

A Comparative Study on Traditional vs. Tech-Integrated Learning: A Student-Centric Perspective Among Autonomous College Students in Mumbai (Age Group 18-21 Years)

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Abstract: *The education system has undergone a significant transformation with the integration of technology into learning methodologies. Traditional learning methods, characterized by face-to-face interactions, structured pedagogies, and classroom discipline, have long been the standard approach. However, with advancements in digital technology, tech-integrated learning, which includes online platforms, digital tools, and interactive learning environments, has gained traction. This research explores the effectiveness of both learning methods from a student-centric perspective, focusing on engagement, knowledge retention, accessibility, and overall learning outcomes. By adopting a mixed-methods approach, the study assesses students' preferences, examines the impact of both methodologies, and provides recommendations for optimizing blended learning experiences.*

Keywords: *learning methodologies*

I. INTRODUCTION

Education has evolved significantly over the years, adapting to societal and technological changes. Traditional learning, which involves direct interaction between students and teachers in a physical classroom, has been the dominant approach for centuries. However, the rapid advancement of technology has introduced tech-integrated learning, which incorporates digital resources, online platforms, and interactive methods to enhance education. This study seeks to compare these two learning approaches, assessing their effectiveness from the perspective of undergraduate students aged 18-21.

The research focuses on key factors such as student engagement, knowledge retention, accessibility, and overall academic performance. By evaluating students' preferences and experiences, the study aims to provide insights into the advantages and limitations of each approach and offer recommendations for a balanced and effective learning model.

II. CONCEPTUAL FRAMEWORK

Traditional Learning- Traditional learning refers to face-to-face education where teaching occurs in a physical classroom setting. The traditional learning is a teacher-centric approach focussing on delivering lessons through lectures and explanations. Learning happens in a real world setting like classroom, laboratory or library. Traditional examinations and written assignments are the primary methods of evaluation.

Tech-Integrated Learning- Tech-Integrated Learning refers to an educational approach that seamlessly incorporates technology into the teaching-learning process to enhance student engagement, understanding, and overall learning outcomes. It involves the use of digital tools, software, and online resources to complement or replace traditional teaching methods.



Student-centric perspective- A Student-Centric Perspective focuses on understanding and analysing educational topics from the viewpoint of students, considering their experiences, preferences, challenges, and learning outcomes. It emphasizes how students perceive, interact with, and benefit from various teaching-learning methods, policies, or educational reforms.

Autonomous Institutions- **Autonomous** institutions are higher education institutions that have the freedom to design their curriculum, academic policies, and evaluation systems while still being affiliated with a recognized university. They operate with greater independence compared to regular affiliated colleges but remain under the oversight of government regulatory bodies like the University Grants Commission (UGC) in India.

III. RESEARCH OBJECTIVES

- To assess students' preferences for traditional vs. tech-integrated learning.
- To evaluate the impact of both methods on student engagement, motivation, and performance.
- To analyze the advantages and challenges of traditional and tech-integrated learning from a student-centric perspective.
- To recommend strategies for optimizing learning experiences by integrating the best aspects of both approaches.

IV. LITERATURE REVIEW

The literature review explores existing studies on traditional and tech-integrated learning, emphasizing their impact on student engagement and academic success.

Author(s) & Year	Title	Country	Variable(s) Studied	Methodology	Key Findings	Source
Fredricks, Blumenfeld & Paris (2004)	School engagement: Potential of the concept, state of the evidence	USA	Student engagement (behavioral, emotional, cognitive)	Literature review & conceptual analysis	Engagement has multiple dimensions that influence learning outcomes	DOI: 10.3102/00346543074001059
Wang & Eccles (2013)	School context, achievement motivation, and academic engagement	USA	Motivation, engagement, academic performance	Longitudinal study with surveys	Student motivation significantly influences engagement levels over time	DOI: 10.1016/j.learninstruc.2013.04.002
Bond, Bedenlier, Marín & Händel (2020)	Emergency remote teaching in higher education: Mapping the first global online semester	Global	Online learning, student engagement	Systematic review of research during COVID-19	Digital learning poses engagement challenges but also new opportunities	DOI: 10.1186/s41239-020-00293-x
Mayer (2021)	Evidence-based	USA	Multimedia learning,	Experimental studies &	Well-structured	DOI: 10.1016/j.jarmac.2021.



