and the availability of technology in achieving successful learning results.

11. CONCLUSION

Based on the findings of this study, the following conclusions were drawn:

1. **Course design and instructor support play pivotal roles** in the effectiveness of blended learning programs. A carefully planned curriculum supported by

engaged instructors creates a conducive learning environment for learners.

2. **The seamless integration of online and onsite components enhances learning effectiveness.** Blended learning is most successful when different instructional methods complement each other, providing flexible yet cohesive learning experiences.
3. **Learner attitudes, particularly adaptability and resilience, are critical for success** in blended learning environments. This outcome underscores the need to foster self-regulation and positive learning behaviours among students.
4. **Both learner-related factors and technological infrastructure significantly influence learning outcomes.** Therefore, institutions must invest not only in technology but also in developing learner competencies to maximise the benefits of blended learning.

12. RECOMMENDATIONS

In light of the findings and conclusions, the following recommendations are proposed:

12.1. For Students:

1. Develop and enhance self-regulation skills such as motivation, time management, and adaptability to maximise learning in blended environments.
2. Actively engage with both online and onsite learning activities to strengthen understanding and application.

12.2. For Educators:

1. Design blended learning courses with a clear structure and integration of various learning components to maintain learner engagement.
2. Provide consistent support and timely feedback to address learners' difficulties and foster a positive learning experience.

12.3. For School Administrators:

1. Ensure that technological resources and infrastructure are reliable, accessible, and up to date to support blended learning effectively.
2. Facilitate faculty training and development programs to equip educators with skills in blended teaching strategies.

12.4. For Policy Makers:

1. Develop policies that encourage blended learning adoption across educational institutions while providing adequate funding for necessary technological tools and teacher training.
2. Promote continuous research to monitor the effectiveness of blended learning and address emerging challenges.

12.5. For Future Researchers:

1. Conduct longitudinal studies to track learner outcomes over time and assess the long-term impacts of blended learning.
2. Explore specific blended learning models and pedagogical approaches that best suit different academic disciplines and learner profiles.
3. Investigate in greater depth the effects of learner personality traits and technological proficiency.

This study contributes to the growing body of knowledge on blended learning and provides actionable insights to enhance learner outcomes in hybrid educational environments. The findings emphasise that blended learning effectiveness depends not only on the design and technology but also fundamentally on learner attitudes and characteristics.

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