	principles for how to design effective instructional videos		engagement, retention	cognitive load theory	videos improve student engagement and learning retention	04.003
Selwyn (2020)	Digital education after COVID-19: The long-term implications	UK	Digital access, engagement gaps	Theoretical analysis	Socioeconomic disparities affect digital learning accessibility	DOI: 10.1080/17439884.2020.1761641
Van Deursen & Helsper (2018)	The third-level digital divide: Who benefits most from being online?	Netherlands	Digital literacy, online learning	Survey-based study	Digital access does not always translate to better learning outcomes	DOI: 10.1108/S2050-206020180000011002
Kuh (2009)	What student engagement data tell us about college readiness	USA	Engagement, readiness for higher education	Data-driven analysis from NSSE	Engagement levels are a strong predictor of college success	Peer Review Journal

V. RESEARCH METHODOLOGY

5.1 Research Design

- The study adopts a quantitative research approach, as it relies on numerical data collected from survey responses.
- The research aims to measure engagement levels in traditional and tech-integrated learning environments.

5.2 Sampling

- Target Population: Undergraduate students (aged 18-21) from various disciplines.
- Sample Size: 100 students from different disciplines.
- Sampling Technique: Stratified random sampling to ensure diversity in academic backgrounds.

5.3 Data Collection Methods

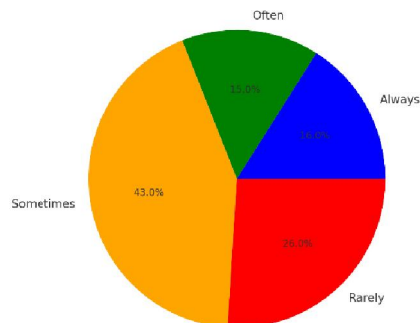
- A structured survey is created using Google Forms.
- The survey consisted of open-ended and close-ended questions
- Respondents include students from different backgrounds to ensure a diverse and representative sample.
- Responses are collected and exported into an Excel spreadsheet for analysis.



VI. FINDINGS AND ANALYSIS

6.1. Findings & Analysis of Digital Tool Usage in Learning (Based on 100 Responses)

Pie Chart: Digital Tool Usage in Learning



The frequency of digital tool usage can be categorized into five groups:

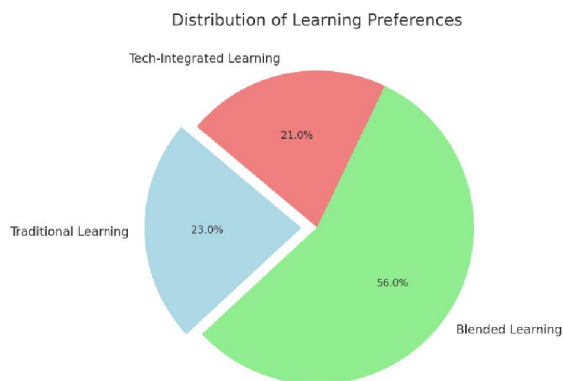
- Always – 16% (16 responses)
- Often – 15% (15 responses)
- Sometimes – 43% (43 responses)
- Rarely – 26% (26 responses)

From the data, "Sometimes" is the most common response, followed by "Rarely", indicating that while digital tools are used, they are not yet a dominant part of students' learning routines. The survey data suggests that while digital tools are used moderately, they are not yet the primary mode of learning. Since most students use them sometimes or rarely (69%), this indicates that digital learning should complement rather than replace traditional learning. A blended learning model, which combines traditional teaching with digital tools, would likely offer the most effective learning experience for students.

6.2. Findings & Analysis of Learning Preferences & Motivation (Based on 100 Responses)

The survey results provide insights into students' preferred learning methods—Traditional, Blended, or Tech-Integrated. Understanding these preferences can help educators design more effective learning experiences.

Distribution of Learning Preferences



The responses can be categorized as follows:

- Traditional Learning: 23% (23 responses)
- Blended Learning: 56% (56 responses)
- Tech-Integrated Learning: 21% (21 responses)



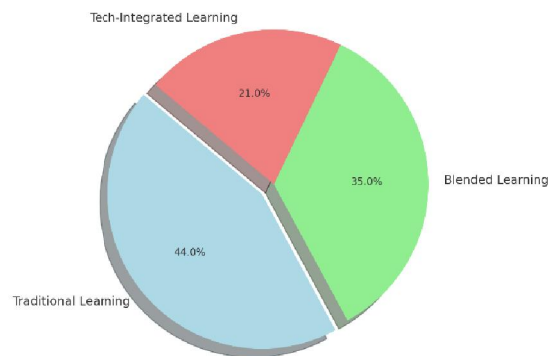
Most students prefer a blended learning approach, indicating that a mix of traditional face-to-face instruction and technology-enhanced learning is the most favoured method. The data suggests that students prefer a blended learning model (56%) over either fully traditional (23%) or fully tech-integrated (21%) approaches. Institutions should move towards hybrid learning, ensuring that both traditional and digital elements complement each other. The key to an ideal learning experience lies in flexibility, accessibility, and engagement, integrating both traditional classroom methods and modern digital tools.

6.3. Findings & Analysis of Learning Preferences & Motivation (Based on 100 Responses)

This analysis explores students' motivation levels based on their preferred learning methods—Traditional, Blended, or Tech-Integrated.

Distribution of Motivation Levels by Learning Method

Distribution of Motivation Levels by Learning Method



The responses indicate the following preferences:

- Traditional Learning: 44% (44 responses)
- Blended Learning: 35% (35 responses)
- Tech-Integrated Learning: 21% (21 responses)

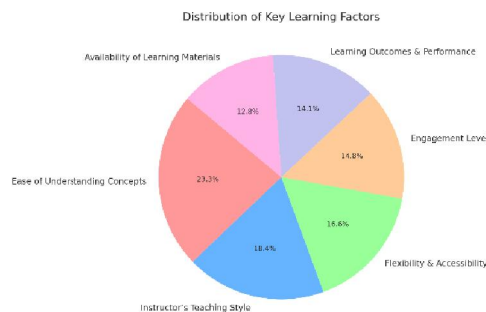
The results show that students feel most motivated when there is structured engagement, personal interaction, and flexibility. Blended learning is an effective compromise—offering both structured learning and digital flexibility. While technology is valuable, traditional engagement methods remain crucial for motivation. The future of education should combine structured traditional approaches with engaging tech-based learning tools to maximize student motivation.

6.4. Findings & Analysis of Factors Influencing Learning Preferences

This analysis examines the key factors that influence students' learning preferences. Respondents could select multiple factors, making it possible to identify which elements play the most significant role in shaping their learning experiences.



Distribution of Key Learning Factors



The top factors influencing learning preferences were:

- Ease of Understanding Concepts – 91%
- Instructor's Teaching Style – 72%
- Flexibility & Accessibility – 65%
- Engagement Level – 58%
- Learning Outcomes & Performance – 55%
- Availability of Learning Materials – 50%

Students value clarity, teaching styles, flexibility, and engagement the most when choosing a learning method. A balanced approach that combines structured instruction, digital flexibility, and interactive elements will improve learning motivation. Educators should continuously adapt their teaching methods to align with students' evolving needs and expectations.

6.5. Findings & Analysis of Frequency of Engagement Levels in a traditional classroom set up and, in a tech-integrated learning environment.

Traditional Classroom

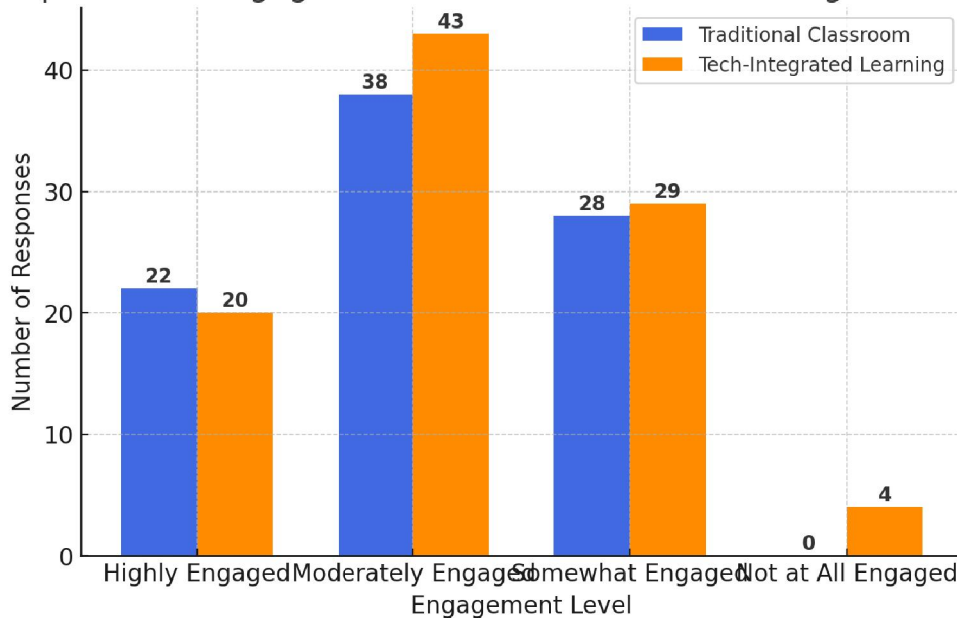
- Highly engaged: 22 times
- Moderately engaged: 38 times
- Somewhat engaged: 28 times

Tech-Integrated Learning

- Highly engaged: 20 times
- Moderately engaged: 43 times
- Somewhat engaged: 29 times
- Not at all engaged: 4 times



Comparison of Engagement in Traditional vs Tech-Integrated Learning



The collected responses indicate varying levels of engagement in both traditional classroom settings and tech-integrated learning environments.

- Traditional learning remains effective: Many students feel engaged in face-to-face settings due to direct interaction, structured lessons, and the presence of a teacher.
- Tech Integration enhances but doesn't guarantee engagement: While technology adds flexibility, multimedia resources, and interactive tools, it does not automatically increase engagement for all students.
- Personalized approaches needed: The data suggests that a hybrid approach—combining traditional classroom teaching with tech-based learning—may work best to cater to diverse learning preferences.
- Student-Centred engagement strategies: Educators should explore active learning strategies such as gamification, discussion-based learning, and real-world applications to maximize engagement.

6.5. Findings & Analysis of Access to High-Speed Internet and Digital Devices for Learning.

- Most students reported having consistent access to high-speed internet and digital devices. This suggests that digital learning is feasible for most, but not all, students.
- A significant portion of students stated they have only occasional access to internet and devices. This may be due to unstable internet connections, limited device availability, or shared usage. Students with inconsistent access may struggle with online assignments, virtual classrooms, and digital resources.
- A minority of students reported having no access to high-speed internet or digital devices. This indicates a digital divide, which could hinder effective participation in online learning.

6.6. Findings & Analysis on The Most Valued Aspects of Traditional Learning

1. Face-to-Face Interaction with Instructors

A significant number of responses emphasize the importance of direct interaction with teachers. Traditional learning allows for real-time doubt clarification, personalized feedback, and immediate responses, which enhances comprehension and retention.

Significances:

- Direct, spontaneous interactions with instructors improve understanding.



- Teachers can adapt their teaching styles based on student responses.
- Mentorship and guidance play a crucial role in academic and personal development.

2. High Engagement and Focus

Traditional learning is often associated with higher engagement levels due to personal attention and structured classroom environments. This setting reduces distractions, leading to better focus and concept retention.

Significances:

- Live discussions keep students actively involved.
- Classroom learning encourages participation and attentiveness.
- Less reliance on digital distractions, allowing for better concentration.

3. Peer Interaction and Social Learning

The ability to collaborate with classmates and engage in group discussions is a defining strength of traditional learning. Social interaction enhances communication skills, teamwork, and collaborative problem-solving.

Significances:

- Spontaneous conversations with peers and instructors enhance learning.
- Group activities encourage teamwork and critical thinking.
- Provides access to shared resources and collective learning experiences.

4. Structured Learning Environment

A well-defined classroom setting instills discipline, routine, and accountability, ensuring that students stay on track with their studies. The structured nature of traditional learning supports habit formation and time management skills.

Significances:

- A fixed schedule helps in building consistency.
- Well-defined learning objectives ensure clarity and goal-setting.
- Encourages discipline and responsibility in students.

5. Hands-on and Experiential Learning

Traditional learning allows for physical engagement in learning activities, such as lab experiments, fieldwork, and hands-on projects. This tangible experience helps students understand complex concepts effectively.

Significances:

- Practical exposure through demonstrations and experiments.
- Reinforces learning through direct application.
- Encourages active rather than passive learning.

6. Personalized Attention and Mentorship

Unlike digital learning, traditional methods provide one-on-one interactions, helping students receive personalized guidance and individualized support from their professors.

Significances:

- Helps in identifying and addressing learning gaps.
- Teachers can provide motivation and mentorship.
- Builds long-term student-teacher relationships, fostering growth.



6.7. Findings & Analysis on The Most Beneficial Aspects of Tech-Integrated Learning

1. Accessibility and Ease of Information Retrieval

One of the most frequently mentioned benefits of tech-integrated learning is the ease of access to diverse resources. Technology enables students to retrieve vast amounts of information quickly and explore multiple sources for a deeper understanding.

Significances:

- Instant access to online lectures, e-books, research papers, and educational videos.
- Ability to learn anytime, anywhere, breaking geographical barriers.
- Multiple sources of information enhance understanding and provide different perspectives.

2. Flexibility and Time Efficiency

Many responses highlight the convenience and time-saving nature of tech-integrated learning. Digital tools allow students to learn at their own pace, revisit lectures, and manage their schedules more efficiently.

Significances:

- Self-paced learning accommodates different learning speeds.
- Saves time by eliminating travel and allowing quick access to study materials.
- Enables students to balance academics with other commitments.

3. Enhanced Visual and Interactive Learning

Tech-driven education offers multimedia-based learning through presentations, videos, simulations, and gamification, making the learning process more engaging and effective.

Significances:

- Visual learning aids in better retention of concepts.
- Interactive elements such as quizzes, animations, and simulations enhance engagement.
- Gamification techniques make learning enjoyable and encourage active participation.

4. Personalized and Adaptive Learning

Several responses emphasize the benefit of personalized learning experiences where technology tailors education based on individual needs and performance.

Significances:

- AI-driven learning platforms adapt to a student's pace and provide targeted lessons.
- On-the-spot feedback helps students correct mistakes instantly.
- Customized study plans improve efficiency and cater to diverse learning styles.

5. Improved Collaboration and Communication

Tech-integrated learning fosters better communication and collaboration, allowing students to engage in group discussions, virtual teamwork, and global interactions.

Significances:

- Online discussion forums and live Q&A sessions promote engagement.
- Students can collaborate on projects remotely.
- Peer-to-peer learning improves communication skills.

6. Skill Development and Future Readiness

Technology-based learning encourages the development of digital skills, preparing students for modern workplaces that rely heavily on digital tools.

Significances:

- Exposure to new-age technology like AI, data analytics, and automation.



- Hands-on experience with digital tools improves employability.
- Encourages critical thinking and problem-solving using tech-based solutions.

7. Instant Feedback and Academic Progress Tracking

Another highlighted benefit is the ability to receive immediate feedback, helping students track their learning progress and make improvements accordingly.

Significances:

- Automated assessments provide real-time results and insights.
- Students can identify areas of improvement quickly.
- Data-driven learning analytics help educators personalize instruction.

6.8. Findings & Analysis on Enhancing the Ideal Learning Experience

1. Balanced Learning Approach

A significant trend in the responses highlights the necessity of blending traditional and tech-integrated learning. Many respondents emphasize that while technology is crucial for efficiency and adaptability, traditional learning methods should not be abandoned. The combination of both ensures a structured yet flexible approach to education.

Significances:

- Equal importance to traditional and tech-based learning.
- Avoid over-reliance on technology.
- Adapt digital tools to complement, not replace, conventional learning.

2. Integration of Visual and Interactive Teaching Resources

Many responses stress the importance of engagement through visual and interactive teaching tools. Incorporating multimedia, interactive discussions, and real-world applications can enhance comprehension and retention.

Improvements Suggested:

- Use of videos, infographics, and animations for better conceptual clarity.
- On-the-spot doubt resolution to prevent learning gaps.
- Interactive and immersive technologies (like AR/VR) to create experiential learning.

3. Emphasis on Personalization and Adaptive Learning

A few responses emphasize the importance of self-paced learning and adaptive learning platforms. Students have different learning speeds, and personalized pathways can help cater to individual needs.

Proposed Enhancements:

- AI-driven platforms for customized learning.
- Flexible modules that allow students to progress at their own pace.
- Gamification techniques to enhance engagement and motivation.

4. Focus on Critical Thinking and Real-World Application

Several responses stress the need for critical thinking and practical applications rather than rote learning. The ability to solve real-world problems is crucial for an effective education system.

Ways to Improve:

- Case studies and problem-solving exercises to encourage analytical thinking.
- Project-based learning and industry exposure to bridge the gap between academics and corporate expectations.
- Encouraging creativity and innovation through open-ended assignments.



5. Collaboration and Classroom Engagement

Many respondents suggest that learning should be more interactive and engaging rather than passive consumption of information. Classroom activities and peer discussions play a crucial role in enhancing student participation.

Proposed Methods:

- Group activities, debates, and brainstorming sessions.
- Encouraging collaborative problem-solving and teamwork.
- Continuous assessment and feedback to track progress and improve learning outcomes.

6. Technology: A Supportive Tool, Not a Replacement

While technology is seen as a valuable asset, some responses caution against over-reliance on AI and automated tools, as they may not always provide accurate or contextualized answers. A structured human-guided approach with tech support is preferred.

Suggestions:

- Encourage students to analyze and validate AI-generated answers rather than blindly accepting them.
- Maintain a balance where teachers guide and technology assists.
- Ensure that digital tools are used for enhancement rather than replacement of traditional teaching.

7. Wellness and Holistic Learning

A few responses highlight the need for mental and emotional well-being to be integrated into the learning experience. Overburdened students may struggle with engagement and retention.

Recommendations:

- Incorporate wellness programs and stress management techniques into academic schedules.
- Encourage mindfulness and work-life balance for students.
- Design learning modules that reduce unnecessary pressure and promote holistic development.

8. Significance of the Study

This research provides valuable insights for educators, policymakers, and institutions to enhance curriculum design. By understanding students' perspectives, the study aims to bridge the gap between traditional and tech-integrated learning for a more effective and engaging educational experience. The analysis of engagement, motivation, and digital accessibility provides critical insights into the effectiveness of different learning environments. Here's why these findings matter:

- To develop an understanding of the impact of traditional vs. tech integrated learning environment on learning effectiveness
- To ensure equity and inclusivity in education
- To develop effective education policy and effective institutional decision-making
- To understand the future of Learning Models

VIII. LIMITATIONS

- The study focuses on students aged 18-21, limiting broader generalizability.
- Variability in technology access among students may impact findings.
- Differences in institutional teaching strategies may influence responses.
- Limited measurement of learning outcomes.
- Static data instead of longitudinal trends.

IX. RECOMMENDATIONS

- **For Traditional Classrooms:** Introduce interactive elements such as case studies, debates, and real-world applications to maintain high engagement.



- **For Tech-Based Learning:** Use adaptive learning tools, interactive assessments, and student collaboration platforms to enhance engagement.
- **Hybrid Model:** A blended approach leveraging both traditional and tech-integrated learning can help bridge the engagement gap.
- **Institutions Should Provide Support:** Colleges and universities could offer loaner devices, subsidized internet plans, or offline learning materials for students with limited access.
- **Encourage Offline Alternatives:** Recorded lectures, printed study materials, and asynchronous learning options can help bridge the gap for students without stable internet.
- **Improve Infrastructure:** Educational institutions can partner with telecom providers or government programs to enhance internet accessibility for students.

X. CONCLUSION

This comparative study highlights the strengths and challenges of traditional and tech-integrated learning. While traditional methods offer structured pedagogy and interpersonal engagement, tech-integrated learning enhances accessibility and flexibility. The study emphasizes the importance of a blended learning model, incorporating the best aspects of both approaches to create an optimal student learning experience. The findings support educators in designing student-centric pedagogies that enhance engagement and academic success.

Traditional learning is highly valued for its face-to-face interactions, structured environment, peer collaboration, and hands-on experiences. It fosters strong engagement, better focus, and personal mentorship, making it an essential component of an effective education system whereas tech-integrated learning offers unparalleled accessibility, flexibility, engagement, and personalization, making it a powerful tool for modern education. While it should be balanced with traditional learning methods, its ability to provide real-time feedback, interactive experiences, and global collaboration ensures an enriched and efficient learning process.

An ideal learning experience is one that effectively blends traditional and tech-based education, fosters engagement, encourages critical thinking, promotes personalization, and supports well-being.

By integrating practical applications, interactive resources, self-paced learning, and collaborative environments, educators can ensure that students develop real-world skills, adaptability, and lifelong learning habits.

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